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TILL GEOCHEMICAL DISPERSAL IN CENTRAL BRITISH COLUMBIA

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ABSTRACT

Till geochemical sampling was conducted on the CH, Blackwater-Davidson, and Uduk Lake mineral properties, on the Nechako River map sheet (93 F), central British Columbia and the results were used to compare glacial dispersal in areas of variable terrain. For each property, geochemical dispersal trains were typically elongated in the direction of the last major glaciation (045-060°). Although the dimensions of the dispersal patterns were different, these differences can be attribute to variations in glacier velocity and erosiveness and to variations in the size and type of mineralization of the bedrock source.

The geochemical dispersal patterns using C-horizon basal till sample media were compared to dispersal patterns using B or C-horizon soil samples, previously collected on each mineral property. The shape, magnitude and size of the dispersal trains were commonly different between the soil and till geochemical surveys. The basal till surveys were very effective at identifying geochemical anomalies. The soil surveys were also effective at identifying most of the geochemical anomalies, in soil samples overlying colluvium, till, and locally-derived glaciofluvial deposits. Soils overlying channelized glaciofluvial or glaciolacustrine deposits generally did not form dispersal patterns or identify local geochemical anomalies.

Results indicate that till geochemical anomalies on each property could have been identified by a regional till program with a sample density of 1 sample on a 2 km grid.

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INTRODUCTION

Late Wisconsinan Cordilleran glacial ice sheets covered much of British Columbia and deposited extensive blankets of glacial sediments. Where thick sediment cover obscures the bedrock, mineral exploration techniques such as soil and geophysical surveys may be unreliable. Supplementary exploration methods such as till sampling are often required to identify potential economic targets. Glacial sediments can only be used to this end provided the dynamics of local glacial dispersal are understood.

Glacial dispersal is the result of entrainment, transport and deposition of bedrock debris by glaciers. Bedrock debris occurs as geochemical and lithological components of matrix and clasts in till (*e.g.* Dreimanis and Vagners, 1971). High concentrations of these components can form distinctive aerial patterns that are identified as dispersal trains. The trains outline an area of "anomalous" concentration in the till. The patterns commonly trend parallel to the last, or most pronounced direction of ice movement (*e.g.* Shilts, 1976; Coker and DiLabio, 1989). Trains are frequently fan or ribbon-shaped zones of anomalous mineral and geochemical concentrations decreasing down-ice from mineral occurrences. The size of the dispersal train within the till is often many times larger than the original outcrop of mineralized bedrock because of debris mixing and dispersal within the glacier. As a result, till provides an excellent medium for geochemical exploration. Dispersal trains also contribute to understanding the dynamics of glacier flow (Hornibrook *et al.*, 1993).

Till is a poorly-sorted mixture of debris deposited directly by a glacier, with little or no influence by water or gravity (*cf.* Dreimanis and Lundquist, 1984). Till can be deposited from the glacial surface as supraglacial till; or deposited directly beneath the glacier, commonly after a short transport distance as basal till. Thus basal till, which consists of lodgement and melt-out till, is the best medium for target delineation. Consistent values of trace metal geochemistry are often found in the relatively homogenous fine-grained fraction of basal till (Dreimanis and Vagners, 1971). Because tills are 'first-derivative' products of bedrock, deposited by the movement of glaciers, till dispersal trains are relatively easy to trace back to the point of origin (Shilts, 1993). Second and third-order derivatives, such as glaciofluvial or glaciolacustrine sediments, have a more complicated transport history, often with several episodes of transport (Shilts, 1976). Identification of the source using glaciofluvial and glaciolacustrine sediments is more difficult and less accurate than with basal till.

PURPOSE AND SCOPE

A till geochemical sampling program was conducted in the 1994 and 1995 field seasons on the CH (93 F/7 and 93 F/8), Blackwater-Davidson (93 F/2), and Uduk Lake (93 F/12, 93 E/8) properties (Figures 1, 2). This detailed sampling program was completed in conjunction with a regional till survey (Giles *et al.*, 1995), as part of the Interior Plateau Mapping Project for the British Columbia Geological Survey.

The objectives of the current project were two-fold: firstly, to examine glacial dispersal and the effectiveness of till geochemical studies in locating zones of high mineral potential in areas of variable overburden thickness; and secondly, to compare the geochemistry of till samples with samples previously collected from the B- and C-soil horizons. Geochemical soil-sampling data from the selected properties were reviewed from property assessment reports to help delineate areas of anomalous concentrations that would merit further study.

Vertical profile sampling was completed in trenches on the Uduk Lake property. These samples were used to assess geochemical variability in the B and C soil horizons derived from till and other sediments and to examine three-dimensional dispersion in till.

PREVIOUS WORK

REGIONAL BEDROCK GEOLOGY

The regional geology of the Nechako River (NTS 93 F) map sheet was mapped by Tipper (1954) at a scale of 1:250 000. Recently, the Tsacha Lake (93 F/2) and Chedukuz Creek (93 F/7) 1:50 000 bedrock geology map sheets were completed by Diakow *et al.* (1995a, b).

The general stratigraphy underlying the properties is the same throughout the study area

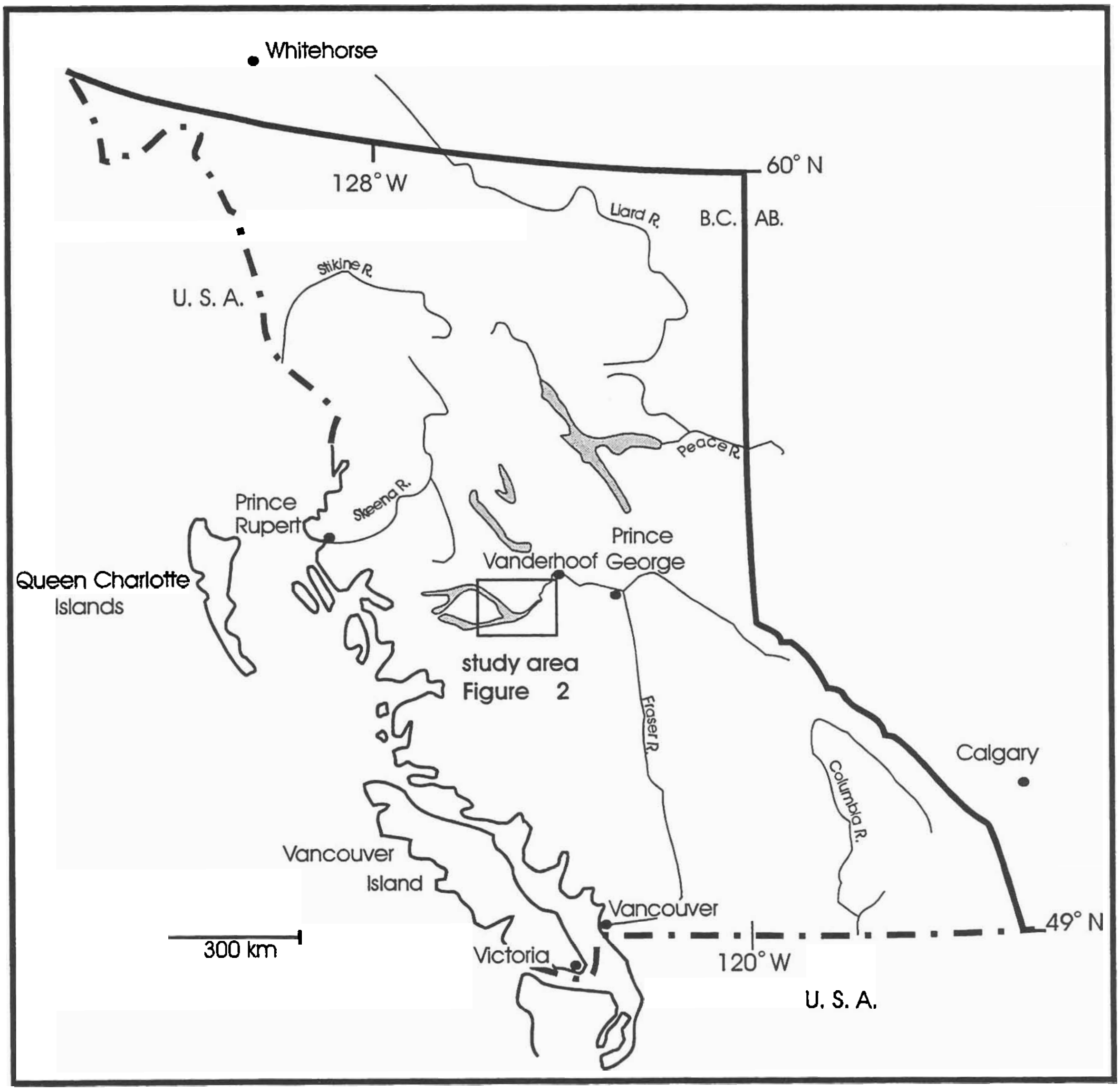


Figure 1: Location of the study area in the Interior Plateau, British Columbia, Canada.

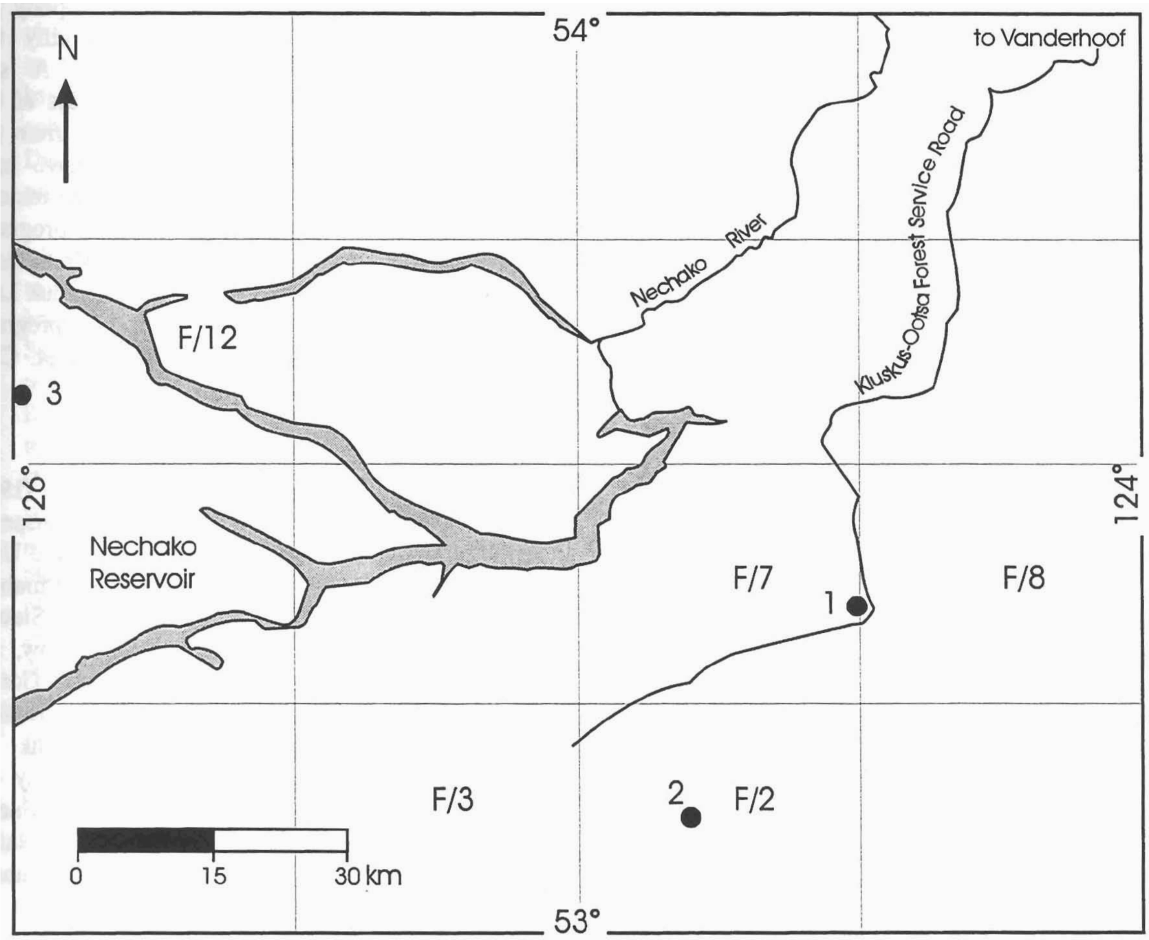


Figure 2: Location of 1: CH, 2: Blackwater-Davidson and 3: Uduk Lake mineral properties, Nechako River Map Sheet (93 F), British Columbia.

(NTS 93 F). Rare exposure of the basement rock forms part of the Stahini Group, a suite of volcanic rocks interbedded with argillite, greywacke and thin limestone beds of Upper Triassic age. This is unconformably overlain by volcanic and sedimentary rocks of the Hazelton Group. The Hazelton Group in the study area is subdivided into two informal map units, the Naglico and Entiako formations (Diakow *et al.*, 1995c). They consist of rhyolitic volcanic rocks interbedded with conglomerate, greywacke and shale beds of Lower to Middle Jurassic age. The Eocene age and younger Ootsa Lake Group, consisting of felsic to intermediate volcanic rocks, unconformably overlies the Hazleton Group and is in turn overlain unconformably by late Tertiary andesitic flows of the Endako Group (Diakow *et al.*, 1995c). Areas in the southern part of the map sheet are capped by the Miocene-Pliocene Chilcotin Group basaltic flows (Diakow *et al.*, 1995c). During the Late Jurassic to Early Cretaceous and also during the Eocene, granitic to dioritic intrusions were emplaced into the Hazelton Group (Diakow *et al.*, 1995c).

GLACIAL GEOLOGY

Reconnaissance mapping of the surficial geology of the Nechako River map area (NTS 93 F) at 1:250 000 scale was completed by Tipper (1971). The mapped area was glaciated with an inferred ice thickness of at least 1830 meters (6000'; Tipper, 1963). Depositional features indicate that ice flowed into the area, and did not form in the alpine highlands (Tipper, 1963). The last regional ice flow directions vary from 040° to 090°, with several indications of a southwestern source (Tipper, 1963).

Recent surficial geological studies in the region were completed by the British Columbia Geological Survey Branch in the 1993 and 1994 field seasons at the 1:50 000 scale. Levson and Giles (1994) mapped the surficial geology and Levson *et al.* (1994) conducted a till geochemical sampling program of the Fawnie Creek map area (93 F/3). Giles and Levson (1995) undertook a similar mapping project in the Tsacha Lake map area (93 F/2), as did Weary *et al.* (1995) in the Chedukuz Creek map area (93 F/7; Figure 2). O'Brien *et al.* (1995) reports on the preliminary work of the current study.

Reconnaissance mapping of the surficial geology was conducted on the CH mineral property by Edwards and Campbell (1992) to identify the unconsolidated materials on the property. A soil sampling program was conducted on parts of the CH claims, frequently sampling materials from the B-soil horizon. No glacial studies have been undertaken on the Blackwater-Davidson mineral property, although several soil-sampling programs were completed (Allen, 1992). Some basic surficial geology mapping was undertaken on the Uduk Lake property, as well as a soil sampling program, collecting C-horizon samples (Tupper and St. Clair Dunn, 1994).

ACKNOWLEDGEMENTS

This open file is based on O'Brien's (1996) M.Sc. thesis entitled "Till Geochemistry Dispersal Patterns at the CH, Blackwater-Davidson and Uduk Lake Mineral Properties, Central British Columbia." The authors extend gratitude to Andrew Stumpf, David Huntley, Steven Cook, Larry Diakow, and Tim Giles of the BCGS. Special thanks to Gordon Weary for assistance in the field and help in drafting the manuscript. The authors also thank the geologists of the properties where the study was completed: Peter Bradshaw of First Point Minerals (formerally Orvana Minerals) and prospector Nathan Kencayd; Dave Tupper and David St-Clair Dunn of Pioneer Metals; and Granges.

METHODOLOGY

FIELD METHODS

Mapping the surficial geology at each mineral property was completed during the 1994 and 1995 field seasons. Areas suitable for geochemical till sampling were initially identified on 1:60 000 aerial photographs. A total of 238 samples were collected on the mineral properties, and of these, 157 were basal till. One-hundred and seven samples were collected for the CH property, 41 for the Blackwater-Davidson, property, and 90 for the Uduk Lake property.

With the exception of the Uduk Lake property, where eight trenches were available for study, sample sites typically consisted of road-cuts and hand-dug pits often exceeding one meter in depth. Samples consisted of approximately 3-4 kg of sediment. Basal till (*sensu stricto*, Dreimanis, 1976) from the C-horizon was the preferred sample material. During sample collection, only a single till sheet was recognized, believed to be regionally consistent and representing deposition from the last glaciation (Tipper, 1963). Sample locations were plotted on topographic maps with the aid of aerial photographs; where possible sample locations were referenced to the property grids. Sample descriptions were recorded at each site noting the topographic position, aspect, slope, drainage, vegetation in the area, soil profile and additional identifying characteristics of the sample medium (*e.g.* sedimentary structures, clast content, and sample color, texture and density).

Local ice-flow directions were interpreted mainly from glaciated landforms identified on 1 to 60 000 aerial photographs, including crag-and-tail features, flutings and drumlins. These directions were confirmed at each study site by direct measurement of striae and landforms.

Till sample sites were sometimes located at sites with soil-geochemical anomalies (*e.g.* Edwards and Campbell, 1992; Allen, 1992; and Tupper and St. Clair Dunn, 1994). On the CH and Blackwater-Davidson properties, samples were preferentially collected on and down-ice of the area of highest mineral potential, as defined by previous property surveys. Till samples were collected directly up-ice from the inferred mineralization zones to confirm that the sources of the dispersal trains were not further up-ice than suspected by the individual property owners.

LABORATORY METHODS

The samples were prepared for analysis in the laboratory in the British Columbia Geological Survey in Victoria. Sample preparation involved air drying, splitting and sieving. Geochemical analyses of samples were performed on the silt and clay fraction (-62.5 µm) for precious metal, base metal, trace and rare earth elements. Thirty-five elements were analyzed by instrumental neutron activation analysis (INAA). Thirty elements were analyzed by induced coupled plasma atomic emission spectroscopy (ICP-ES). The geochemical data for the CH, Blackwater-Davidson and Uduk Lake mineral properties are presented in Appendix A, B and C, respectively.

DATA ACCURACY AND PRESENTATION

Field duplicates, analytical duplicates and standards were inserted into the data set to evaluate the quality of the geochemical till data and to test the field sampling procedures and the analytical techniques of the laboratory. The data were found to be accurate and reproducible for all elements except for gold. The problems in accurately measuring gold concentrations have been discussed in detail elsewhere (Kettles and Shilts, 1989). Reliable and reproducible geochemical analysis of gold in till is rarely achieved because gold has very low concentrations in till and because gold is susceptible to the nugget effect (Kettles and Shilts, 1989).

Geochemical data was contoured by hand. The surface till sheet was assumed to be continuous and interpolation of geochemical concentrations was assumed to be reasonable for distances of approximately 1 km between points of known values.

CH PROPERTY

DESCRIPTION OF THE SURVEY AREA

The CH mineral property, currently optioned to Orvana Minerals Corporation, is located approximately 90 kilometers south-southwest of Vanderhoof, British Columbia (Figure 2). The claims straddle the 93 F/7 and 93 F/8 map sheets, and cover an area of approximately 16 km^2, west of Chutanli Lake (Figure 3). The property is accessible from the Kluskus-Ootsa forestry service road at kilometer 99, south of Vanderhoof. Several short roads provide access to the property grid.

The CH property lies on the north flank of the Nechako Range, in the Interior Plateau. The area is characterized by gently undulating topography, dissected by glacial meltwater channels and containing abundant swamps and lakes. Local elevations range from 1100 meters (3600') to about 1340 meters (4400').

ALTERATION AND MINERALIZATION

The local bedrock geology for the CH claims area is presented in Figure 4. In the western half of the study area, the local bedrock was mapped at 1:50 000 scale for the 93 F/7 map sheet, (Diakow *et al.*, 1995b). Only regionally-mapped geology is available for the 93 F/8 map sheet, in the eastern portion (Figure 4; Tipper, 1954). Rock outcrops in the study area include the Hazelton Group; Lower and Middle Jurassic sandstones and siltstones with local outcrops of Middle Jurassic basalt and andesitic lava flows. The sedimentary unit of the Hazelton Group is intruded in places by late Cretaceous porphyritic diorite and by the Eocene age CH stock of granodiorite (Diakow *et al.*, 1995c). The eastern margin of the study area is underlain by Eocene to Oligocene andesitic and basaltic volcanic rocks from the Endako Group.

Mineralization on the property may be related to the hydrothermal system active during the emplacement of the Eocene age CH stock. Intrusion of the CH stock caused metamorphism, including hornfelsing of the country rock (Edwards and Campbell, 1992). Multiple episodes of alteration accompanied the emplacement of the stock including: propylitic, potassic, sericitic and siliceous (Edwards and Campbell, 1992). Several types of mineralization are present on the property including epithermal veins, late-stage quartz veining with sulphides and porphyry-type mineralization.

The April showing is located on the CH property (Figure 3). The occurrence is a vein of massive to semi-massive sulphides. A previous exploration program by Granges Incorporated uncovered sulphide veins containing lead, zinc and copper-bearing sulphide minerals in outcrop and in diamond drill core. The sulphide minerals identified in outcrop and in core are pyrite, magnetite, sphalerite, galena, arsenopyrite and minor chalcopyrite. The vein is steeply dipping and observed over an interval of 15 m, with a maximum thickness of 1.8 m (Lane and Schroeter, 1995).

Late-stage quartz and potassium-feldspar veins bearing copper are present in silicified andesitic rocks, likely from the Naglico Formation of the Hazelton Group, in subcrop and the trench on the central grid (Figure 3). The geologic setting responsible for this stage of mineralization is not known, but the amount of mineralization is considered to be minor (Edwards and Campbell, 1992).

The primary exploration target on the property is a porphyry-style quartz stock work containing copper with minor gold mineralization (Edwards and Campbell, 1992). Sulphide minerals associated with the quartz stock work are pyrite, magnetite and chalcopyrite. This mineralization has been reported in both intrusive and extrusive rocks on the property, likely in the CH intrusive stock and in the Naglico Formation (Hazelton Group) basalt and andesite unit. Defining the location and extent of the mineralized zone has been difficult and thus far, unsuccessful. Logging of the property has uncovered numerous local boulders containing sulphide mineralization in a biotite-hornblende granodiorite, likely the CH stock. Mineralized float was common on the main grid of the property including in a sulphide-bearing quartz stock work. Mineralized float was reported one kilometer down-ice of the mineralized outcrop (Edwards and Campbell, 1992),

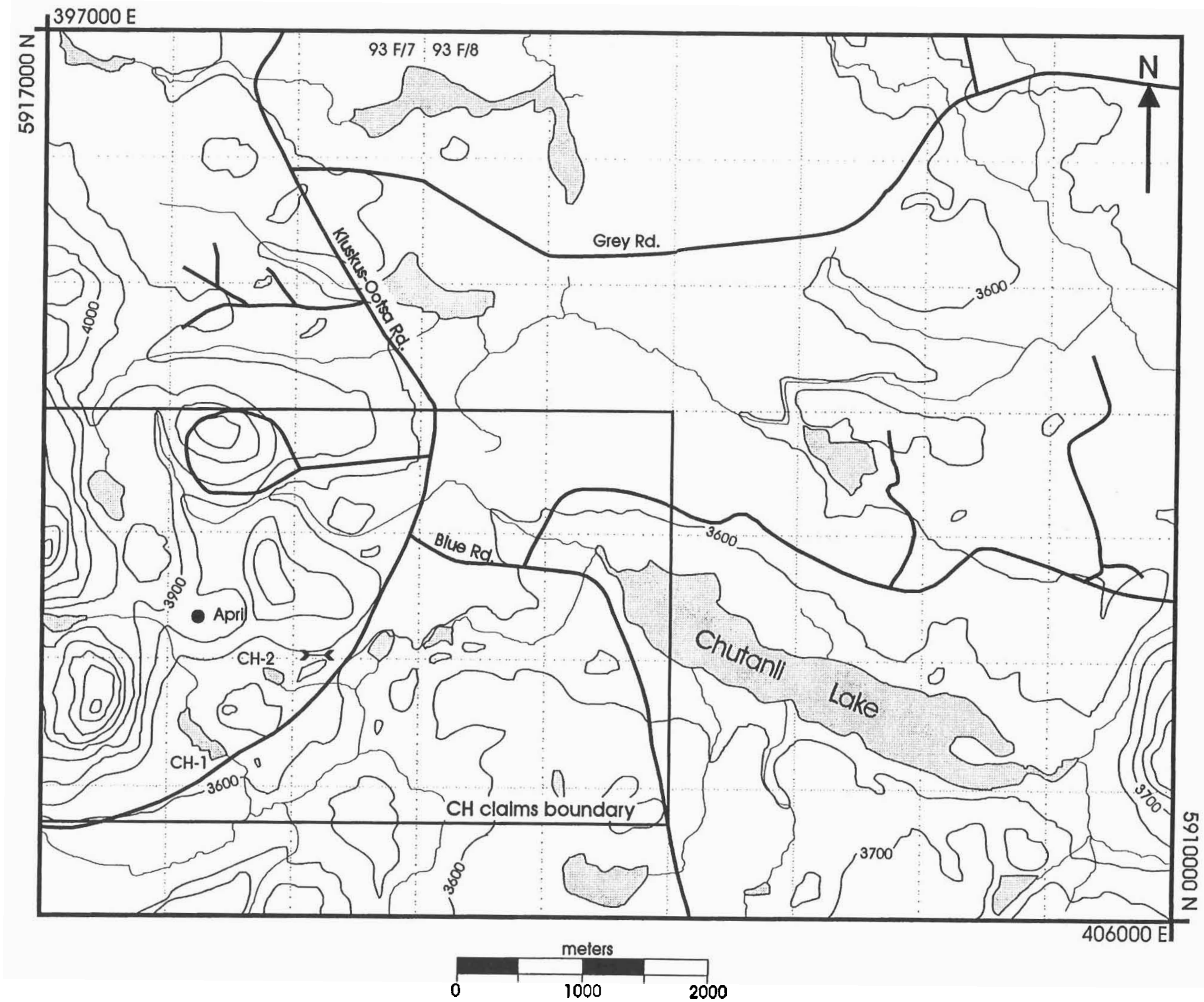


Figure 3: Location of the CH claims, April showing, the trench bearing mineralized bedrock, and the CH-1 and CH-2 lakes.

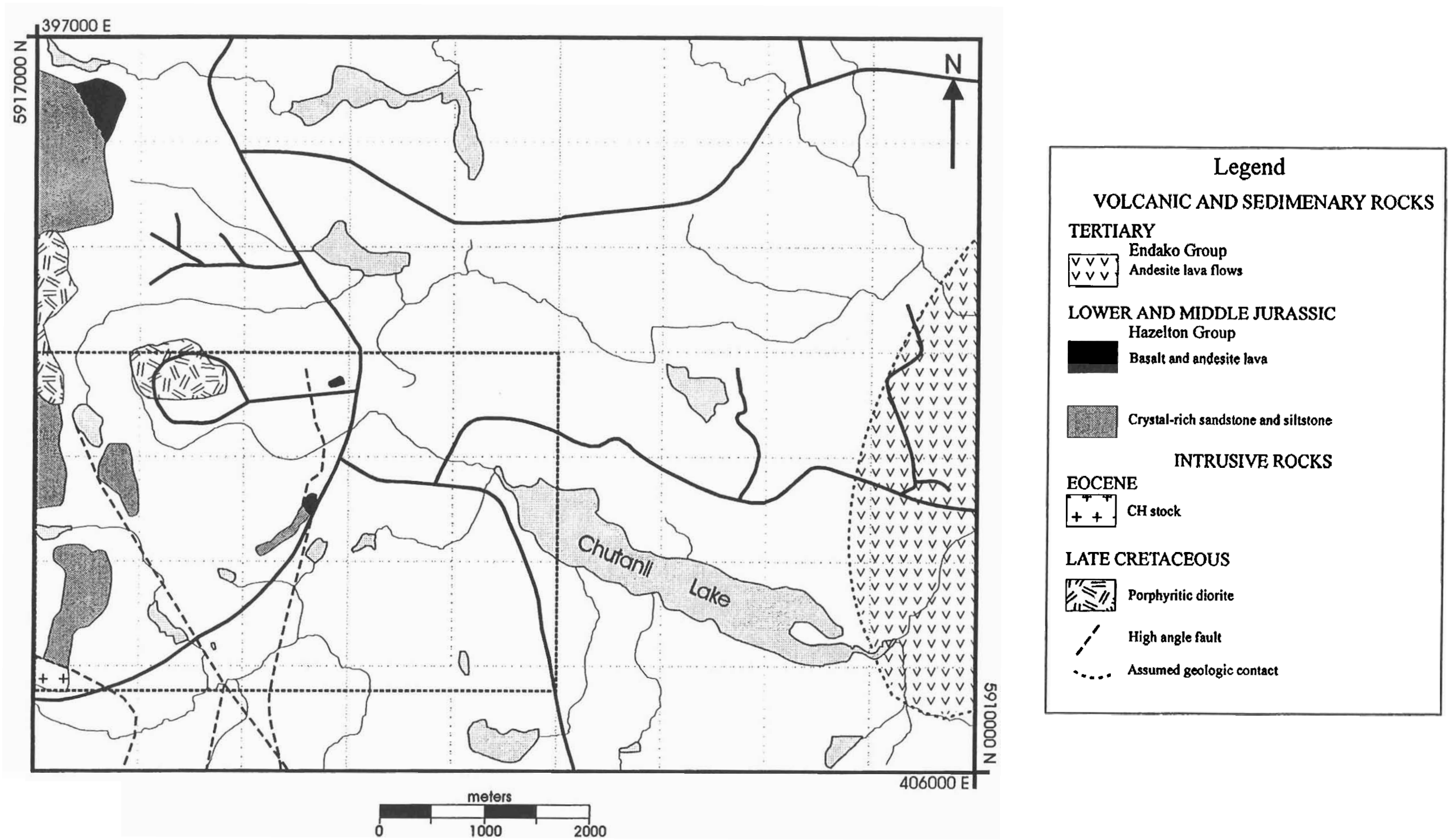


Figure 4: Bedrock geology of the CH area, after Diakow *et al.* (1995b) and Tipper (1963).

and was observed during this study as much as 5 km down-ice of the mineralized outcrop.

A geophysical survey was undertaken as part of Placer Dome's exploration program (Edwards and Campbell, 1992). Results of this survey identified an extensive, well-developed induced polarization (IP) anomaly trending northwest-southeast (Figure 5).

SURFICIAL GEOLOGY

Late Wisconsinan glaciation covered the property with thick deposits of till and meltwater debris, reported to be up to 45 m thick (Edwards and Campbell, 1992). The orientation of drumlins and flutings on the property indicate that the last major direction of ice flow was northeastward, at 055°.

The surficial geology of the CH claims was mapped in detail using 1: 20 000 aerial photographs, digitized in a GIS environment using CARIS software and printed from the CorelDraw graphics program (Figure 6). The majority of the property is overlain by glaciofluvial sand and gravel deposits. This unit is frequently over a meter thick and may be tens of meters thick in places. The glaciofluvial unit was deposited during glacial retreat and commonly occurs in channels, in hummocky or undulating topography or as a veneer or blanket overlying morainal deposits. Veneers of morainal and colluvial deposits overlie rocky uplands on the property. These deposits commonly consist of colluviated till with local angular clasts. Primary basal till is found mainly in the northern part of the property, especially west of the Kluskus-Ootsa forest service road (Figure 3).

From the observed geomorphology and the surficial deposits mapped on the CH property, part of the glacial history of the area could be interpreted. During deglaciation, large areas were inundated with meltwater and dissected by spillway channels (Weary, 1996). Deposits of glaciofluvial sand and gravel occur in and adjacent to the spillway channels and in large outwash plains. Small ice-dammed ponds allowed for the deposition of occasionally laminated silt and clay, often with sub-rounded dropstone pebbles. Silt deposits without dropstones occur with glaciofluvial units and may have formed in a fluvial overbank environment. Following glacial retreat, sediment gravity flows produced deposits of loose diamictons containing striated clasts that are found on the slopes and at the bases of topographic highs.

RESULTS AND INTERPRETATIONS

Sixty-six samples were collected on the CH claims and 22 samples were collected down-ice of the claims boundary (Appendix A). The average sample density of the claims area is approximately 4 samples per km^2 , but is as high as 15 samples per km^2 in the center of the property. Many locations on the claims area were overlain by over a meter of glaciofluvial deposits, which prohibited till sample collection.

PREVIOUS STUDIES

PREVIOUS STREAM AND LAKE SEDIMENT SURVEYS

Stream and lake sediments were sampled on and near the molybdenite-chalcopyrite-pyrite Chu showing, located approximately 3 km east of the CH claims (Mehrthens, 1975). The Chu is a porphyry-type deposit consisting of disseminated sulphides with Mo in a stockwork matrix. Molybdenum anomalies were reported down-stream of the mineralized bedrock and in lakes which received drainage from the mineralized area, including several small lakes on the CH claims (Mehrthens, 1975). A Mo soil anomaly was detected up to 2 km down-ice of the showing. Since the anomaly trends parallel to ice-flow direction, it was suggested the anomaly is ice transported debris, deposited in basal till (Mehrthens, 1975).

Lake sediment sampling was completed in two small ponds (CH-1 and CH-2) on the CH claims and in Chutanli Lake (Figure 3; Cook and Luscombe, 1995). Results from this study (Cook, 1996) indicate the presence of elevated concentrations for Mo, As, Sb, Au and Zn, compared to lake geochemistry from the regional data set (Cook and Jackaman, 1994). Lake CH-1 contained anomalous values for Zn, the source for which is likely the April showing and surrounding area. Lake CH-2 contained elevated concentrations of Mo and As. Chutanli Lake contained anomalous values for Mo, As and Sb. Arsenic values were noted for their particularly high values in Chutanli Lake. Gold plots in Chutanli Lake suggest the possibility of a source draining from the south. Results from the lake sediment sampling survey suggest there are multiple mineralization sources in the CH area, since the anomalies vary in character for each lake. Possible sources include the Chu Mo prospect, the April

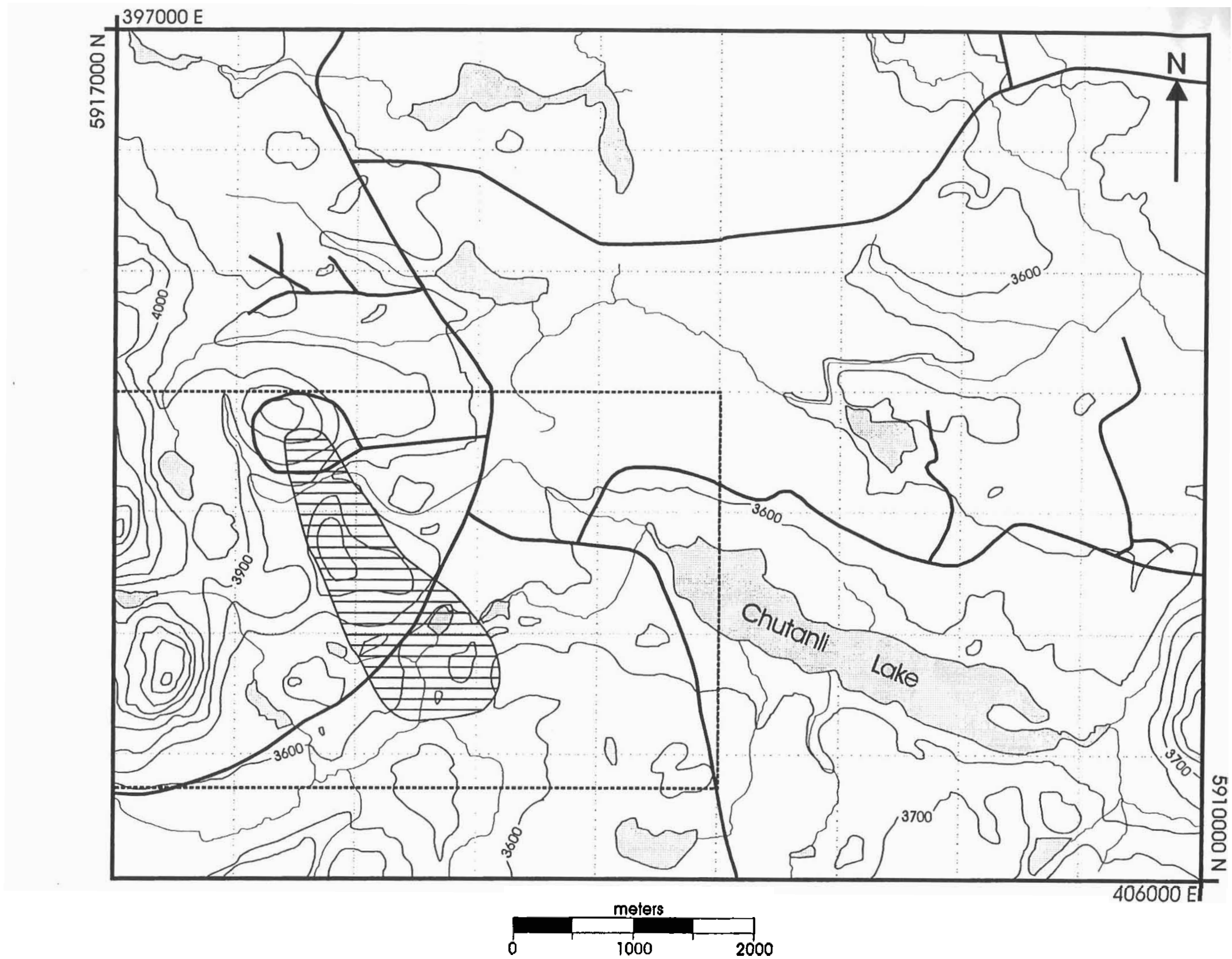


Figure 5: Magnetic induced polarization (IP) chargeability anomaly, CH claims.

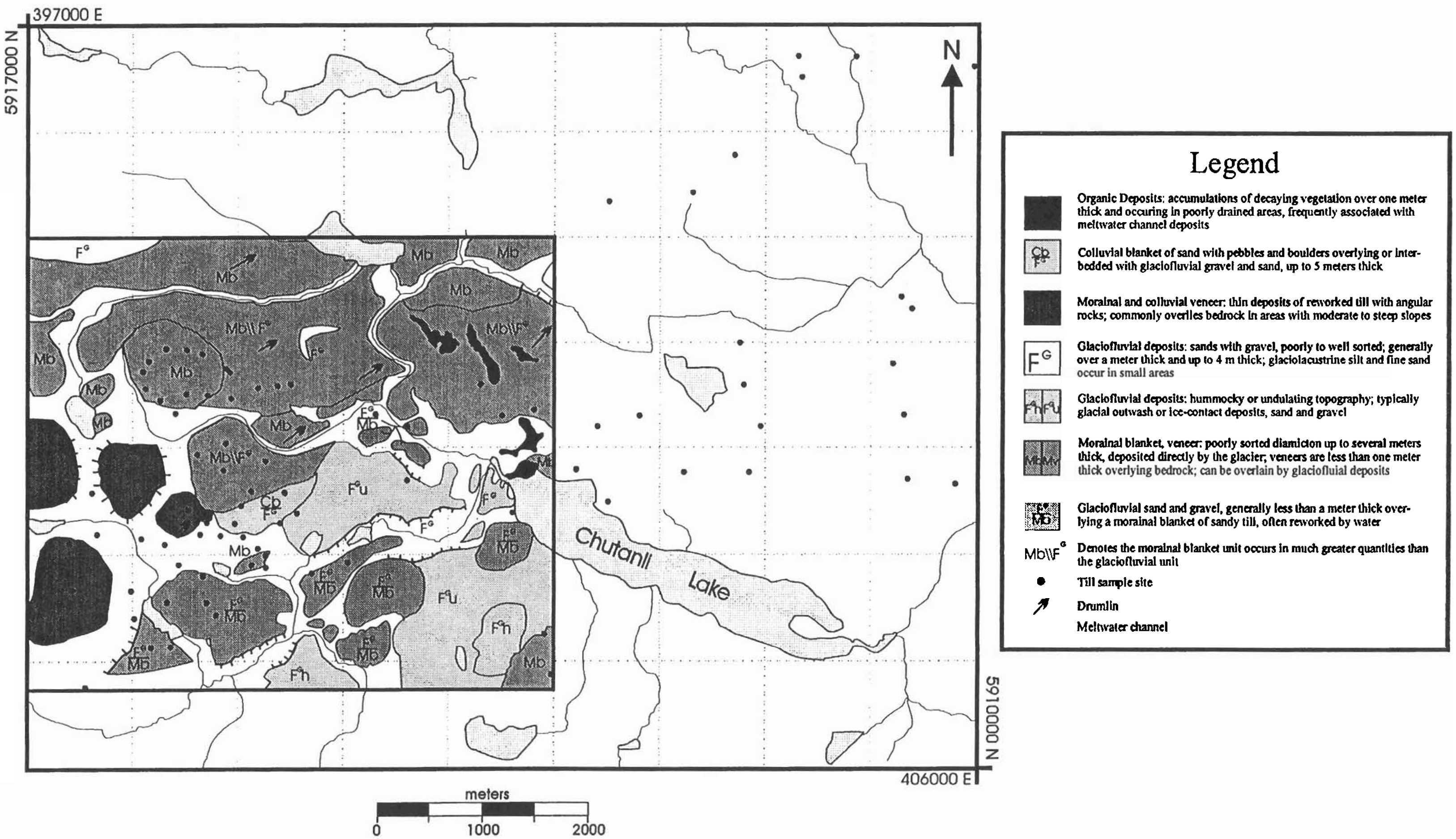


Figure 6: Surficial geology and location of basal till sample sites, CH claims area.

showing, the poorly-defined CH showing and possibly a new source, south of Chutanli Lake.

PREVIOUS SOIL SURVEY

During the 1991 field season, 789 soil samples were collected mainly from the B-soil horizon (Edwards and Campbell, 1992). Samples were collected from a depth of between 10-100 cm, at an average depth of 30 cm. Grid lines were spaced 100 m apart and samples collected every 40 m. The fine sand, silt and clay fractions (-177 µm) were analyzed by ICP for 30 elements and gold was analyzed by INA.

The results of the soil sampling program produced elongate, multi-element dispersal trains, trending roughly parallel to ice-flow (Edwards and Campbell, 1992). The geochemical dispersal trains are commonly several hundred meters wide and can be up to 2 km long. These dimensions are considered to be typical for dispersal patterns in the Nechako Plateau (Levson and Giles, 1995). The threshold value for 'anomalous' soil samples for the 1991 CH data was chosen from results of a previous survey (Warner and Cannon, 1990). The threshold values, when converted to a ranked percentile, vary for different elements. Threshold values are similar for Cu and Zn (84%), Au (83%), Pb (80%) but is higher for Ag (90%) and is lower for As (74%).

The soil survey outlines three areas of interest. The first anomalous area is defined by dispersal patterns that occur in the central claims area. The multi-element geochemical dispersal trains are approximately 0.4 km wide and extend down-ice for over 1 km for Au, Cu, Pb, Zn, Ag, and As (Figures 7-12, after Edwards and Campbell, 1992). Most of the highly anomalous (>95th percentile) soil samples occur in this area. The source for these dispersal patterns may be mineralized bedrock exposed in part in a trench in the center of the main grid, which contains magnetite, chalcopyrite and pyrite (Figure 3).

The shape and location of the anomaly patterns in the central claims area are very similar except that Ag forms a smaller dispersal pattern (Figure 11) and As forms a larger pattern (Figure 12) than the Au, Cu, Pb and Zn dispersal patterns (Figures 7-10). Since anomalous soil values for Ag was defined as the top 10 percentile, Ag will inherently have a smaller pattern than the other element analyzed (top 16-20th percentile). Similarly, As will have a larger dispersal pattern, since the top 26th percentile was defined as anomalous. A second reason to account for the smaller dimensions of the Ag dispersal pattern, compared to the Au, Cu, Pb and Zn anomaly patterns, is that regional Ag geochemical values are typically low. For example, Ag values are often just above the detection limit of 0.1 ppm in till (Levson *et al.*, 1994; Weary, 1996). The soil anomaly pattern for As (Figure 12) is slightly more extensive than the Au, Cu, Pb and Zn dispersal patterns. Anomalous As values are encountered 1 km up-ice of the Au, Cu, Pb and Zn dispersal patterns, intersecting approximately with a northwest-southeast trending fault (Figures 4, 12). The As anomaly also extends further to the northeast, located 200 m down-ice of the multi-element anomaly from the central grid area.

The second area of anomalous soil concentrations occurs close to the April showing (Figure 3). The April showing consists of lead, zinc and copper sulphides in veins. Lead, Zn and As form anomaly patterns on, east, and north of the April showing forming a train almost 1 km long (Figures 9, 10, 12). The Pb anomaly follows the drainage pattern, therefore, Edwards and Campbell (1992) suggested that the anomaly shape may be due to hydromorphic dispersion. Downslope dispersion of the soil anomaly may also be due to reworking or meltwater washing, since the April showing is located on a gentle slope and the surficial deposits in the area are glaciofluvial sand and gravel (Figure 6).

The third and smallest anomalous area for Pb-Ag-As occurs approximately 1 km northwest of the large multi-element anomaly on the central grid area (Figures 9, 11, 12). The source of this anomaly has not been identified, and may represent undiscovered mineralization, as suggested by Levson and Giles (1995).

RESULTS FROM THE TILL SURVEY

Results from the till geochemical survey are used to examine glacial dispersal patterns in the CH area. Contour plots of the till data are presented for the six elements (Au, Cu, Pb, Zn, Ag and As) analyzed for the soil survey and also for Sb. Geochemical data from the Chedakuz Creek (93 F/7) regional till sampling program (Weary, 1996) was used to define elemental anomalies on the CH claims as values ranking in the top 25th percentile (Rose *et al.*, 1979). Commonly, concentrations for a detailed property grid are expected to be much higher than

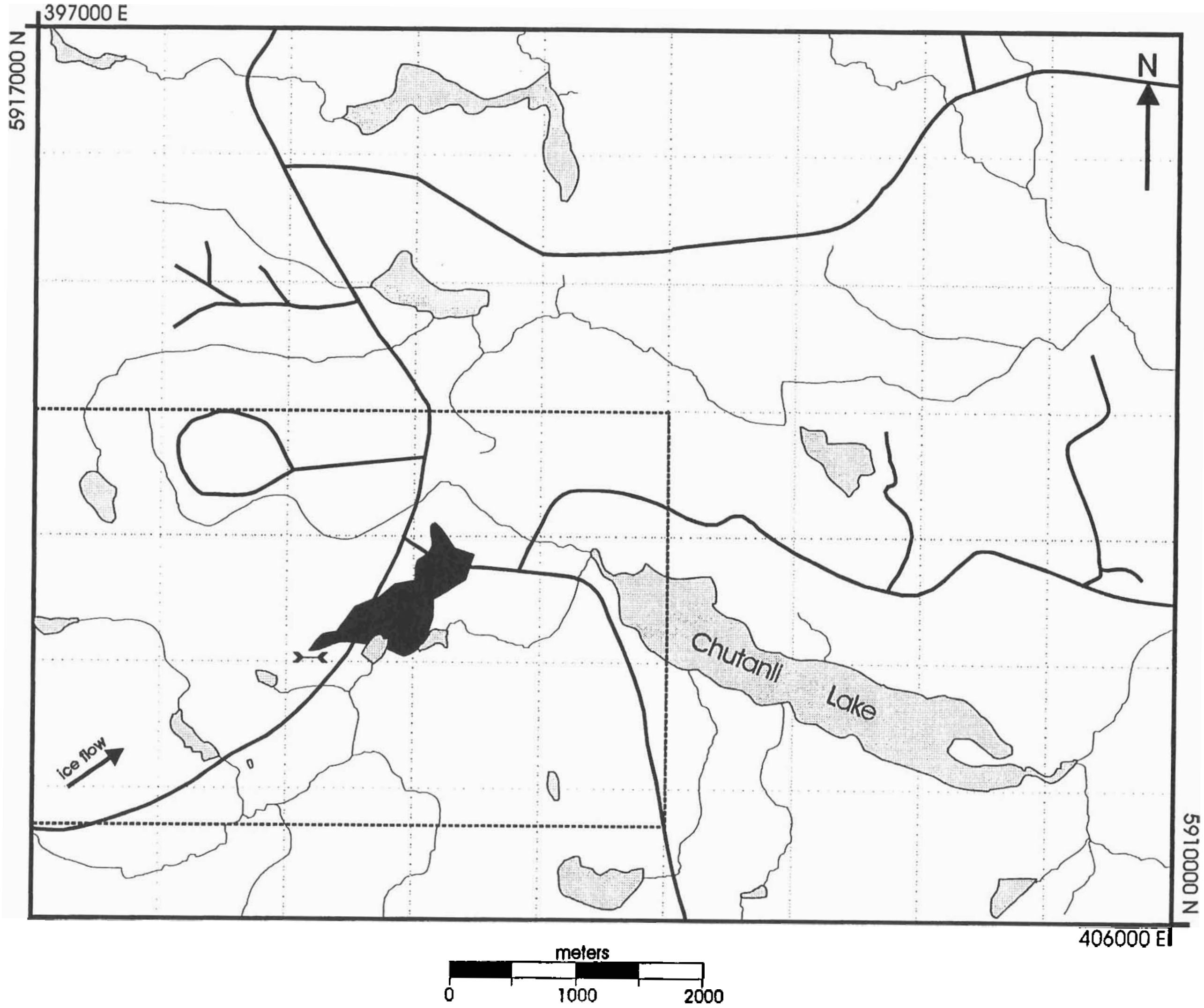


Figure 7: Soil dispersal anomaly pattern for gold (Au) over 6 ppb, dark pattern on the CH claims (Edwards and Campbell, 1992).

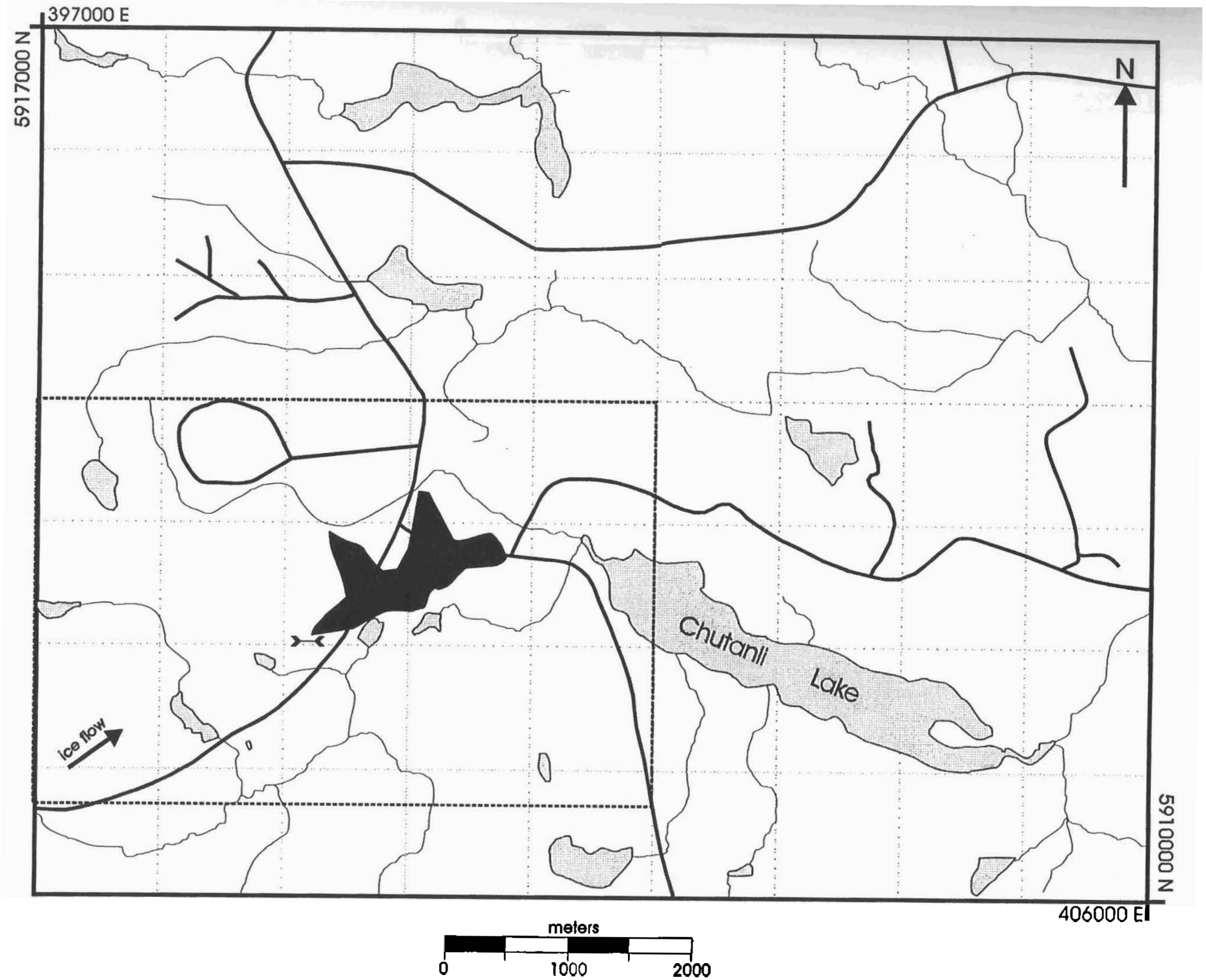


Figure 8: Soil dispersal pattern for copper (Cu) over 82 ppm, dark pattern on the CH claims (Edwards and Campbell, 1992).

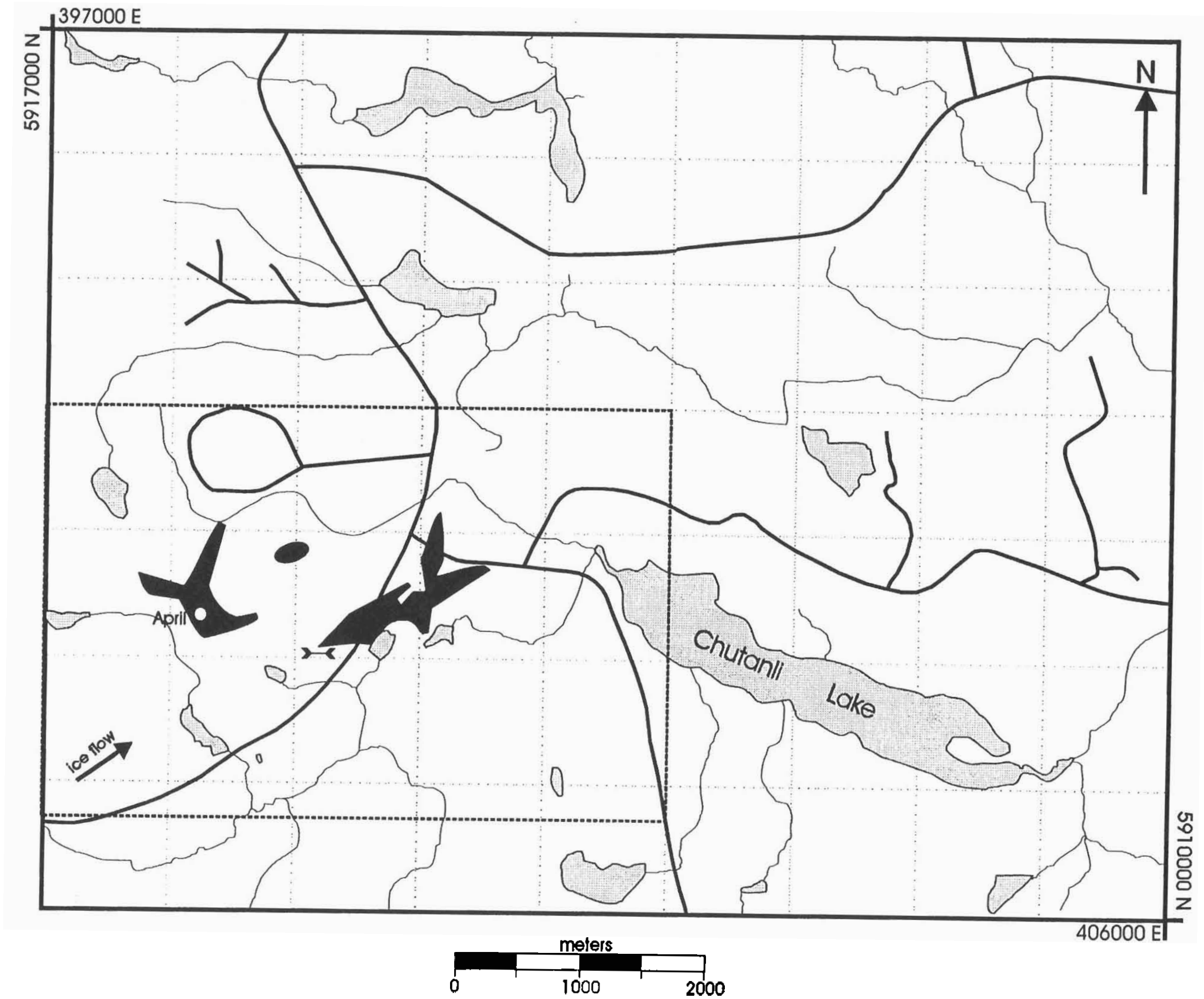


Figure 9: Soil dispersal pattern for lead (Pb) over 28 ppm, dark pattern on the CH claims (Edwards and Campbell, 1992).

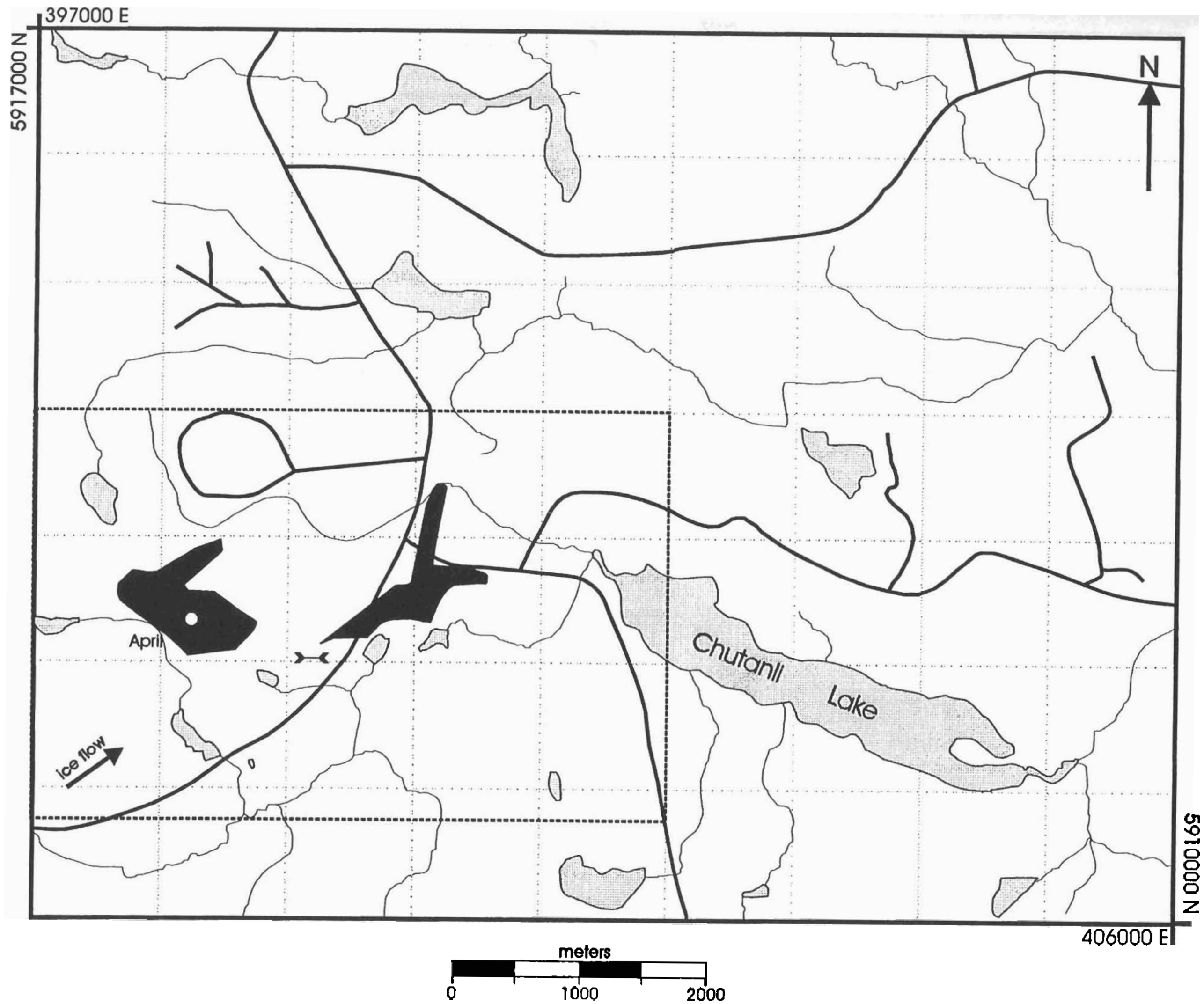


Figure 10: Soil dispersal pattern for zinc (Zn) over 120 ppm, dark pattern on the CH claims (after Edwards and Campbell, 1992).

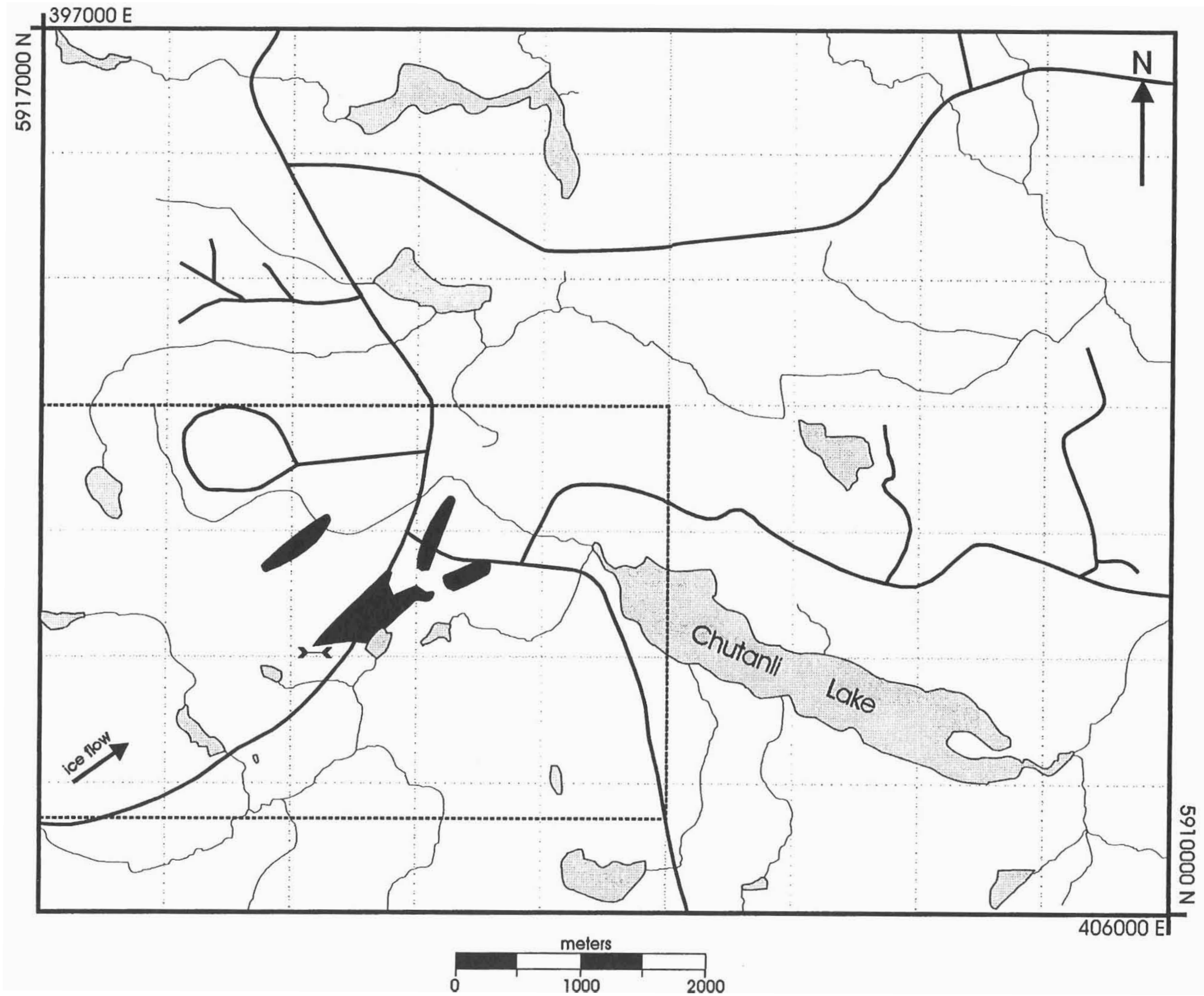


Figure 11: Soil dispersal pattern for silver (Ag) over 0.6 ppm, dark pattern on the CH claims (Edwards and Campbell, 1992).

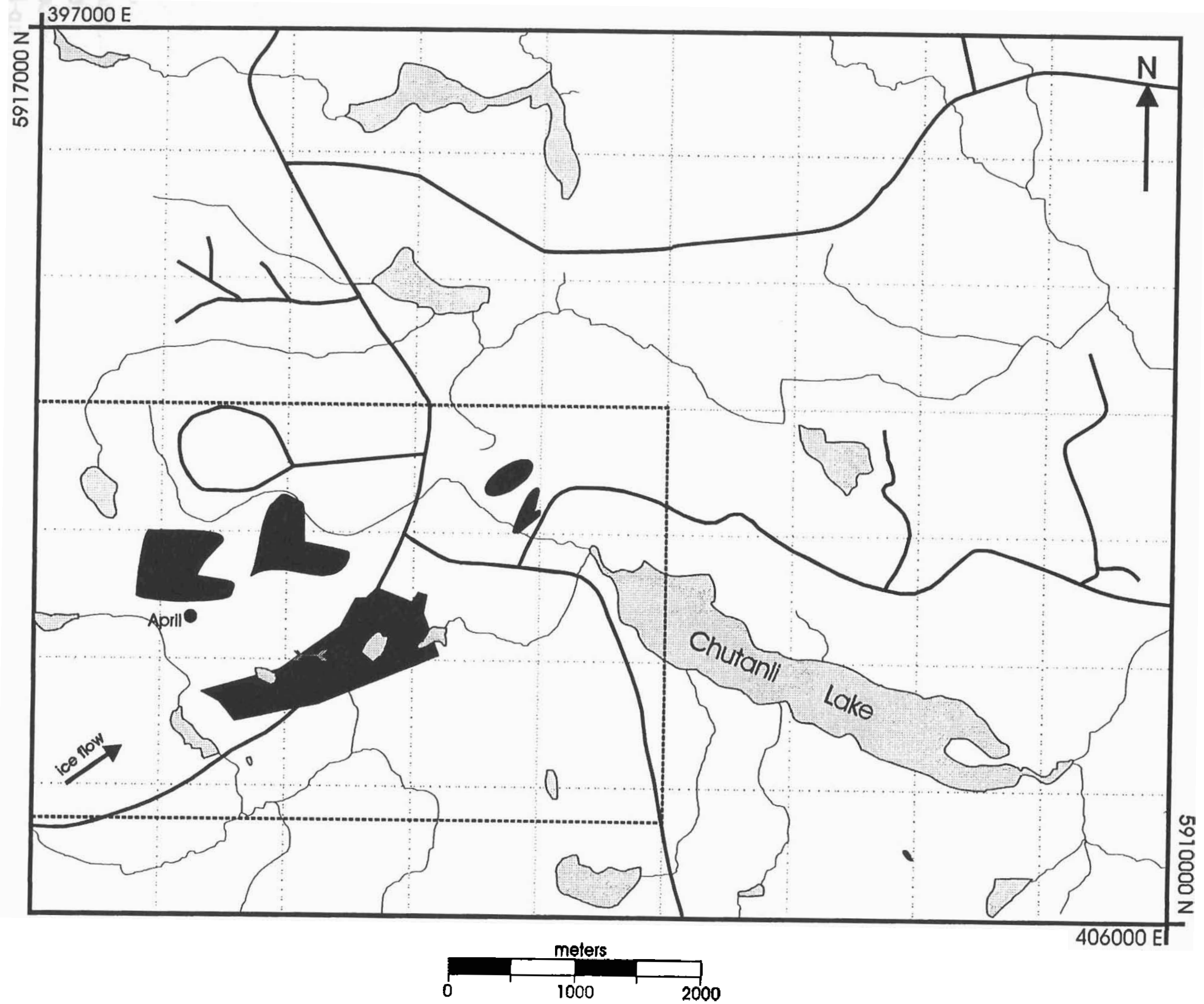


Figure 12: Soil dispersal pattern for arsenic (As) over 37 ppm, dark pattern on the CH claims (Edwards and Campbell, 1992).

those in a regional data set since samples are taken on a closely spaced grid over a known mineral occurrence. Thus, till samples from the detailed study on the CH claims are defined as anomalous for the regional set, not the CH claims. The value for the 75th percentile for the regional set was chosen as the lowest contour interval for the plots (Weary, 1996). Hence, samples with values falling within the lowest contour effectively outline "anomalous" values for the regional set. The purpose of this is to demonstrate the effectiveness of till sampling in identifying areas of potential mineralization.

Results from the till survey outline a coinciding multi-element anomaly which extends down-ice, parallel or sub-parallel to ice-flow direction, for up to 10 km. Similar to the soil survey, elemental anomalies help define areas with high mineral potential. The three areas with anomalous concentrations defined in the soil survey are also anomalous for the till survey. A fourth anomalous area was defined by the till survey, on a recently cut logging road on the northern border of the property.

COPPER

Spatial plots of copper concentrations define an elongate dispersal train 1-3 kilometers wide extending down-ice for 7.5 km (Figure 13). The dispersal anomaly pattern forms a train which begins in the central grid area, on the crest of a drumlin. The train is relatively thin but fans out towards the northeast, in the down-ice direction. Values at the head of the train are very anomalous (> 200 ppm), but within a kilometer fall to less than 100 ppm. Values above the regional 75 percentile (40 ppm) are encountered as much as 7.5 km away from the head of the anomaly.

Copper produces two other smaller anomaly patterns in till. The first smaller anomaly is situated on a small hill and its flanks, on the western border of the property, near the April showing (Figure 3). It consists of seven anomalous samples located 2 km up-ice of the head of the primary dispersal train. The second smaller anomaly, occurs on the northwestern border of the property on the new logging road. This anomaly consists of eleven samples and was essentially undetected by previous studies. Both of these smaller anomalies have similar values between 40 and 70 ppm. These patterns show that these areas contain anomalous Cu values, but Cu is not likely the main type of mineralization.

LEAD

The spatial plot for anomalous Pb concentrations (Figure 14) forms a similar pattern as Cu (Figure 13), except it is longer and narrower, especially at the down-ice end, and it extends further to the west. The Pb dispersal pattern forms a train with the head of the anomaly beginning on the hill on the western edge of the property, near the April showing (Figure 3) and continues down-ice for 10 km, to the most distal sample (Figure 14). The Pb dispersal train remains relatively thin and ribbon shaped. Values at the head of the anomaly are not the highest encountered. The highest geochemical concentrations were recorded from samples in the trench on the central grid (123 ppm, Figure 3) and on the crest of a drumlin 100 m southwest of the trench (55 ppm). Moderately anomalous samples (21-49 ppm) are also concentrated near the trench (Figure 14). Several kilometers down-ice of the highest values, till samples have concentrations above the 75th percentile for the regional set (10 ppm) and are up to 45 ppm.

The small anomalous area, as defined by the Cu values, in the northwestern edge of the claims area (Figure 13) is also anomalous for Pb (Figure 14). Twelve samples define this anomalous area, with four Pb samples above 50 ppm. Lead is likely a significant mineral related to local mineralization, since values are very high. No dispersal trains were produced for this showing since samples were not collected immediately down-ice of this area. However, very distal samples 5 km down-ice are above the 75th percentile for regional data.

ZINC

Spatial plots for Zn geochemical values form an anomaly pattern which is considerably shorter than that for Cu and Pb. The anomalous area begins northwest (up-ice) of the April showing and is elongated for 5 km towards the northeast (Figure 15). The dispersal pattern forms a train which separates in two ribbon-shaped trails. The head of the anomaly, near the April showing, contains some of the most elevated Zn values for the area. However, other highly anomalous Zn values for the claims area (351, 282, 279 ppm) occur up-ice, south and on the April showing (Figure 15). The down-ice dispersal train is not as well developed for Zn. Several sample sites occur as isolated anomalies and are encountered as far as 9 km from the head of the anomaly. Very anomalous values are also

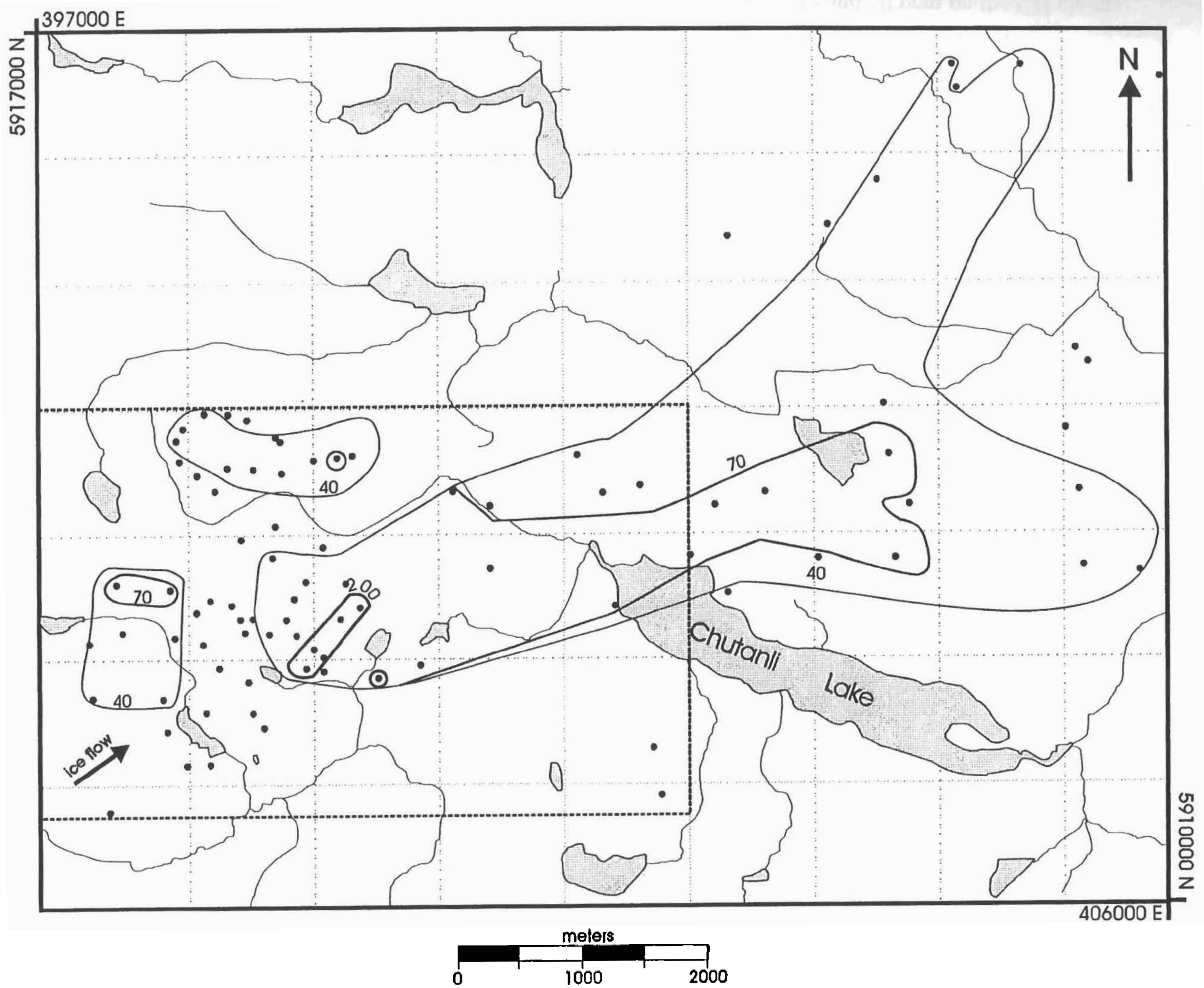


Figure 13: Till dispersal anomaly pattern for copper (Cu), contoured at 40, 70 and 200 ppm on the CH claims.

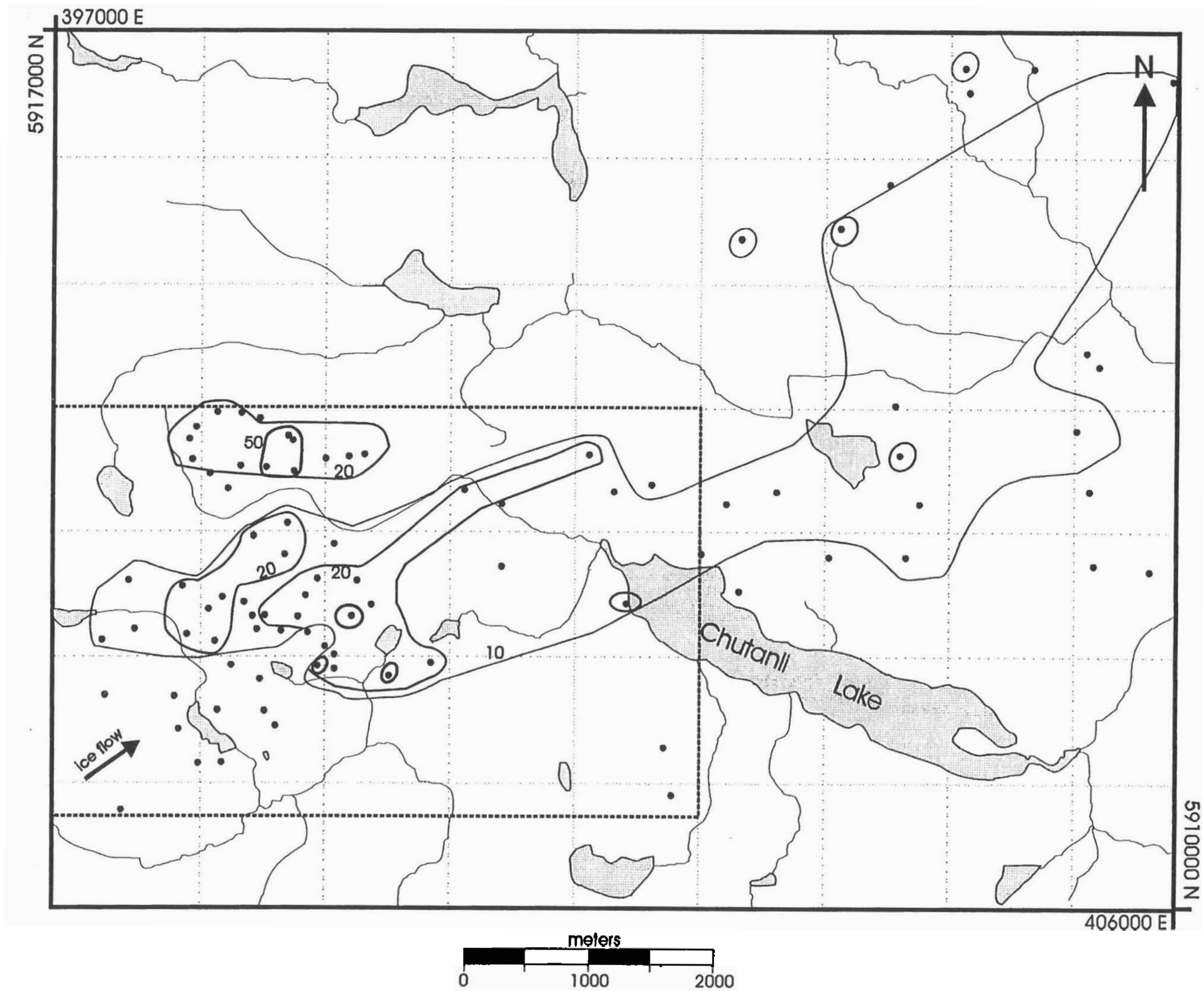


Figure 14: Till dispersal anomaly pattern for lead (Pb), contoured at 10, 20 and 50 ppm on the CH claims.

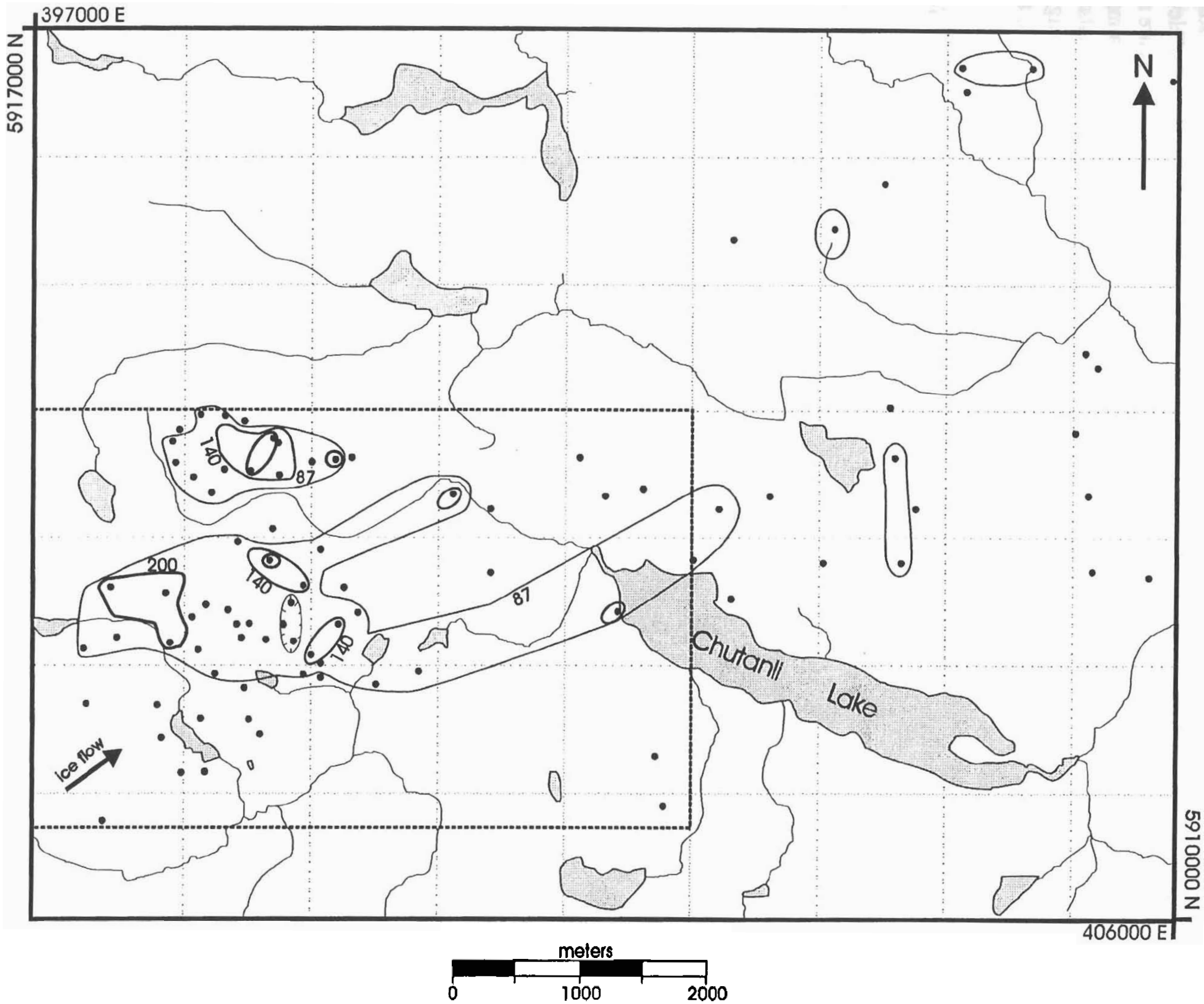


Figure 15: Till dispersal anomaly pattern for zinc (Zn), contoured at 87, 140 and 200 ppm, CH claims.

encountered in the northwestern edge of the property (237, 254 ppm, Figure 15), coinciding with the Cu-Pb till anomaly (Figures 13, 14).

SILVER

The spatial plots for Ag do not show a well-defined down-ice dispersal train (Figure 16). The highest values are encountered in the northwestern edge of the claims area (9.0, 6.0, 1.2 ppm) and south of this area (1.7 ppm). Samples from the central grid area are also anomalous (1.3, 1.2 ppm). The dispersal trains for Ag are poorly-defined because values are too low. Values considered to be in the top 75th percentile for the regional set are 0.3 ppm, which is just above the detection level of the analytical instruments (0.2 ppm).

ARSENIC

The spatial plot for As extends down-ice for 7 km (Figure 17). The dispersal anomaly pattern forms a train which begins near the April showing, and reaches a maximum width of almost 2.5 km (Figure 17). The dimensions of the As anomaly train is particularly extensive because nearly 60% of the till samples in the CH area are defined as "anomalous" on a regional basis. The highest As values are dispersed throughout the central claims area, including the highest value of the data set (183 ppm; Figure 17). Other highly anomalous As values are encountered near the April showing (71 ppm) and east and south of the Kluskus-Ootsa forest service road (Figure 3; 100, 59, 144 and 72 ppm). Arsenic has, for both the till and soil surveys, highly anomalous values (>95th percentile) further down-ice than the other elements analyzed. This may be attributed to an additional or different mineralized source or because a larger population was defined as anomalous for both the soil and till surveys.

GOLD

Spatial plots for Au indicate the till anomaly extends down-ice of the central claims area for over 6 km (Figure 18). Very anomalous samples occur erratically, but moderately anomalous samples are concentrated in the same area. The highest values occur in the trench (Figure 3) and adjacent to it, in the central claims area (85 and 84 ppb). An isolated sample on the top of the hill on the western edge of the property records the third highest Au value of 79 ppb. Eight samples over 20 ppb Au occur in the central claims area.

ANTIMONY

The Sb anomaly pattern forms a dispersal train which extends down-ice for approximately 7 km (Figure 19). The head of the dispersal train begins near the April showing. Very high Sb concentrations were encountered in the study area: the central grid area contained the most elevated Sb values (24, 14 and 9.5 ppm), and values are also very anomalous in the northern edge of the claims (12, 12 and 11 ppm). Several samples near Chutanli Lake also have anomalous concentrations, as high as 8.3 ppm. Up-ice of the main dispersal pattern, all of the till samples have background values.

COMPARISON OF THE TILL AND SOIL GEOCHEMICAL SURVEYS

In a soil sampling survey, the sample medium may vary from soil developed over a variety of surficial sediments including: colluvium, till, glaciofluvial or glaciolacustrine sediments. In addition, the B-horizon has been altered by pedogenic processes. Thus, when interpreting geochemical anomalies in soil, it may not be possible to discriminate between anomalies due to mineralization and anomalies caused by soil pedogenic processes or hydromorphic dispersion. For these reasons, geochemical data from a soil sampling program may be difficult to interpret (Levson *et al.*, 1994).

The dispersal patterns of C-horizon glacial till samples were compared with dispersal patterns of B-horizon overburden soil samples. The contoured geochemical data has somewhat similar patterns for the CH claims area, in locations where data for both sample media were available. The main difference between the two data sets arises from differences in each set's definition of "anomalous." The 75th percentile of regional geochemical statistical values was chosen for the till survey, but percentile ranked values for the soil survey varied between 74-90%. Consequently, the anomalous area for the till survey is generally much larger compared to the anomalous area for the soil survey.

Another caveat when interpreting soil data is that small (<25 samples) geochemical soil anomalies, may not appear to be significant with respect to other anomalies, and could be disregarded. For example, soil samples collected on the CH claims, overlying a small knob on a recent logging road in the northwestern area of the claims (Figure

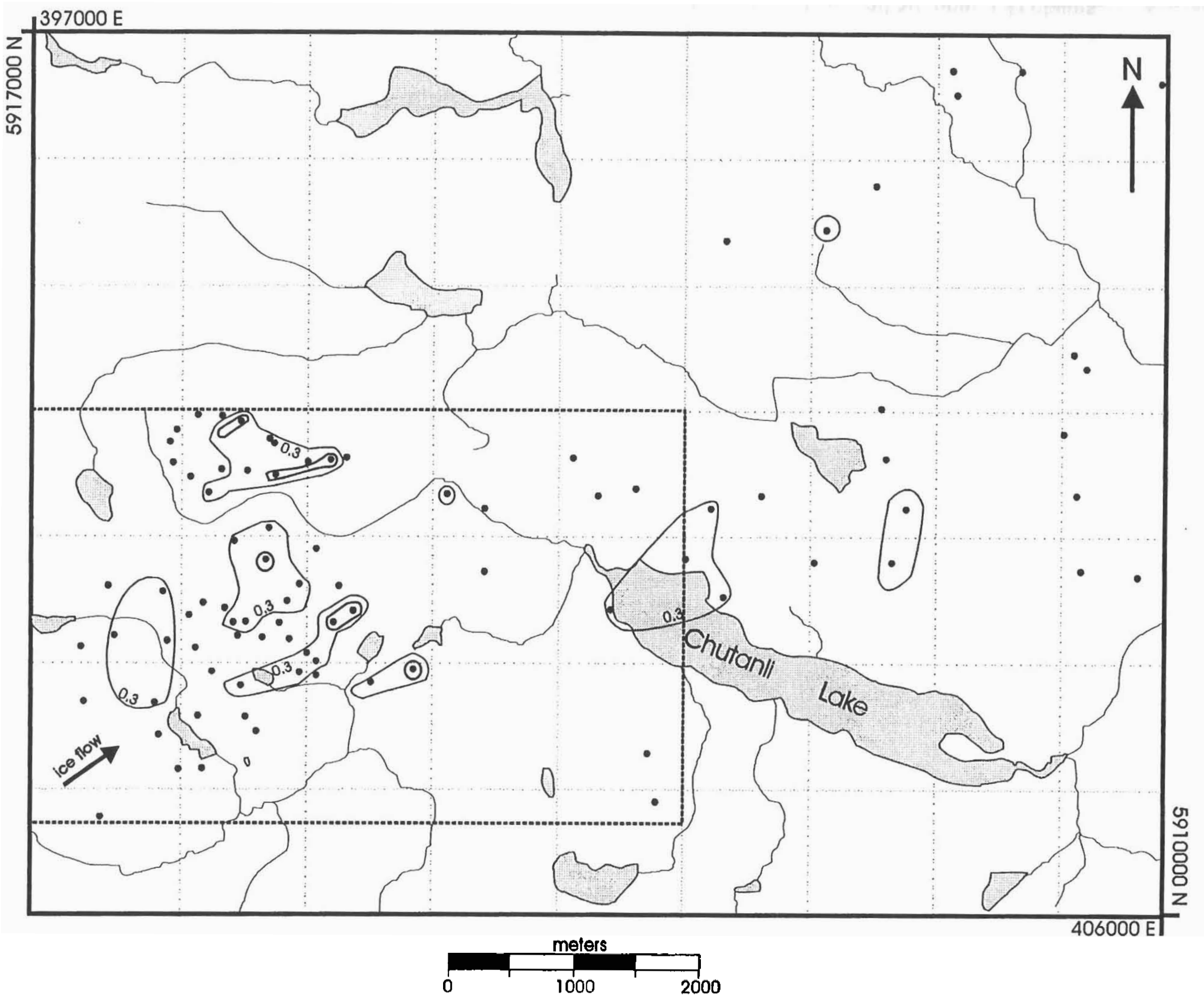


Figure 16: Till dispersal anomaly pattern for silver (Ag), contoured at 0.3 and1 ppm, CH claims.

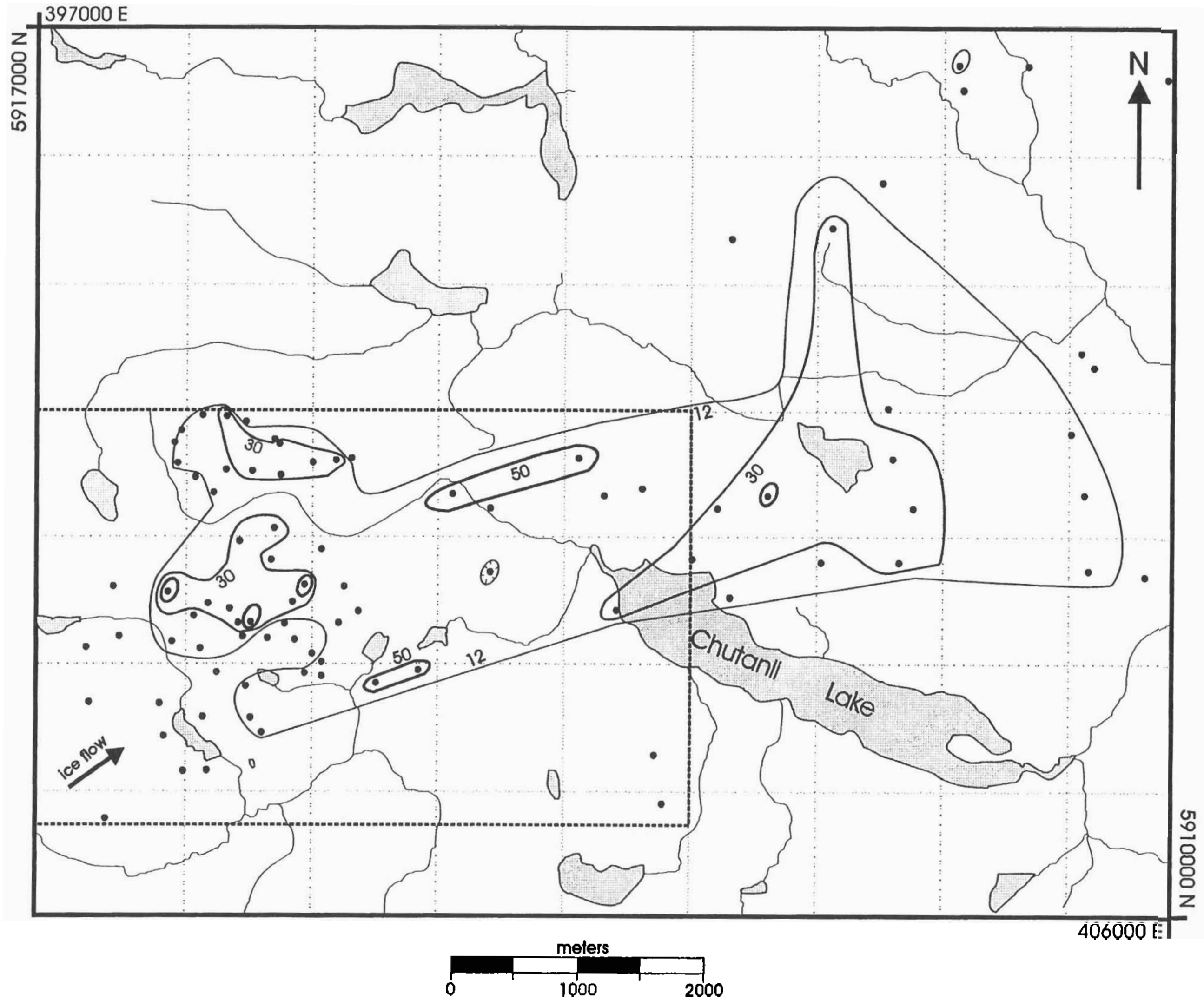


Figure 17: Till dispersal anomaly pattern for arsenic (As), contoured at 12, 30 and 50 ppm, CH claims.

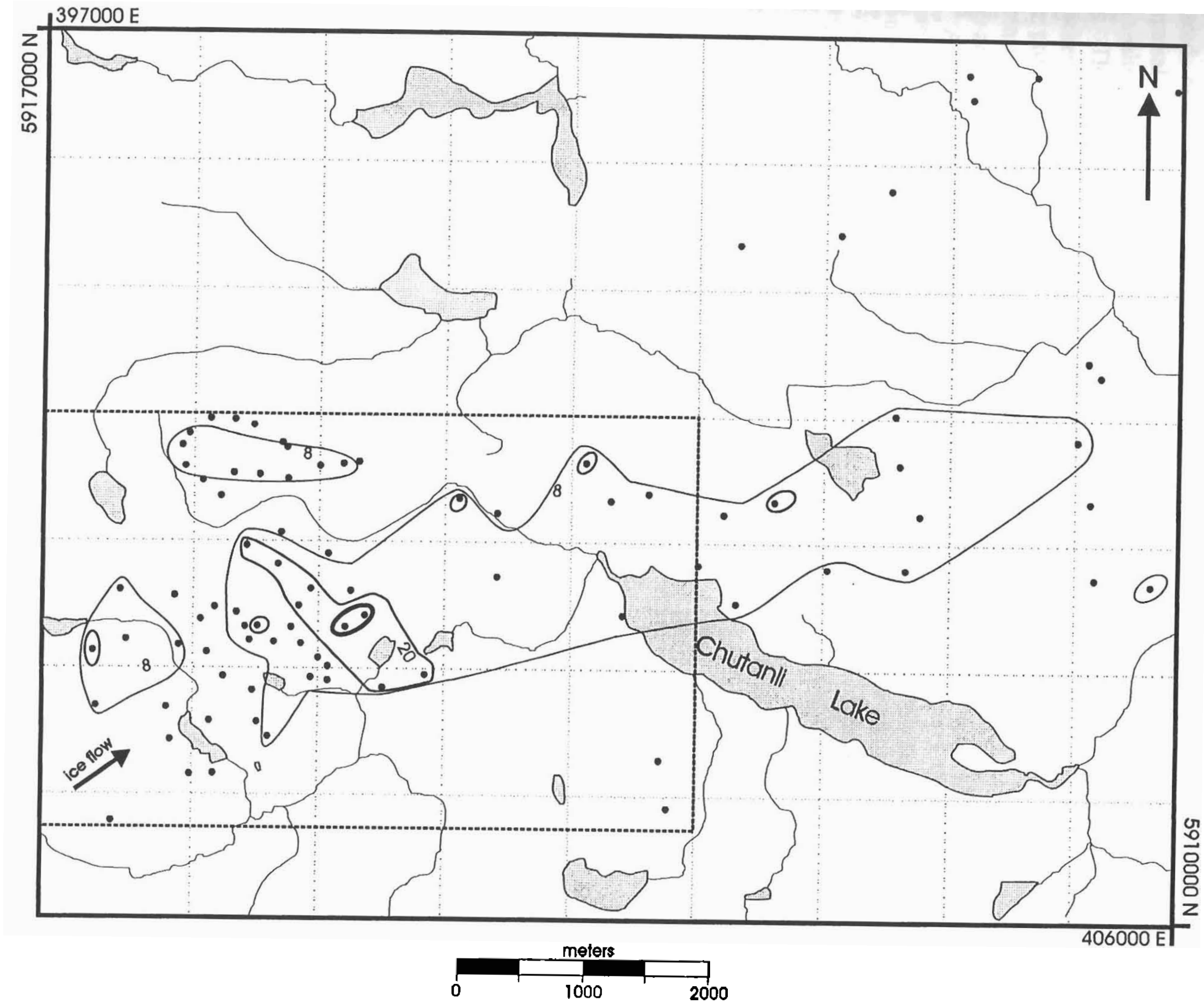


Figure 18: Till dispersal anomaly pattern for gold (Au), contoured at 8, 20 and 50 ppb, CH claims.

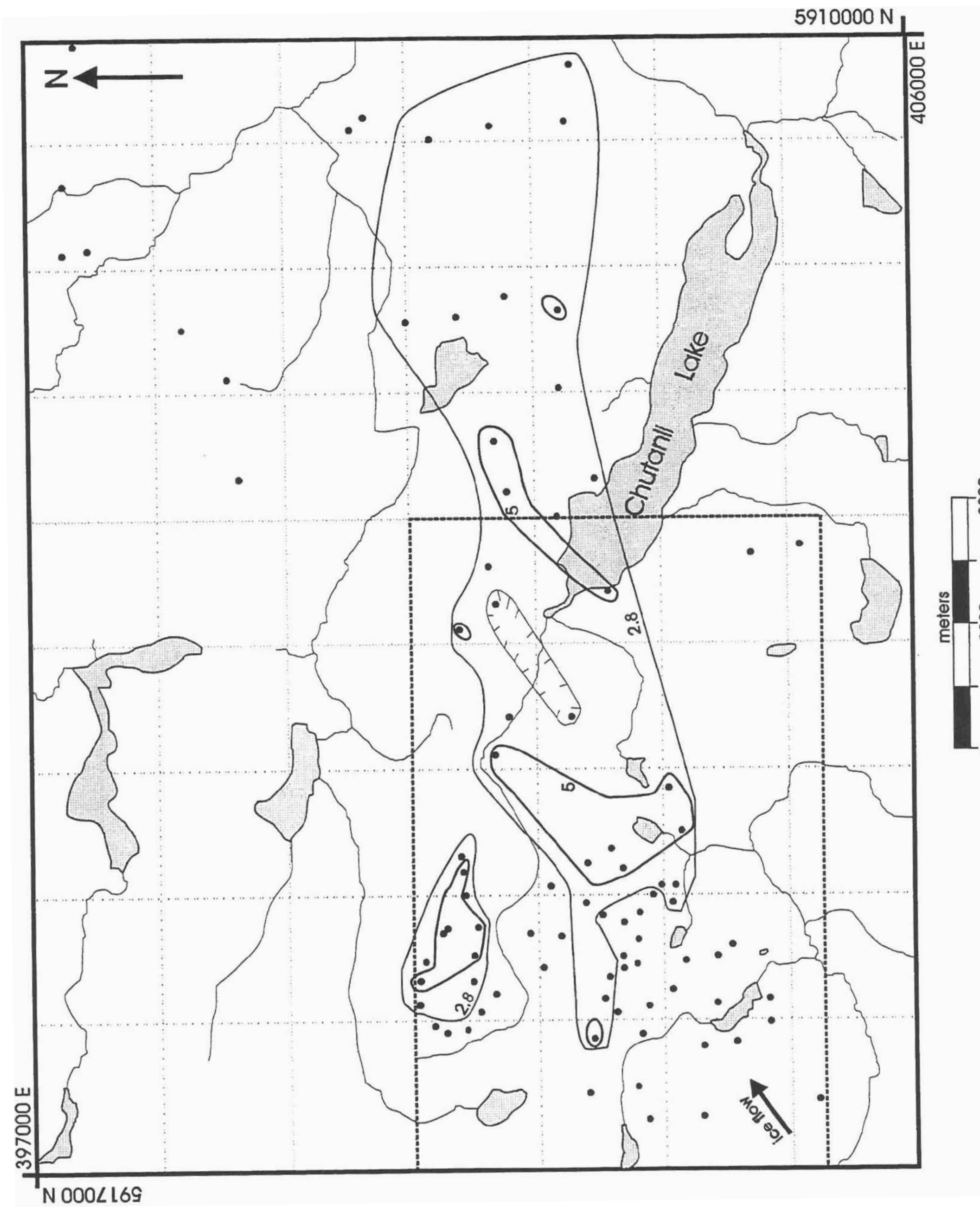


Figure 19: Till dispersal anomaly pattern for antimony (Sb), contoured at 2.8 and 5 ppm, CH claims.

3) returned anomalous values for the following elements: Pb, Zn, Ag and As. This area was not contoured or identified as anomalous, likely because these smaller anomalies appeared insignificant compared to large (>100 samples) soil anomalies. Sixteen samples were collected in the till survey, spaced more widely apart. Till geochemical dispersal trains formed coinciding multi-element anomalies for Pb, Zn, Cu, As, Ag ± Au (Figures 13-18). The till survey, therefore, established that geochemical anomalies in the northwestern edge of the property are significant because (1) of their extensive sizes, (2) their magnitudes and (3) because they are multiple geochemical anomalies.

A third difference between the soil and till contour plots is perceived in the shape of the anomalies. For instance, the Zn, As ± Pb till anomaly begins on the April showing and is elongated down-ice for several kilometers (Figures 15, 17, 14). The geochemical values fluctuate in the till and the values suggest more than one source. The soil anomaly for Zn, As and Pb (Figures 10, 12, 9) is more abrupt than the till anomalies. Where the soil anomaly ends, glaciofluvial deposits are found in a meltwater channel (Figure 6). The channelized glaciofluvial deposits are likely responsible for the low values in the soil survey. Similarly, the extensive multi-element till dispersal train in the central grid area is more extensive than the multi-element soil dispersal train. The average length of the soil geochemical dispersal train for Au, Cu, Pb, Zn, Ag and As (Figures 7-12) is 1 km, whereas, the till dispersal train is approximately 5 km for Cu, Pb, Zn, Ag, As, Au and Sb (Figures 13-19). The continuous pattern of the geochemical till anomaly demonstrates that anomalies can be detected over a greater distance from the source using basal till samples than can be detected by soil samples. It further demonstrates that indiscriminate soil sampling can give misleading results. That is, the soils data is strongly influenced by the nature of the underlying surficial material.

BLACKWATER-DAVIDSON PROPERTY

DESCRIPTION OF THE SURVEY AREA

The Blackwater-Davidson property, owned by Granges Incorporated, is located approximately 150 kilometers south-southwest of Vanderhoof, British Columbia at 53°11' north, 124°48' west (Figure 2). The claims lie on the 93 F/2 map area. Access to the property from Vanderhoof is by the Kluskus-Ootsa forest service road to kilometer 146. An access road suitable for four-wheel-drive vehicles continues eastward for approximately 18 kilometers to the property grid. Access to the property is difficult and only a few minor tracks made during a drilling program cover part of the Pem claims, which is the area of active exploration (Figure 20). Extensive glaciofluvial deposits prohibited sampling of till in and adjacent to meltwater channels during foot traverses.

Blackwater-Davidson is situated on the north slope of Mount Davidson, in the Fawnie Range of the Interior Plateau. The area is characterized by gently undulating highlands, dissected by numerous meltwater channels. Elevations range from 1565 meters (4500') to 1861 meters (6107') at the peak of Mt. Davidson.

ALTERATION AND MINERALIZATION

The bedrock geology of the Blackwater-Davidson area is presented in Figure 21. The study area was mapped at 1: 50 000 scale for the Tsacha Lake map area (93 F/2; Diakow *et al.*, 1995a). Despite the sub-alpine terrain on the top of Mount Davidson, bedrock exposures on the property are limited because of the extensive overburden cover (Figure 22). Bedrock exposed in the study area occurs mainly on the peak and flanks of Mt. Davidson. Tertiary volcanics from the Ootsa Lake Group, ranging from rhyolitic to andesitic in composition occur as flows and tuffs, and may be associated with volcaniclastic rocks. The geologic setting for the Blackwater-Davidson prospect may be similar to other Au or Ag prospects in the region, in that mineralization may be related to the emplacement of the Quanchus Intrusions (Allen, 1992). Sulphide mineralization on the property is associated with phyllic to potassic or kaolinite alteration of felsic and intermediate volcanic rocks, with secondary quartz common. Irregular mineralization on the Pem grid consists of pyrite, sphalerite, tetrahedrite, and arsenopyrite (Allen, 1992). Gold and silver mineralization zones were defined from drill core samples and were not contained within one lithologic unit. A highly altered kaolinized outcrop occurs in the southwest area of the claims, but contains no sulphide minerals (Figure 20).

SURFICIAL GEOLOGY

In the Mount Davidson area, the ice-flow direction was determined from glacial flutings oriented at approximately 045°. Slight deviations were observed in upland montane areas, where the ice masses were initially forced around the mountain rather than flowing directly over it, similar to other mountains in the Fawnie Range (*cf.* Tipper, 1963). This type of interference with glacier flow often results in complex dispersal patterns (Hornibrook *et al.*, 1993).

Most of the area has thick (> 2 m) glacial deposits except for the upper 500 feet on Mount Davidson which is covered with a thin veneer of colluvium. Other than the slopes of Mount Davidson, which are covered by a mixture of till with colluvium, the map area is underlain by lodgement and melt-out till deposits. The till deposits are frequently incised by meltwater channels and sporadically covered by veneer of glaciofluvial deposits and occasionally supraglacial till (Figure 22; Tipper, 1963). These deposits suggest that deglaciation was characterized by ice-stagnation. Eskers on the flanks of Mt. Davidson are evidence for confined subglacial flow (Giles *et al.*, 1995).

RESULTS AND INTERPRETATION

Forty-one till samples were collected on or near to the Blackwater-Davidson property (Appendix B). The sample density for the study area investigated is approximately 1 sample per km^2.

The central grid of the Blackwater-Davidson claims, the Pem grid, lies within an area mapped as

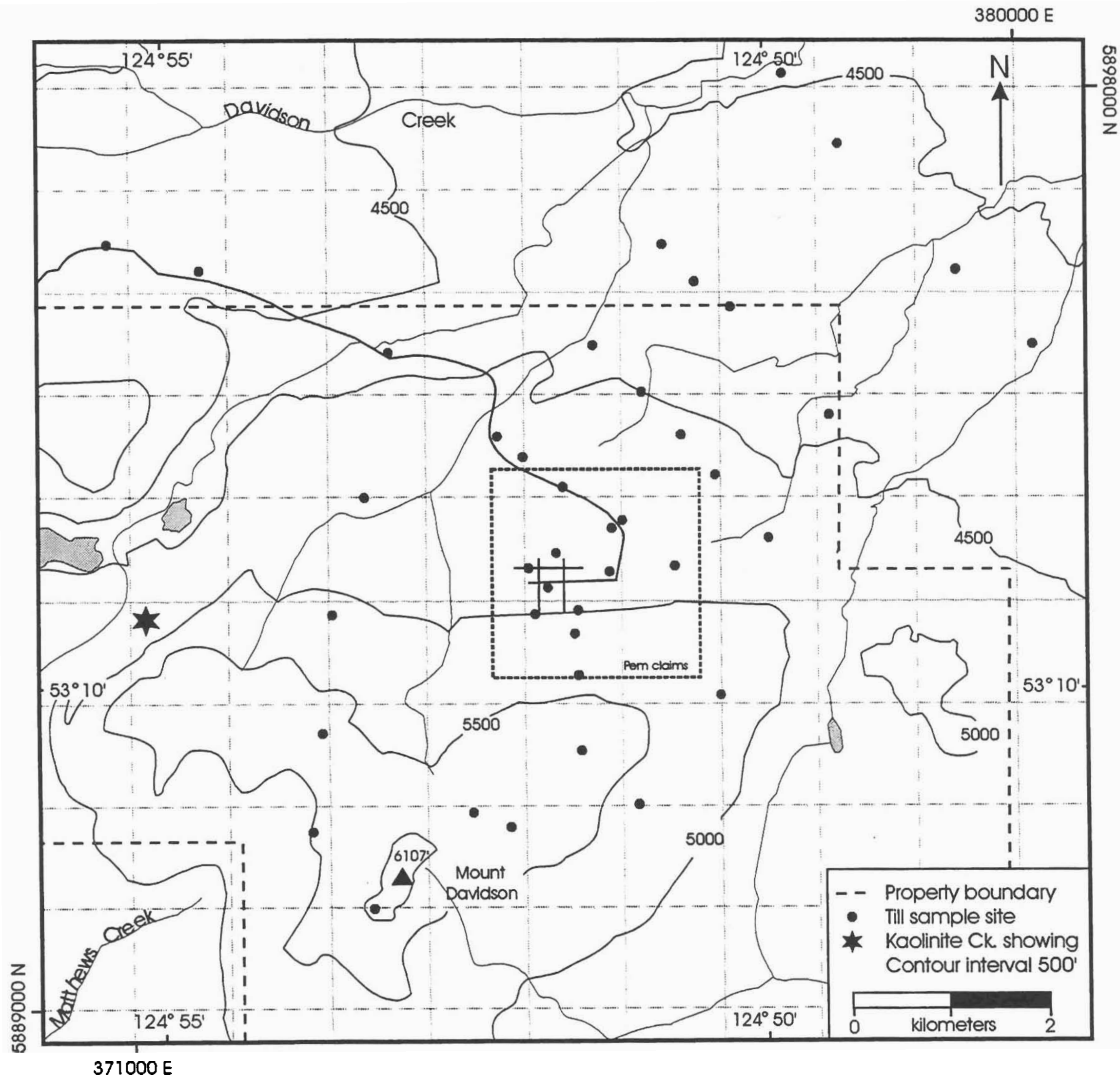


Figure 20: Location of the Blackwater Davidson mineral property, Pem claims and till sample locations.

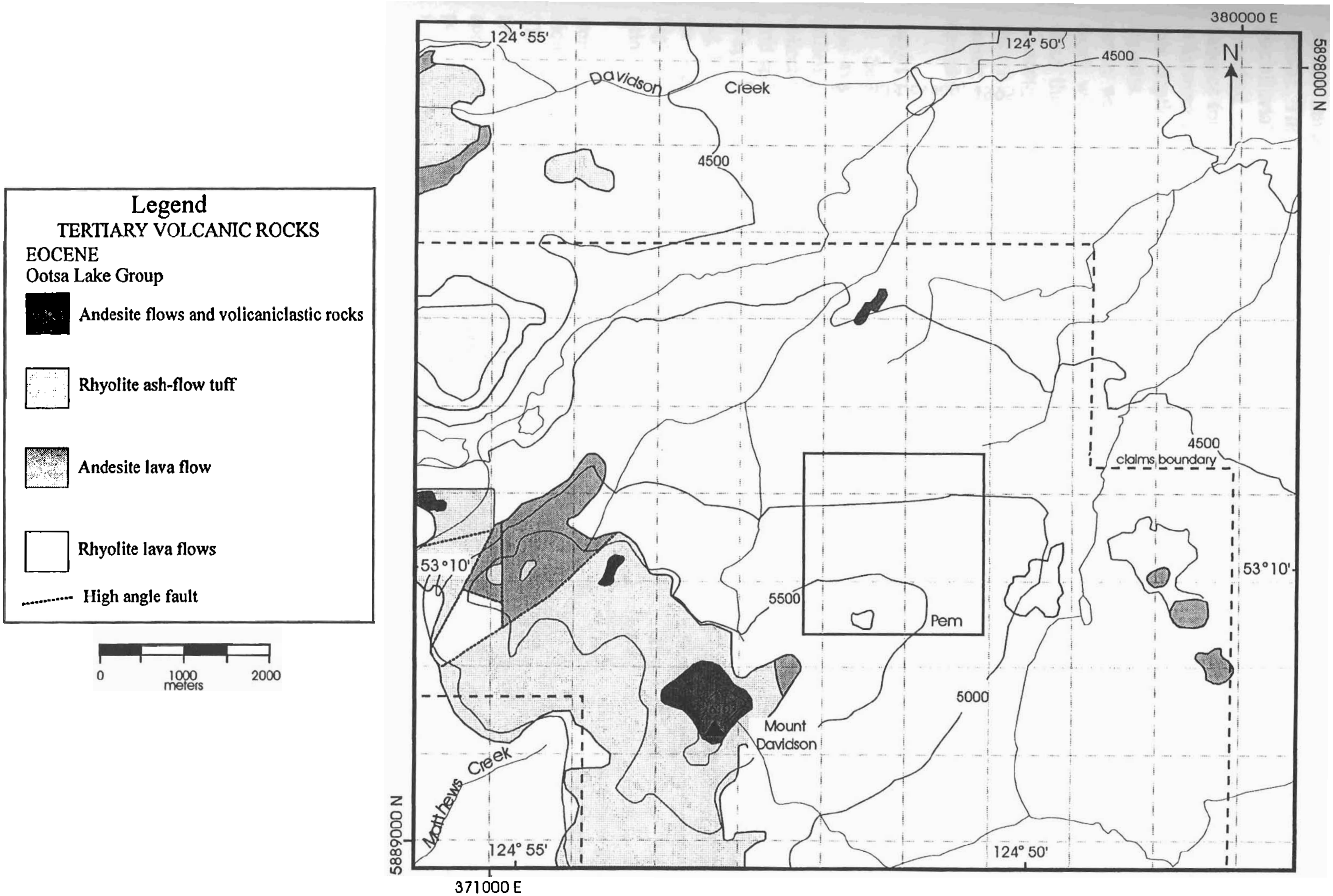
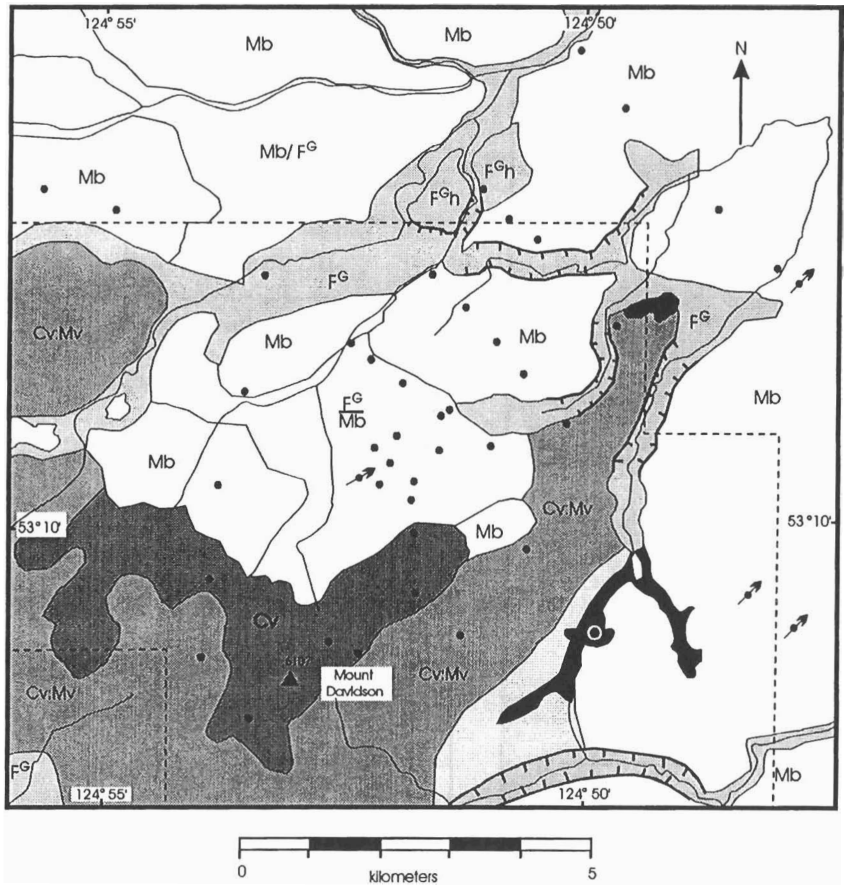


Figure 21: Bedrock geology of the Mount Davidson area (After Diakow *et al.*, 1995a).



Legend

- Colluvial veneer overlying bedrock: cover of loose diamicton less than 1 m thick
- Cv:Mv — Collivial deposits in association with morainal sediments; poorly sorted diamiction with angular clasts common, overlying bedrock
- Mb — Morainal deposits: unsorted dimiction, mainly basal till, forming blankets over 1 m thick commonly occurs on lower valley slopes
- F^G/Mb — Glaciofluvial deposits overlying till:poorly to well-sorted sand and gravel overlying a morainal diamiction, basal till or washed till
- Glaciofluvial deposits: poorly to well sorted gravel and sand, often associated with meltwater channels
- F^Gh — Glaciofluvial kame deposits: course gravels and sand, typically forming hummocky topography
- Mb/ F^G — Morainal sediments with glaciofluvial outwash deposts, often undulatory topography
- O — Organics: deposits of decaying vegetative matter, often over 1 m thick
- Drumlin
- Meltwater channel
- Till Sample Site
- Property boundary

Figure 22: Surficial geology of the Blackwater-Davidson claims (adapted after Giles and Levson, 1995).

layered sands and gravels overlying a diamicton deposit. These have been interpreted and mapped as glaciofluvial deposits overlying till, which was likely reworked by glaciofluvial activity (Figure 22). Samples for the soil geochemical survey were taken at between depths of 20-50 cm. Soils sampled from this depth were likely formed over glaciofluvial deposits. Samples collected for the till geochemical survey were normally taken from about one meter's depth, with a texture described as a sandy diamicton. Since this depth often did not reach basal till, the diamicton likely represents reworked till. Part of the finer fraction of till may have been winnowed out during reworking and the geochemistry of the till unit altered.

PREVIOUS SOIL SURVEY

Soil data for the Blackwater-Davidson property was available in Grange's 1992 assessment report (Allen, 1992). A total of 616 soil samples were collected from the B-soil horizon, along the Pem grid spaced 50 m x 100 m, for a total mapping area of approximately 4 km^2. Soils were analyzed for Au, Ag, Pb, Zn, Mn and As, but data was available only for Au, Ag and Pb. Soil data for these elements highlight anomalous values over part of the Pem grid.

Plotting anomalous concentrations using data from the soil survey produced anomaly patterns elongated sub-parallel to ice-flow for up to 1.5 km. Threshold values for the soil data were defined arbitrarily (Allen, 1992) but are estimated to rank approximately in the 80th percentile for Pb and Ag populations and approximately in the 90th percentile for the Au population.

Anomalous Au concentrations occur mainly in the southern half of the Pem, over an area of roughly 1 km^2 (Figure 23). Concentrations are very erratic, with values greater than 100 ppb occurring adjacent to concentrations just above the detection limit (2 ppb). The anomalous area, defined as concentrations above 20 ppb, is discontinuous and trends sub-parallel to ice-flow (east-northeast). At several site locations, very anomalous samples occur within this anomalous area which may indicate the presence of multiple bedrock sources. Both up and down-ice of the anomalous area, values are consistently low (< 20 ppb).

Anomalous Ag concentrations occur 500 m north of the Au soil anomaly. Silver forms a semi-continuous anomaly for approximately 1.5 km (Figure 24). The most anomalous values are slightly greater than 10 ppm. The dispersal pattern broadly trends parallel to ice-flow (northeast). Outside of the anomalous area, concentrations are less than 1 ppm. The soil dispersal anomaly for Pb (Figure 25) overlaps and is similar to the Ag anomaly (Figure 24). The Pb anomaly occurs approximately 0.2 km south of the Ag dispersal pattern.

The soil anomalies for Ag and Pb occur in the central area of the claims area. With similar dispersal patterns, it is likely that Ag and Pb occur together in mineralized bedrock and have the same source. The soil anomaly for Au occurs several hundred meters south to the Pb and Ag anomaly, but overlaps slightly with the Pb and Ag anomalies. The 'silver zone' as defined by drill core data, occurs on the western edge of the Ag and Pb soil anomaly. Whereas the 'gold zone' lies to the south of the Ag and Pb soil anomalies and coincides in part with the Au soil anomaly. The soil and drill data suggest that Au may have a different source than Pb and Ag. Because the Blackwater-Davidson claims lies on the flanks of Mount Davidson, the material sampled in the soil survey was likely reworked by glaciofluvial and downslope activities. The source of the soil anomalies may be further upslope than suspected. Drilling was confined to areas on the central grid that were accessible by tracks. Thus, potential targets may be to the west and south of the soil anomalies.

TILL GEOCHEMICAL SURVEY

Geochemical data from till samples were plotted and contoured for the elements contoured in the soil survey (Au, Ag and Pb). In addition, As was plotted because it is an element found in arsenopyrite and Sb was plotted since it is found in tetrahedrite. Arsenic and Sb are also commonly used as pathfinder elements.

The till sampling program was concentrated on the Pem grid, and up and down-ice of the Pem because it is considered to be the principal exploration target. Multi-element coincidental dispersal trains are developed down-ice of the Pem grid,

Similar to the till geochemical contour plots produced for the CH claims area (Figures 13-19), a regional data set was used to define anomalous concentrations on the Blackwater-Davidson mineral

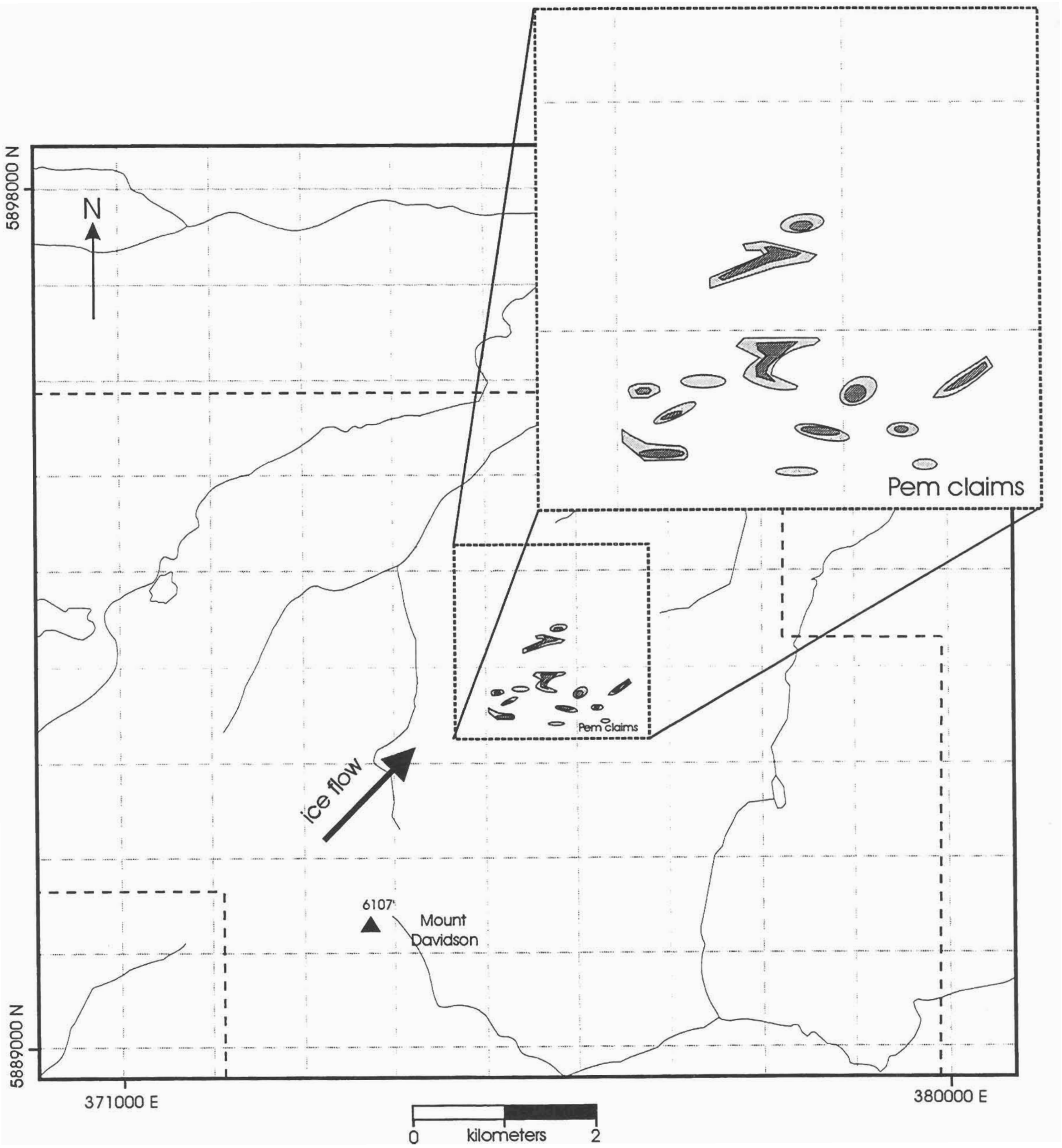


Figure 23: Anomalous soil pattern for gold (Au), contoured at 50 and 100 ppb, Blackwater-Davidson claims (Allen, 1992).

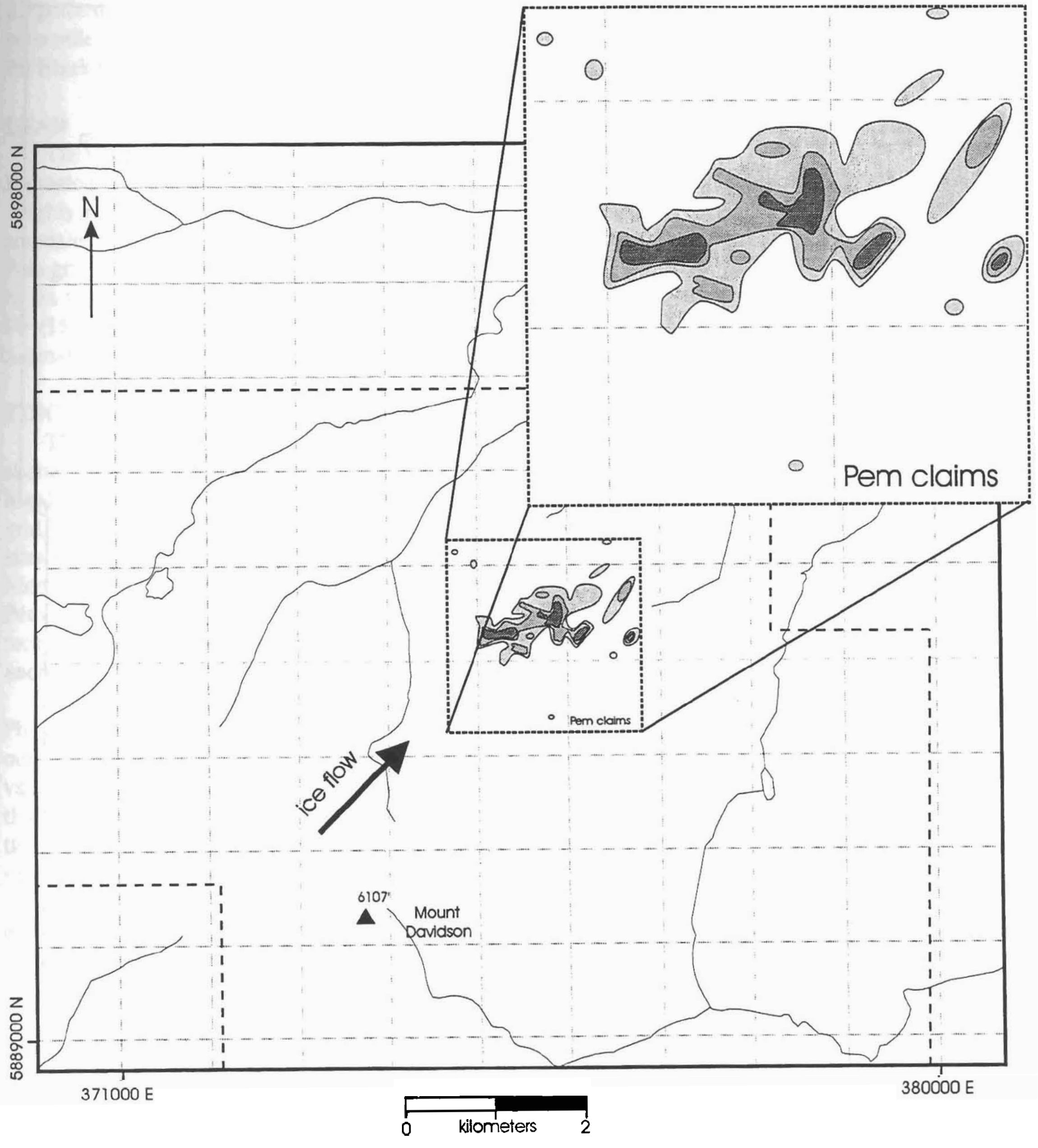


Figure 24: Anomalous soil pattern for silver (Ag), contoured at 1, 2 and 5 ppm, Blackwater-Davidson claims (Allen, 1992).

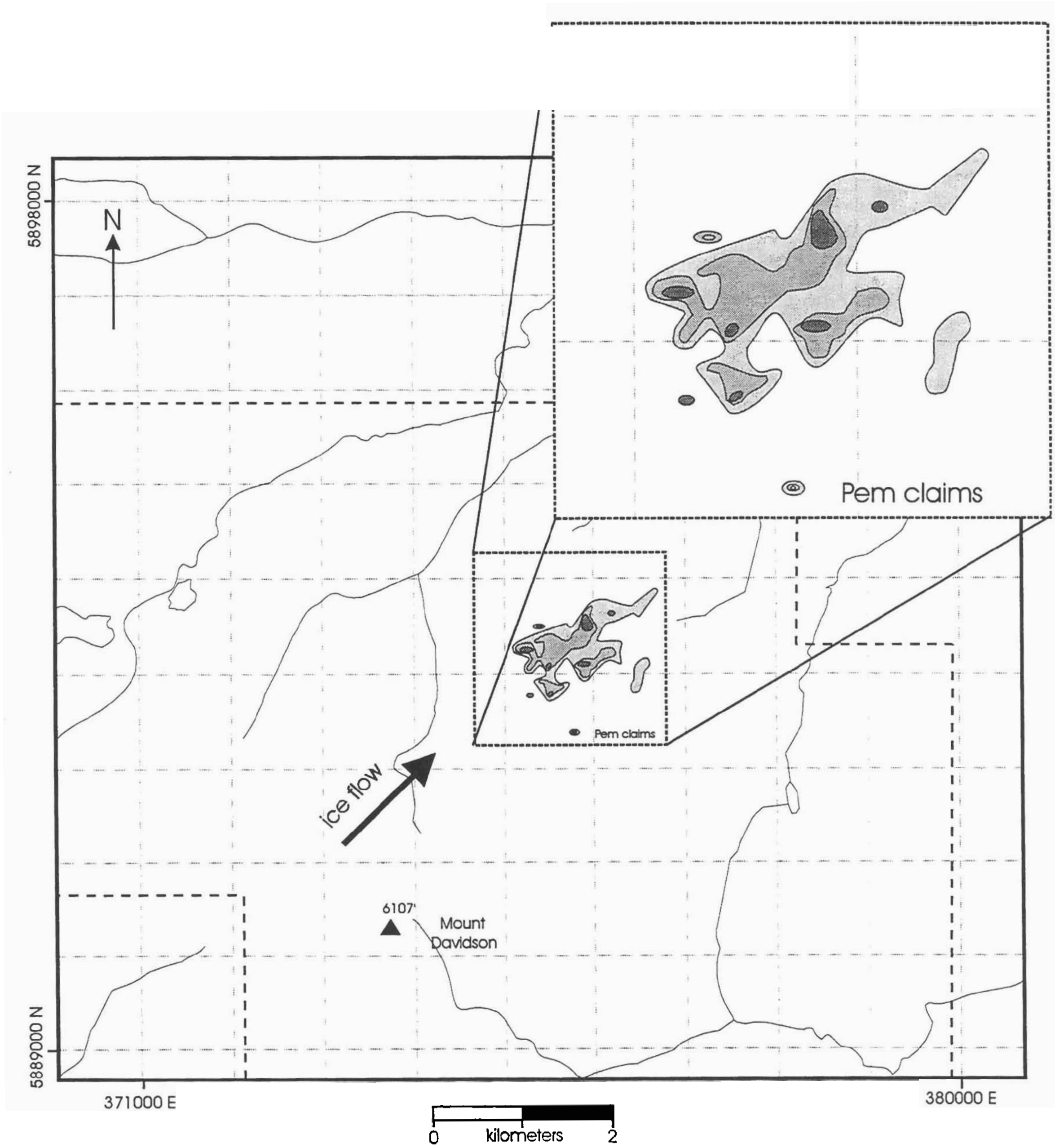


Figure 25: Anomalous soil pattern for lead (Pb), contoured at 50, 100 and 200 ppm, Blackwater-Davidson claims (Allen, 1992).

property. One hundred and ninety-five basal till samples were collected on the Tsacha Lake map sheet (93 F/2; Giles and Levson, 1995). These samples were ranked by percentile. Geochemical anomalies were defined as those occurring in the top 25 percentile (Rose *et al.*, 1979). Thus, the 75th percentile was used as the lowest contour interval on the Blackwater-Davidson mineral property.

LEAD

The spatial geochemical plot for Pb forms an anomalous dispersal train which is elongated roughly parallel to ice-flow (Figure 26). The most anomalous samples occur in the northern half of the Pem grid (133, 58, 57 and 53 ppm). Several samples in the top 25th percentile of the regional data set for Pb (15 ppm) occur 4000 m from the head of the anomaly.

ZINC

The spatial plot for Zn (Figure 27) is much shorter than the Pb anomaly (Figure 26). Zinc is highly anomalous in the central area of the Pem grid, with a maximum value of 941 ppm and several sites with concentrations over 200 ppm (Figure 27). Most of the very anomalous samples occur on the Pem grid, but anomalous values (> 83 ppm) were recorded in sites 2000 m from the head of the anomaly.

The lateral boundaries of the dispersal trains for Pb and Zn are relatively well-defined. Few samples outside of the Pem grid area contain anomalous values, except for those within the dispersal train that commence on the Pem grid. This suggests that there may be several minor showings within the vicinity, but one main target.

A new Zn showing occurs on the western-most edge of the study area (Figure 27). This sample records the second highest Zn value of the data set (471 ppm) and is anomalous for Pb (Figure 26). One kilometer east of this site the Zn concentrations decrease to background levels. According to Shilts' (1976) anomaly classification, an anomaly consisting of concentrations of at least five times background is a high priority for follow-up studies. Local-scale till sampling adjacent to, and up and down-ice of the sample site would define the dispersal train and help delineate the source.

GOLD AND SILVER

The spatial plot for Au concentrations produces a dispersal pattern elongated parallel to ice-flow (Figure 28). Gold values are relatively low (<22 ppb). Anomalous values occur mainly on the southern and central area of the Pem (21, 19, 18 and 17 ppm). Gold values attain background concentrations (< 6 ppb) 5500 m down-ice of the head of the anomaly. Two other minor Au anomalies occur on the flanks of Mt. Davidson (Figure 28).

The anomaly plot for Ag extends north-northeast of the Pem grid for a total distance of 3000 m (Figure 29). The lateral boundaries of the dispersal train for Ag are relatively well-defined, with almost all of the anomalous samples (> 0.2 ppm) occurring on the Pem claims. Similar to Au values, concentrations of Ag for the till geochemical survey are just above the detection limit (maximum 0.6 ppm), but the central grid of the Pem claims contained the most anomalous values.

ARSENIC AND ANTIMONY

Arsenic and Sb are commonly used as pathfinder elements for gold. Arsenic forms a dispersal pattern which consists with the most anomalous samples on the northern half of the Pem claims (Figure 30). The northern half of the claims area contains two samples with 150 ppm, but concentrations quickly decrease to background levels within 1000 m. Arsenic forms a short dispersal train (Figure 30). Arsenic concentrations are rapidly diluted to background levels (12 ppm). It is possible that meltwaters washed the till, winnowing the fines and dispersing the mobile elements, including As.

Antimony forms an irregularly-shaped anomaly pattern (Figure 31). All of the samples collected up-ice of the Pem claims are below threshold concentrations (< 2.0 ppm). The most distal down-ice samples also record background concentrations. Anomalous samples occur on the center and northern half of the Pem claims (Figure 31). Although Sb does not form a classic dispersal train, it appears to generally highlight the zone of highest mineral potential.

COMPARISON WITH PREVIOUS SOIL DATA

Except for the occasional sample, the highest geochemical concentrations in till occur on the Pem

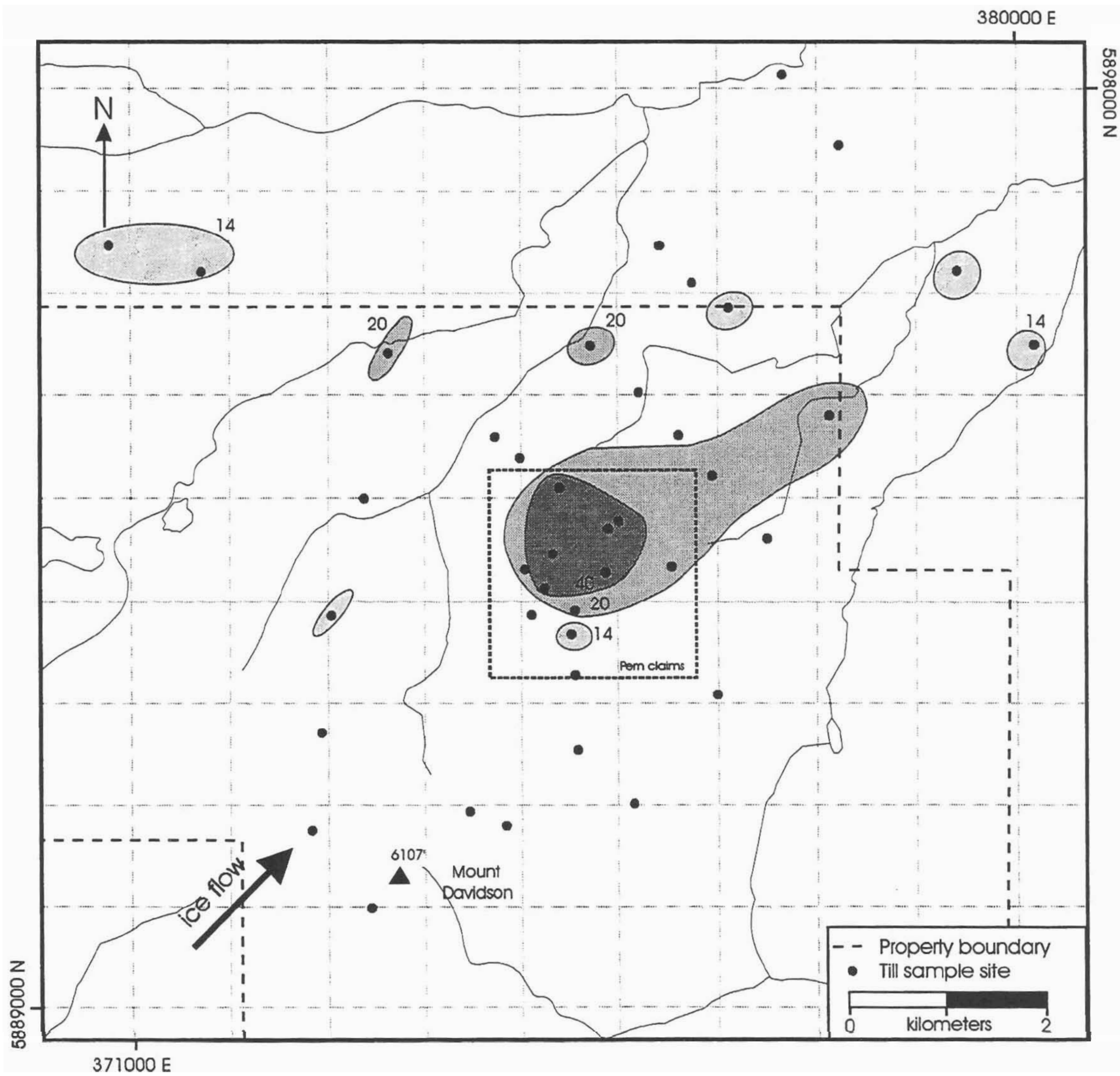


Figure 26: Till dispersal anomaly pattern for lead (Pb), contoured at 14, 20 and 40 ppm, Blackwater-Davidson claims.

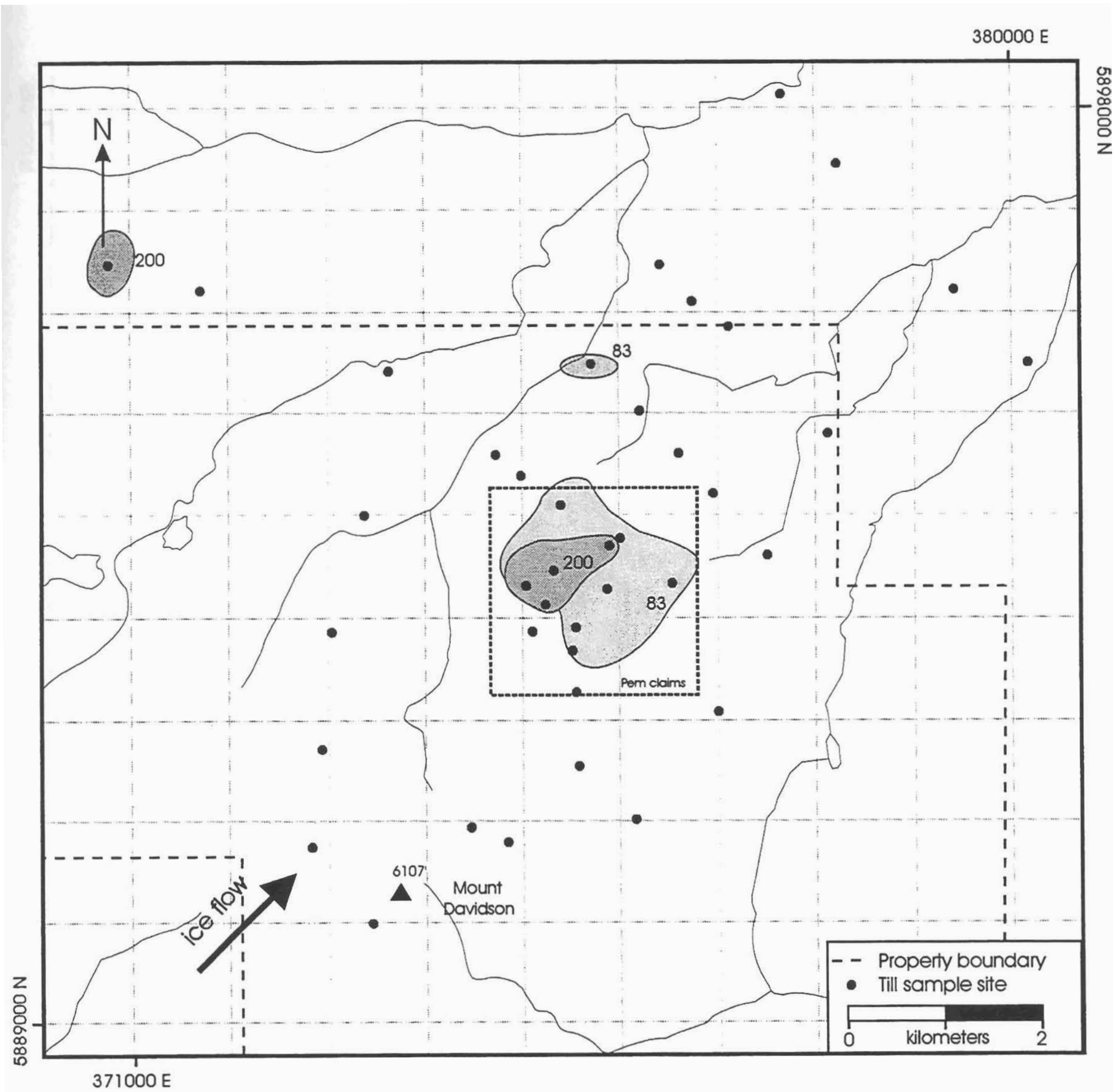


Figure 27: Till dispersal anomaly pattern for zinc (Zn), contoured at 83 and 200 ppm, Blackwater-Davidson claims.

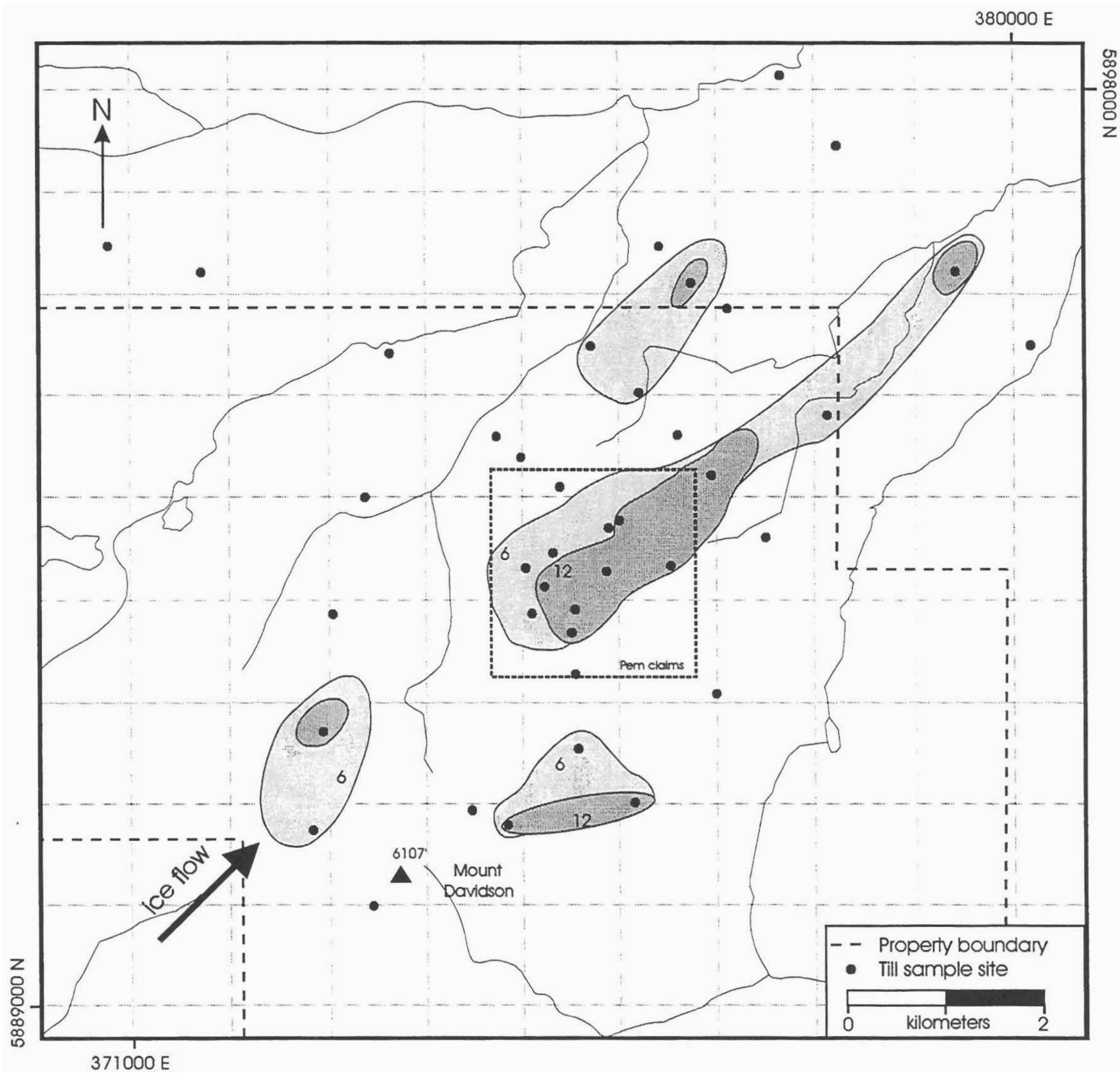


Figure 28: Till dispersal anomaly pattern for gold (Au), contoured at 6 and 12 ppb, Blackwater-Davidson claims.

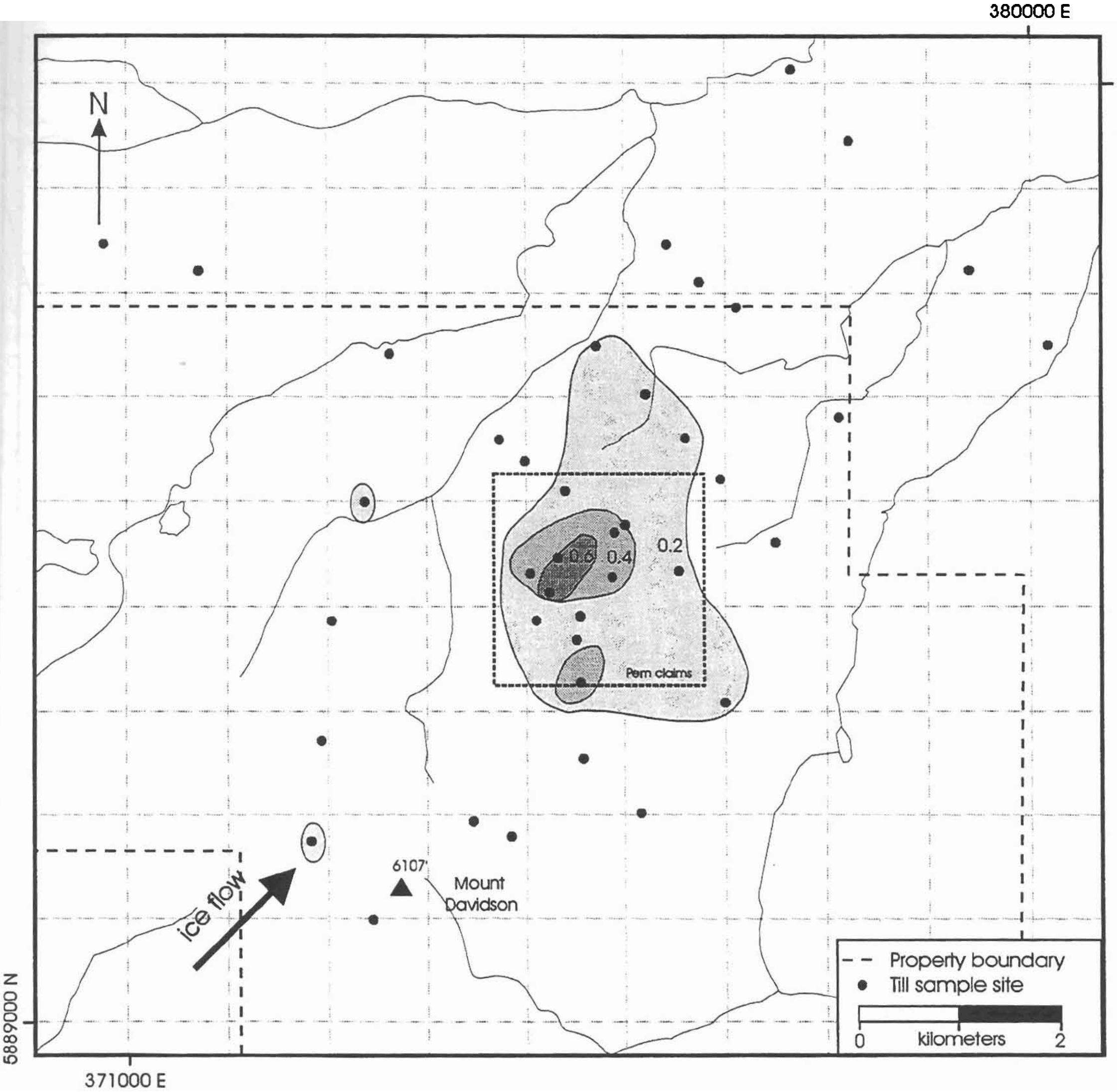


Figure 29: Till dispersal anomaly pattern for silver (Ag), contoured at 0.2, 0.4 and 0.6 ppm, Blackwater-Davidson claims.

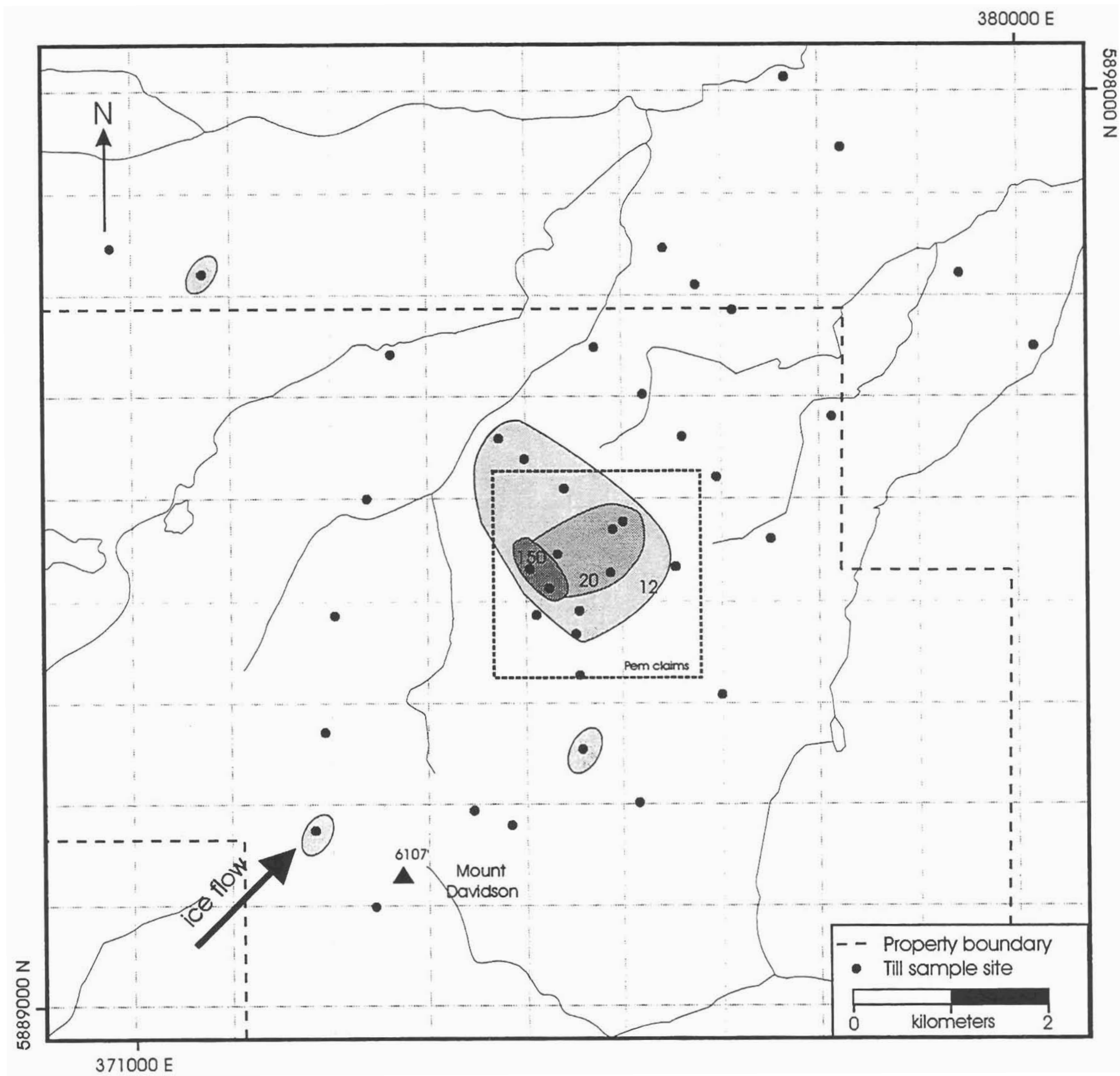


Figure 30: Till dispersal anomaly pattern for arsenic (As), contoured at 12, 20 and 150 ppm, Blackwater-Davidson claims.

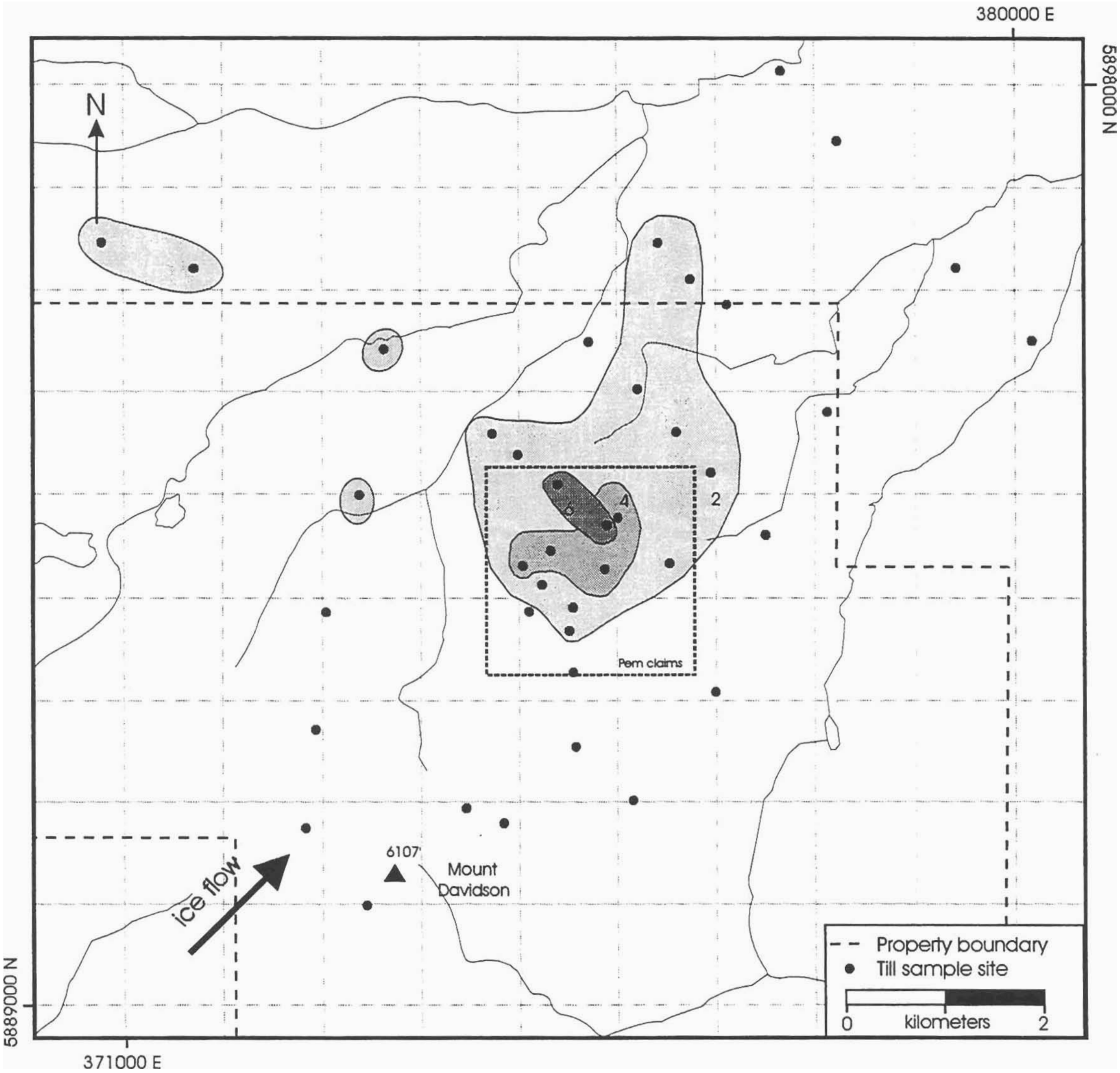


Figure 31: Till dispersal anomaly pattern for Antimony (Sb), contoured at 2, 4 and 6 ppm, Blackwater-Davidson claims.

grid, broadly coinciding with the soil geochemistry anomalies. The values for anomalous till samples are on the order of four to five times smaller than anomalous values for soil samples. This is partly due to the sample density. The till survey is essentially a regional survey (sample density approximately 1 sample per 1.6 km^2 for the study area, with a maximum of 6 samples per km^2), whereas the soil survey is very detailed and concentrated only on the Pem grid, an area of known mineralization (sample density approximately 154 samples per km^2).

Despite these considerable differences in sample density, the till survey was effective at defining similar anomalous areas as the soil survey. For instance, the main soil Au anomaly (Figure 23) occurs several hundred meters to the south of the main Ag and Pb anomalies (Figures 24, 25). Similar trends are observed in the till data. Based on the soil and till data, a potential target to intersect the sources of the Pb, Zn, Ag, As, and Sb anomaly is on the western edge of the Pem grid, slightly up-ice and up-slope of the geochemical anomalies (approximate UTM's: 374800 E, 5892800 N). A second target source to intersect Au mineralization is located south of the first target, in the southwestern corner of the Pem grid, also slightly up-ice and up-slope of the geochemical anomalies (approximate UTM's 375000 E, 5892400 N).

UDUK LAKE PROPERTY

DESCRIPTION OF THE SURVEY AREA

The Uduk Lake property is presently owned by Pacific Comox Resources Limited and operated by Pioneer Metals Incorporated. It is located 70 kilometers south-southwest of Burns Lake, British Columbia, at 53°38' north, 125°59' west, on the boundary between the 93 E/9 and 93 F/12 map sheets (Figure 1). Access to the property can be gained south of Burns Lake.

The property is situated in the Windfall Hills area, within the Interior Plateau. The claims lie just east of Uduk Lake, approximately 15 kilometers south of the Ootsa Lake reservoir (Figure 32). Local topography is relatively subdued, with elevations ranging from about 1095 meters (3600') to 1220 meters (4000'), with abundant areas of swamps and bogs. Approximately 98% of the land surface is covered by glacial deposits or swamps and lakes.

BEDROCK GEOLOGY AND MINERALIZATION

The bedrock geology was mapped at a 1:250 000 scale for the Nechako River (NTS 93 F) mapsheet (Tipper, 1963). Most of the property is underlain by andesitic to rhyolitic volcanic rocks of the Eocene Ootsa Lake Group (Figure 33). To the northeast, Upper Triassic and Lower Jurassic sedimentary rocks from the Stahini Group lie along the Ootsa Lake shoreline. Lower and Middle Jurassic Hazelton Group volcanic rocks lie to the southeast of the Stahini Group. Late Cretaceous granitic to dioritic intrusions outcrop southeast of the property. Tertiary andesitic lava flows from the Endako group outcrop 2 km north of the property and overlie unconformably the rhyolitic rocks of the Ootsa Lake Group. The regional structural trends, including faults, are reported at 130° and 160°, offset by structures trending 050° (Tupper and St. Clair Dunn, 1994). On the property, joints and veins are striking roughly towards the north and have been reported at 006° to 015°.

ALTERATION AND MINERALIZATION

The Uduk Lake property is an epithermal gold prospect (Tupper and St. Clair Dunn, 1994). The Duk claims cover an area 21 km^2, with active exploration confined to the Duk 2 and 3 claims, an area of 8 km^2. The host rock consists of hydrothermally altered rhyolite to dacite flows, tuffs and breccias from the Eocene Ootsa Lake Group. Alteration caused replacement of the original minerals by sericite and quartz. Several episodes of silicification produced breccias and veins with drusy quartz and chalcedony. In the mineralized rock, two or three episodes of silicification were often accompanied by pyrite, and gold and silver mineralization (Tupper and St. Clair Dunn, 1994). Each stage of silicification produced coarser quartz grains and it has been suggested that Au-Ag mineralization is associated with the most hydrothermally altered host rock (Tupper and St. Clair Dunn, 1994).

Pyrite occurs in veins, in the stockwork, in the brecciated zones and occasionally occurs disseminated in altered rhyolite. The pyrite content was not shown to have an effect on the amount of gold and silver mineralization (Lane and Schroeter, 1995). The age of mineralization is not well defined, but likely occurred prior to the deposition of the Endako Group, since this unit is unaltered (Taylor, 1989).

The geology and geochemistry of the Uduk Lake property is comparable to other low-grade high tonnage lode gold deposits (Tupper and St. Clair Dunn, 1994). Generally, lode gold deposits are comprised of veins and altered wall rock. The veins in lode gold deposits are often filled with coarse quartz, with albite, carbonate and clays (Roberts, 1987). Pyrite, is the most abundant mineral, pyrrhotite and arsenopyrite are sulphides commonly associated with lode gold deposits. Fractures in the quartz veins can host the ore, or it may be found in the adjacent wall rock, associated with the sulphides (Roberts, 1987).

SURFICIAL GEOLOGY

The Uduk Lake area was intensely glaciated, with drumlins, flutings and crag and tails present

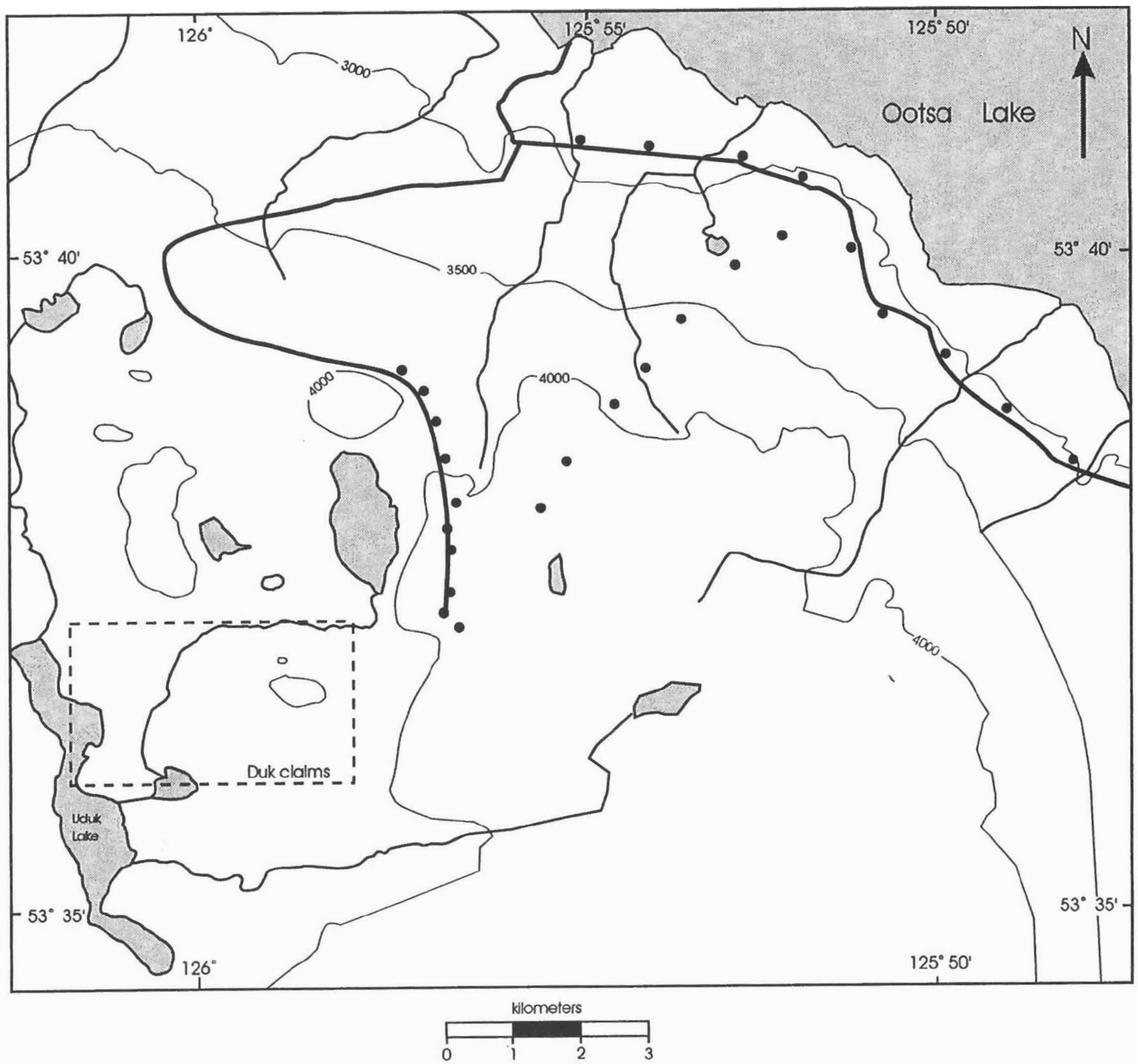


Figure 32: Location of the Duk 2 and 3 claims and regional till sample locations, Uduk Lake area. Note: contour interval every 500'.

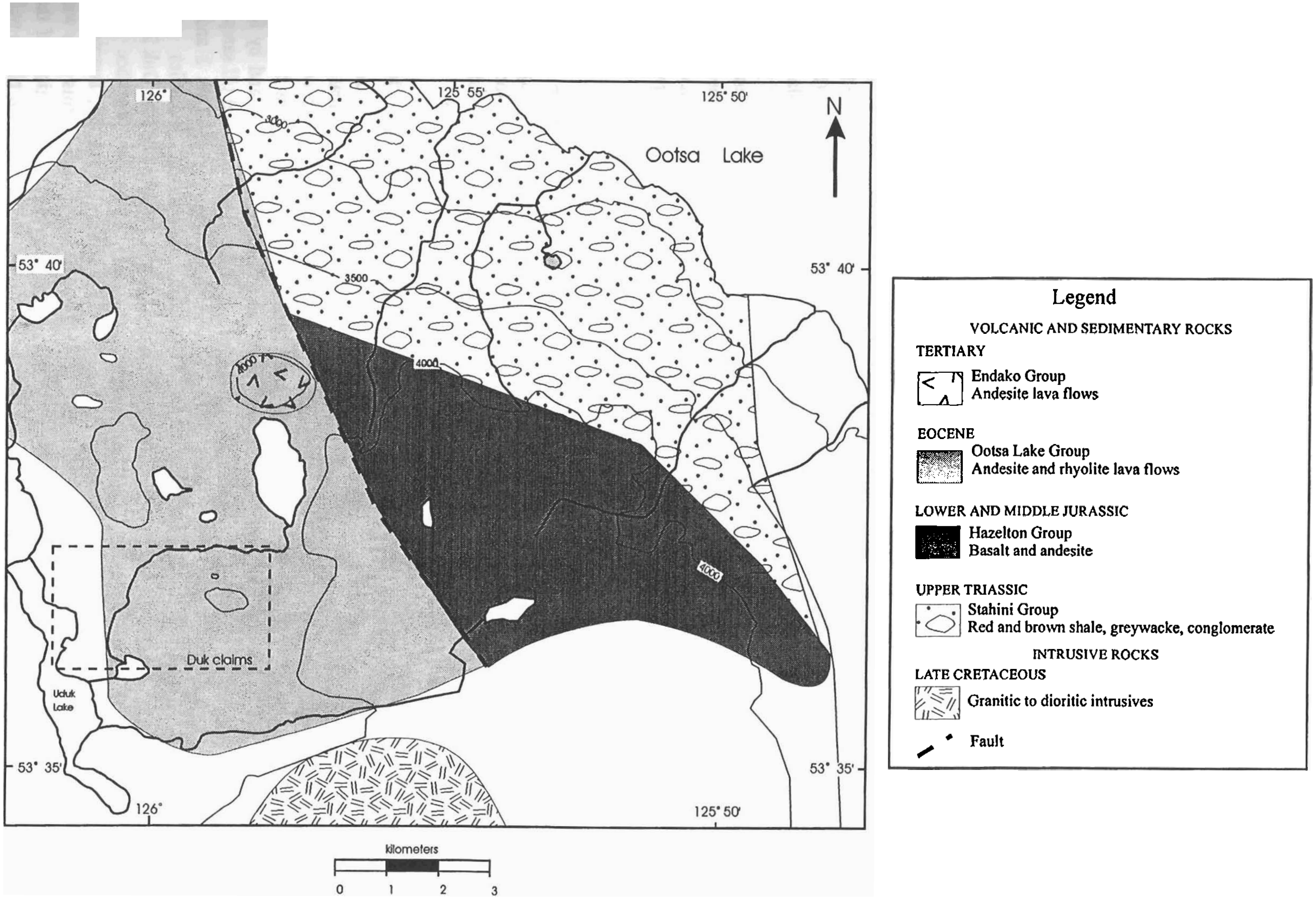


Figure 33: Bedrock geology of the Uduk Lake area (after Tipper, 1963).

throughout most of the area. Outcrop is rare, which has confounded exploration. Local ice-flow direction, towards 050°, was interpreted from streamlined landforms recognized from aerial photographs at 1: 60 000 (Figure 34).

Glacial erosion of the rhyolitic bedrock may have been structurally controlled (Huntley, personal communication, 1996), since a local structural trend in the area is 050°, which coincides with the last major ice-flow direction. However, many of the linear features are crag and tails, suggesting a lithological control also.

GLACIAL STRATIGRAPHY

The glacial stratigraphy can be interpreted from data gathered from eight trenches on the Duk claims (Figure 35). Exposures up to 3 m thick enabled detailed examination of the surficial sediments (Figures in Appendix C-2 to 9). The simplified stratigraphy on the property consists of: rhyolitic bedrock overlain by thin deposits of glaciofluvial sands and gravel, which are in turn overlain by morainal diamicton which is in turn overlain by meltwater deposits (glaciofluvial sands and gravels and glaciolacustrine silts), which is overlain by a veneer of angular diamicton (colluvium). One or more of these units may be absent at each trench site. The regional area contains several abandoned meltwater channels and gullies that transported glaciofluvial material away from the melting glacier (Figure 34).

SANDS AND GRAVEL UNIT OVERLYING BEDROCK

This unit is observed in overburden trench 1 (Figure in Appendix C-3). It overlies weathered rhyolitic bedrock and consists 0.25 m of horizontal laminated sands interbedded with crudely laminated pebbles and rhyolitic cobbles. This unit is commonly overlain by the diamicton unit.

DIAMICTON UNIT

This unit commonly occurs overlying bedrock or the sand and gravels unit and consists of a loose sandy or silty-sand diamicton, interpreted as morainal deposits. The till unit varies in thickness from a veneer less than 1 m, to a blanket exceeding 2.5 m. The predominance of local, striated clasts suggests that it was transported at the base of a glacier. The loose sandy texture locally suggests possible reworking by meltwater or mass-wasting processes. However, the lack of sand or silt lenses within the till and the presence of some interstitial clay indicates that any reworking was likely minimal.

SANDS AND GRAVELS UNIT

This unit occurs in some places overlying the diamicton. In overburden trench 1, it consists 0.25 m of crudely laminated gravelly sand (Figure in Appendix C-3). This unit has likely undergone downslope movement because it was deposited parallel to the slope.

SILTS AND CLAY UNIT

Trench 6 was the only exposure to contain fine-grained sediments, consisting of occasionally-laminated silt and clay deposits interpreted to be a glaciolacustrine or possibly lacustrine unit (Figure in Appendix C-9). This unit may occur in place of the preceding sands and gravels unit, overlying the diamicton unit. The silts and clay unit likely represent a small ice-dammed pond formed during glacial retreat or may be deposits from a recent pond, since this unit occurs in a low-lying, swampy area.

COLLUVIAL UNIT

The above units are often overlain by a veneer of sandy or gravelly diamicton interpreted as colluvium. The unit consists of angular to subangular clasts, mainly rhyolitic, in a loose sandy matrix. This unit is likely locally derived bedrock transported down-slope of bedrock knolls.

RESULTS AND INTERPRETATION

In the Uduk Lake area, a total of 90 overburden samples were collected for geochemical analysis (Appendix C). Of these, 25 till samples were taken from between 1 to 20 km down-ice from the Duk 2 and 3 claims area, along access roads and by foot traverses (Figure 32). Twenty-four basal till samples were collected on the property grid (Duk 2 and 3 claims). Forty-one overburden samples were collected in eight trenches located on the Duk 2 and 3 claims, which were exposed by backhoe work during the 1994 field season (Figure 35; Tupper and St. Clair Dunn, 1994). The data from this study was used to compare the element concentrations of the different soil horizons with that of basal till, as well

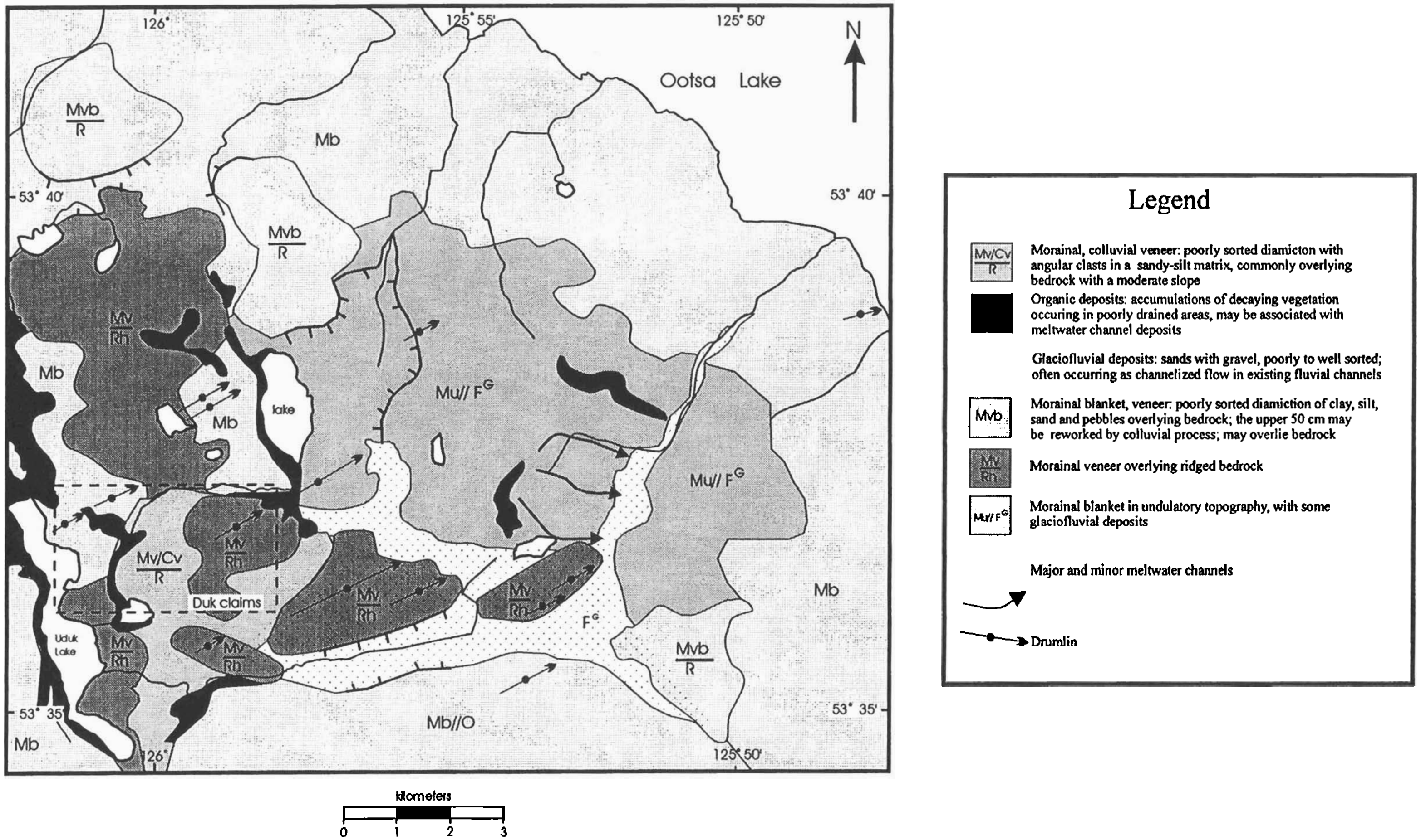


Figure 34: Surficial geology of the Uduk Lake area.

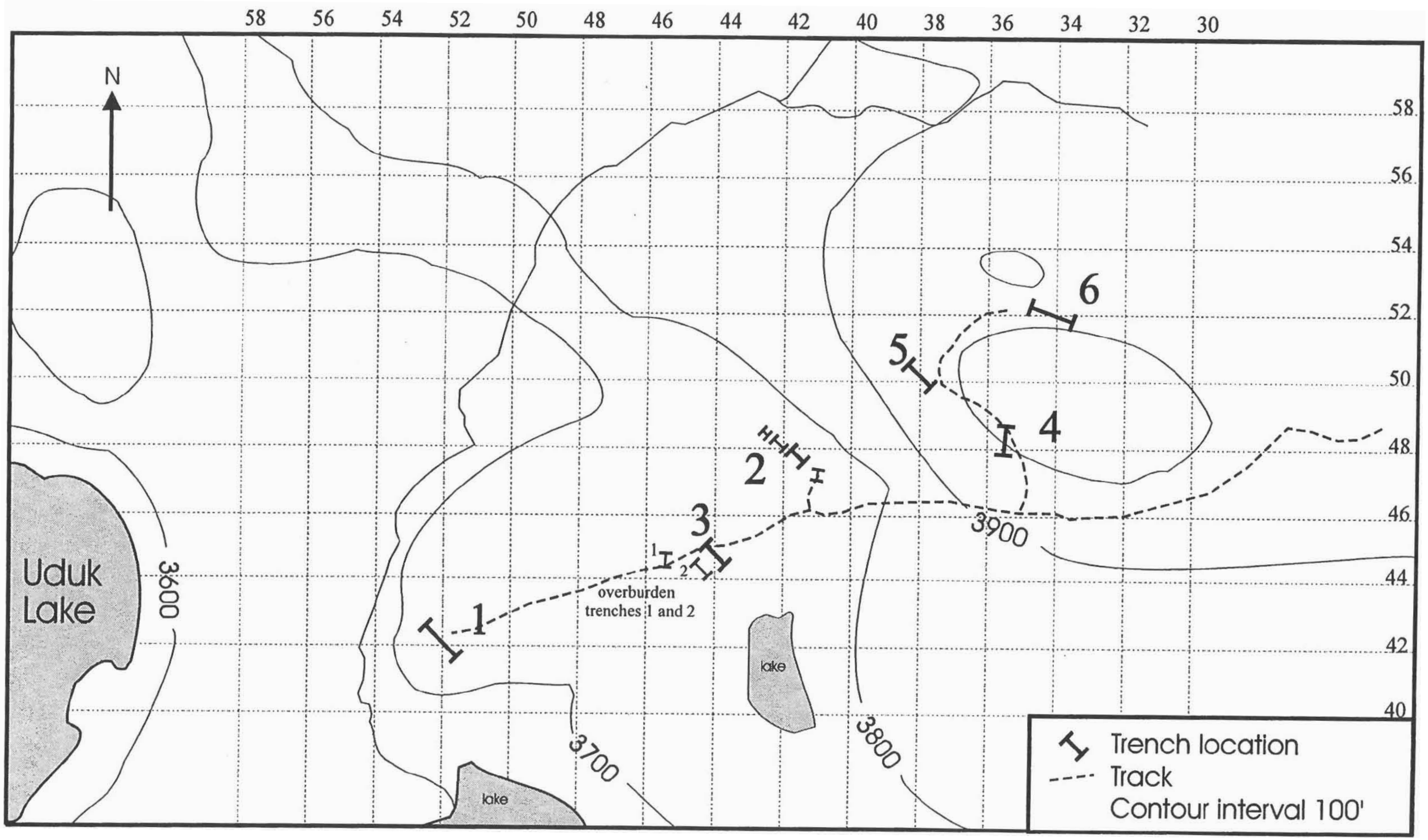


Figure 35: Duk 2 and 3 claims area, with trench locations, Uduk Lake property. Note: grid lines are spaced 200 m apart.

as the homogeneity of the till blanket (*cf.* Broster, 1986).

The areas designated for trenching were delineated by anomalous soil geochemical results from the previous field season. The trenches ranged from one to several meters deep, depending on the depth to bedrock, and 10 to 150 meters long.

RESULTS AND INTERPRETATION OF SOIL GEOCHEMISTRY DATA

In 1993, Pioneer Metals Incorporated collected 864 C-horizon samples on the Duk 2 and 3 grids. Samples were collected every 25 m on a 200 m grid over an area of approximately 4 km^2. Follow-up studies were completed in 1994 in areas with anomalous values from the previous survey. Four hundred and one samples were collected for the follow-up study, on a grid about 1 km^2 in size, with 100 m spacing. Samples were collected from approximately 25-50 cm depth, in the lower B or upper C horizon. Gold was analyzed by atomic absorption (AA) and 30 elements were analyzed by ICP. Gold, Ag and As values were plotted, the data was contoured by hand, and was available in the 1994 assessment report (Tupper and St. Clair Dunn, 1994). No statistical analyses were preformed on the data contained in the assessment report, thus the percentile ranking of the data set was calculated approximately. Anomalous values rank in the top 13% for gold, 7.5% for silver and 16% for arsenic. Results from this survey reveal a northeast trending multi-element coinciding anomaly.

The geochemical plots of soil data for Au, As and Ag form discontinuous patterns, which may be elongated in the down-ice direction, over an area approximately 2.5 km long and 0.6 km wide. The most anomalous soil samples (95th percentile) occur at different site locations.

GOLD

The soil anomaly for Au forms an irregular pattern (Figure 36). Values range from below the detection level to 1000 ppb. Nine samples have concentrations greater than 100 ppb, which constitute the top one percentage of the population. A broad area of approximately 650 m by 2500 m trending northeast across the property, contains the majority of anomalous samples of 50 ppb or greater. Outside this area, most samples have concentrations less than 50 ppb.

The highly anomalous Au values occur near trench one and 300 m south of it (39 N, 52 + 50 W), with this area containing six of the nine very anomalous values (> 100 ppb). The anomaly pattern is a bull's eye of very anomalous samples surrounded mainly by background samples. The other anomalous area is near trench 4. The highest Au value, 1000 ppb, is 100 m north of trench 4 (51 N, 37 + 50 W). Seventy-five meters east of trench 4 (50 N, 37 + 50 W), is the second very anomalous sample (450 ppb). These are part of an extensive anomalous zone extending about 500m.

SILVER

The soil anomaly for Ag forms an irregular, discontinuous pattern (Figure 37). Values for Ag are very low, with most samples less than the detection level (0.2 ppm). Similar to Au, the majority of the anomalous samples are contained in a broad area trending northeast. In this area, 22 samples have Ag concentrations greater than 2 ppm and rank in the top 2 percent of the population. The best-developed Ag anomaly patterns are in areas that have already been trenched (*e.g.* 1, 3, 5, and 6; Figure 37).

ARSENIC

The anomalous As concentrations form a discontinuous elongate pattern, parallel to ice-flow direction (Figure 38). Geochemical concentrations for As range from below the detection level (5 ppm) to a maximum of 290 ppm. Anomalous As values occur in the central and northeast quadrant of the claims (Figure 38), where the Au and Ag anomalies were defined. Samples with values greater than 100 ppm for As roughly align on a line trending 050o, with anomalous values occurring near trench 1 offset to the northwest (Figure 38). This can be attributed to many factors including dispersal parallel to ice-flow, or structural and lithological controls.

RESULTS AND INTERPRETATIONS OF THE TILL GEOCHEMISTRY

Anomalous till geochemical samples were plotted for the detailed property survey on the Duk 2 and 3 claims and the regional area. Since the exploration target is an epithermal gold prospect, the geochemical contour plots are presented for Au, Ag and As. Except for the samples collected for this study, no regional till geochemical data is available for the 93 F/12 map sheet. Therefore, geochemical

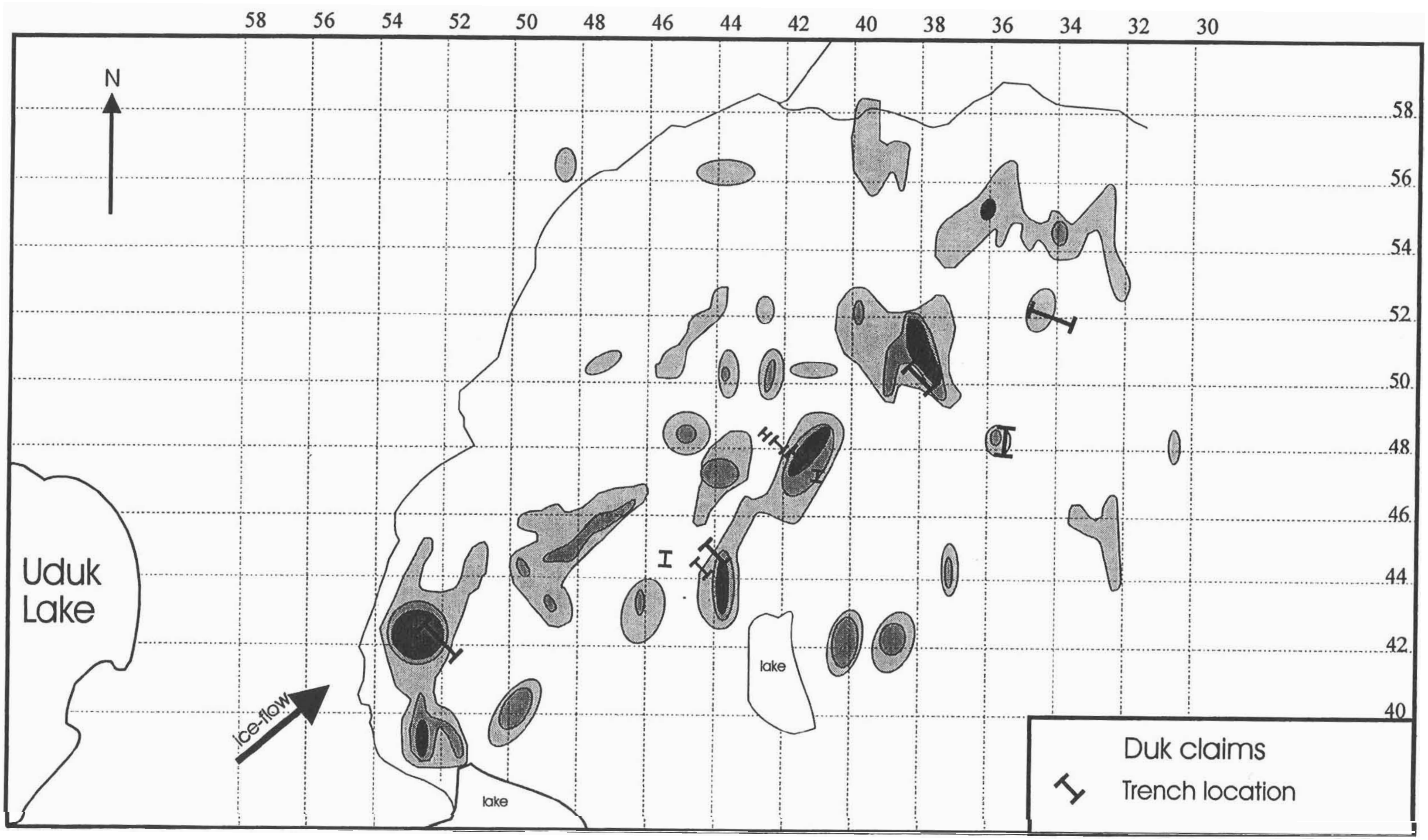


Figure 36: Gold (Au) in soil, Duk claims, Uduk Lake property (after Tupper and St. Clair Dunn, 1994). Contour intervals 20, 50 and 100 ppb. Note: grid lines are spaced 200 m apart.

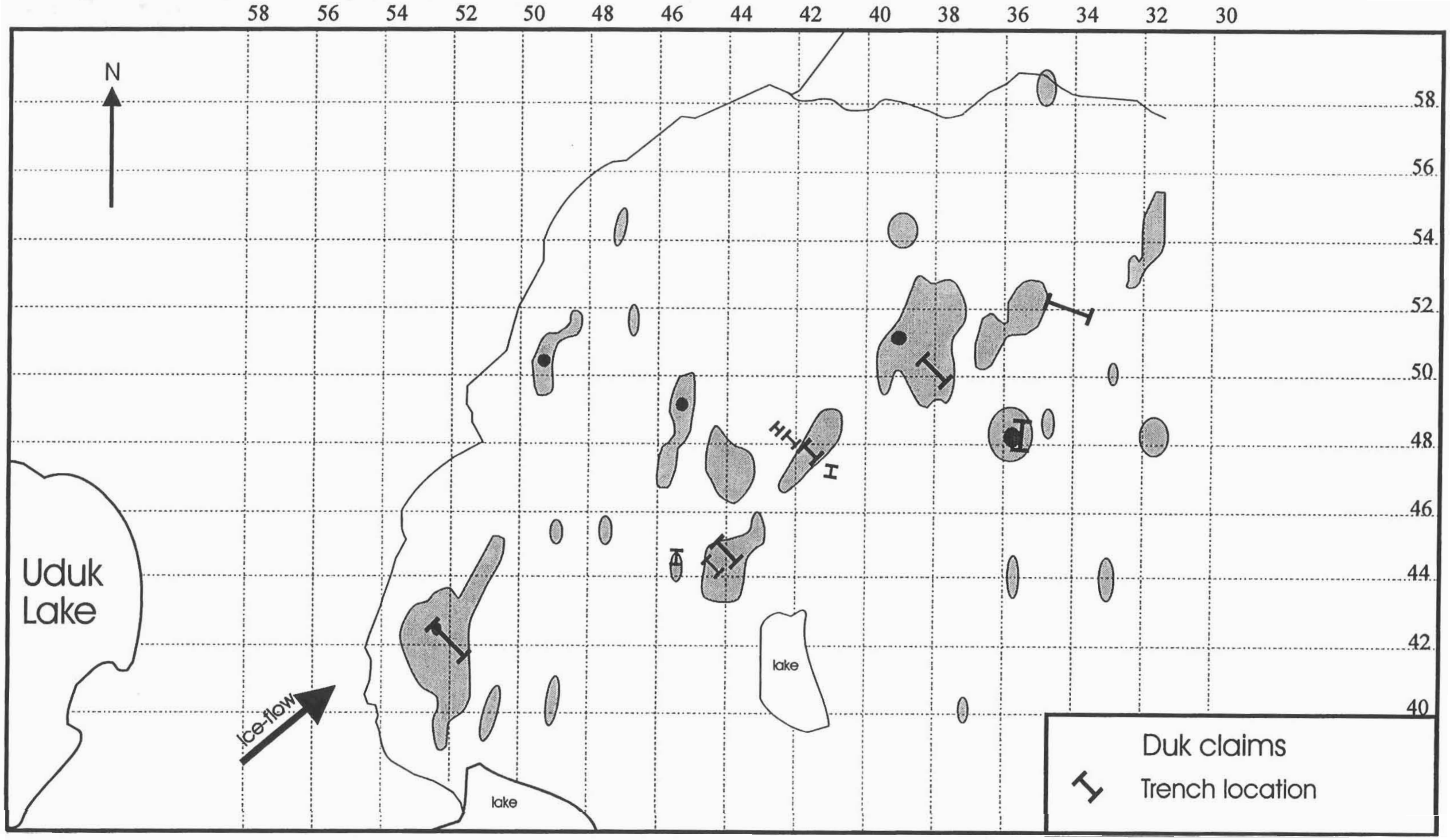


Figure 37: Silver (Ag) in soil, Duk claims, Uduk Lake property (after Tupper and St. Clair Dunn, 1994). Contour intervals 0.6 and 2 ppm. Note: grid lines are spaced 200 m apart.

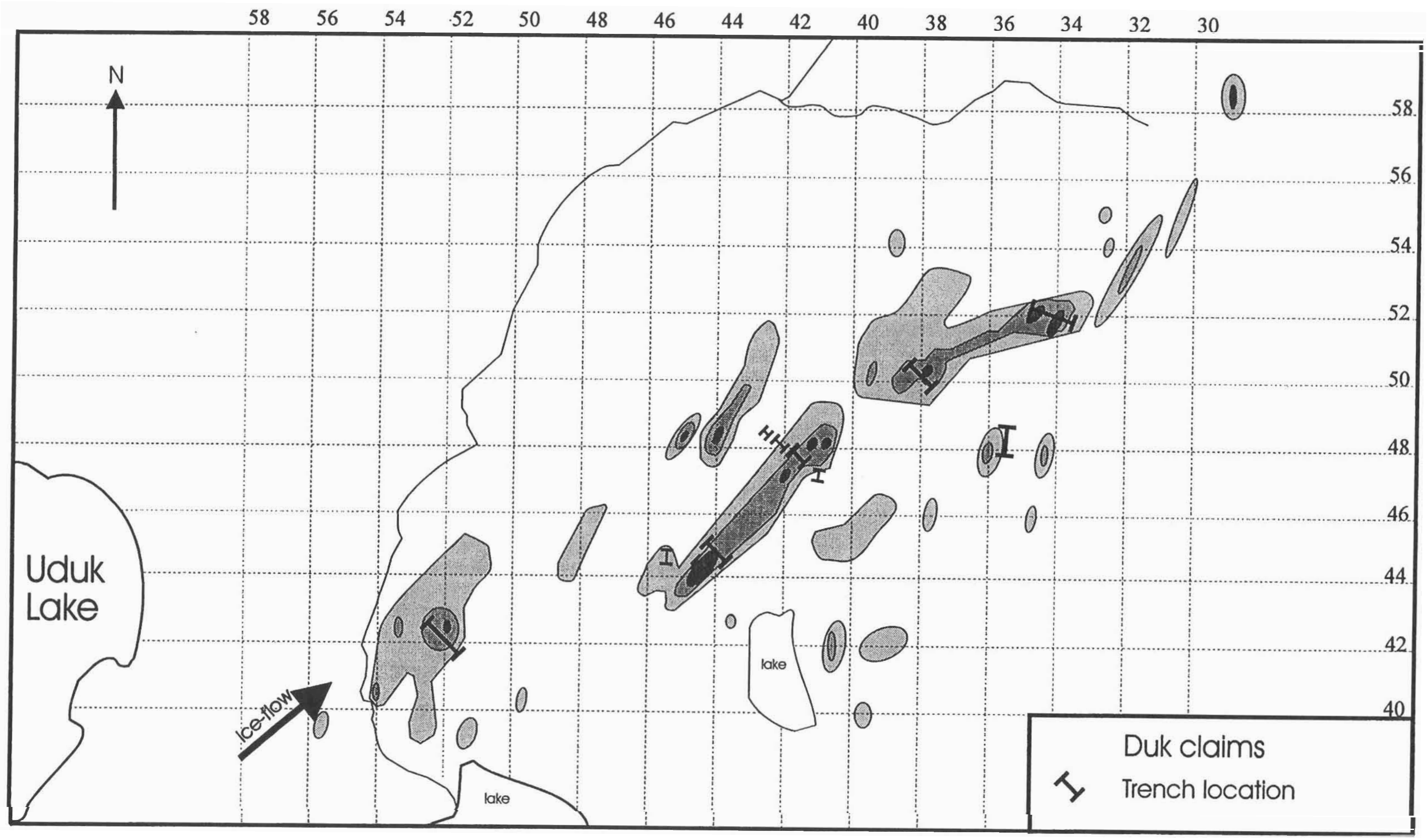


Figure 38: Arsenic (As) in soil, Duk claims, Uduk Lake property (after Tupper and St. Clair Dunn, 1994). Contour intervals 20, 50 and 100 ppm. Note: grid lines are spaced 200 m apart.

anomalies for the Uduk Lake claims and surrounding area are defined differently than geochemical anomalies on the CH and Blackwater-Davidson. The lowest till anomalies were defined as the half of the value of the lowest soil anomaly. Use of a relative comparison was chosen because the soil data set was much larger, and therefore defining 'anomalous' was more easily assessed.

UDUK LAKE (DUK) CLAIMS

Thirty basal till samples were collected on the Duk claims area in hand-dug pits and in trenches. The geochemical dispersal pattern developed for Au forms a train 2500 m long, elongated towards the northeast (Figure 39). The spatial plot of As (Figure 40) also forms a dispersal train which roughly coincides with that of Au (Figure 39) indicating that As may be a suitable pathfinder element for Au on the property. Values for Ag are commonly very low (< 1 ppm) and no continuous down-ice dispersal train was formed. Rather, several isolated anomalies occur in samples close to bedrock (Figure 41). The highest values for Au, As, and Ag occur in trench one, overlying mineralized bedrock: 1050 ppb, 620 ppm and 2.7 ppm, respectively.

UDUK LAKE AREA

Twenty-five basal till samples were collected by foot traverses northeast of the Duk 2 and 3 claims, and along access roads in the study area (Figure 32). Most of the geochemical concentrations for Au and Ag were very low, often just above the detection levels (2 ppb and 0.2 ppm, respectively). Arsenic values are consistent, with the mean approximately 10 ppm. These values likely characterize the local bedrock, and are considered to be background concentrations. Results from the Uduk Lake area survey indicate that geochemical dispersal of anomalous concentrations are limited to approximately 2 km from the mineralized bedrock sources.

COMPARISON OF AREAL DISPERSAL FOR TILL AND SOIL GEOCHEMISTRY

The till geochemistry was compared with the soil geochemistry for Au, As, and Ag on the Duk 2 and 3 claims. The threshold values defining anomalous concentrations are different for the soil and till surveys. The larger sample population from the soil survey constrain the threshold between anomalous and background samples more accurately. None the less, the geochemical data from the till and soil surveys display similar areal geochemical dispersal patterns. Dispersal patterns for both media form anomalies which trend towards the northeast but isolated highs within the overall trends are not always similar. Dispersal patterns of the soil survey are generally discontinuous. Results from this survey suggests soil samples are adequate at defining small (< 2 km) zones of anomalous element concentrations for Au, As and Ag on the Uduk Lake property.

RESULTS AND INTERPRETATION OF SPATIAL GEOCHEMICAL DISPERSAL

Several samples were collected in vertical and horizontal profiles from eight trenches on the property grid (Figures in Appendix C-2 to 9). Results from this study indicate that horizontal and vertical geochemical variability occurs within a single till sheet. Although this phenomenon has been studied (*cf.* Broster, 1986), the reasons for such variability are currently poorly understood (Shilts, 1993).

Horizontal and/ or vertical variability was observed in each trench. Geochemical variability may occur spatially, in the same unit or in a stratigraphic profile. For example, in overburden trench 2, basal till samples collected at approximately the same depth and 4 m apart show considerable variability (Figure in Appendix C-4). Gold values fluctuate from 32 ppb to 139 ppb and As values vary from 28 to 148 ppb. Trench 2 (Figure in Appendix C-5) also displays vertical geochemical variability. The Au value at the base of trench 2 is 24 ppb, at 175 cm above the base it is 139 ppb and at 225 cm above the base it is 47 ppb. Similar trends are observed for As (88, 148 and 21 ppm, respectively), Sb (2.8, 8.2 and 2.5 ppm) and for Ag (0.3, 1.1 and 0.8 ppm).

Several factors are likely responsible for the range of spatial and vertical variability. In till trench 1, geochemical differences can be attributed to differences in the sedimentary facies where the sample was collected. The highest values were encountered in the upper-most unit, a colluvial veneer and the lowest values occur in glaciofluvial units. Geochemical variability within the same till unit is likely a reflection of the variability in the source rock. For instance, in the rock chip samples that were collected from 6 trenches, elemental

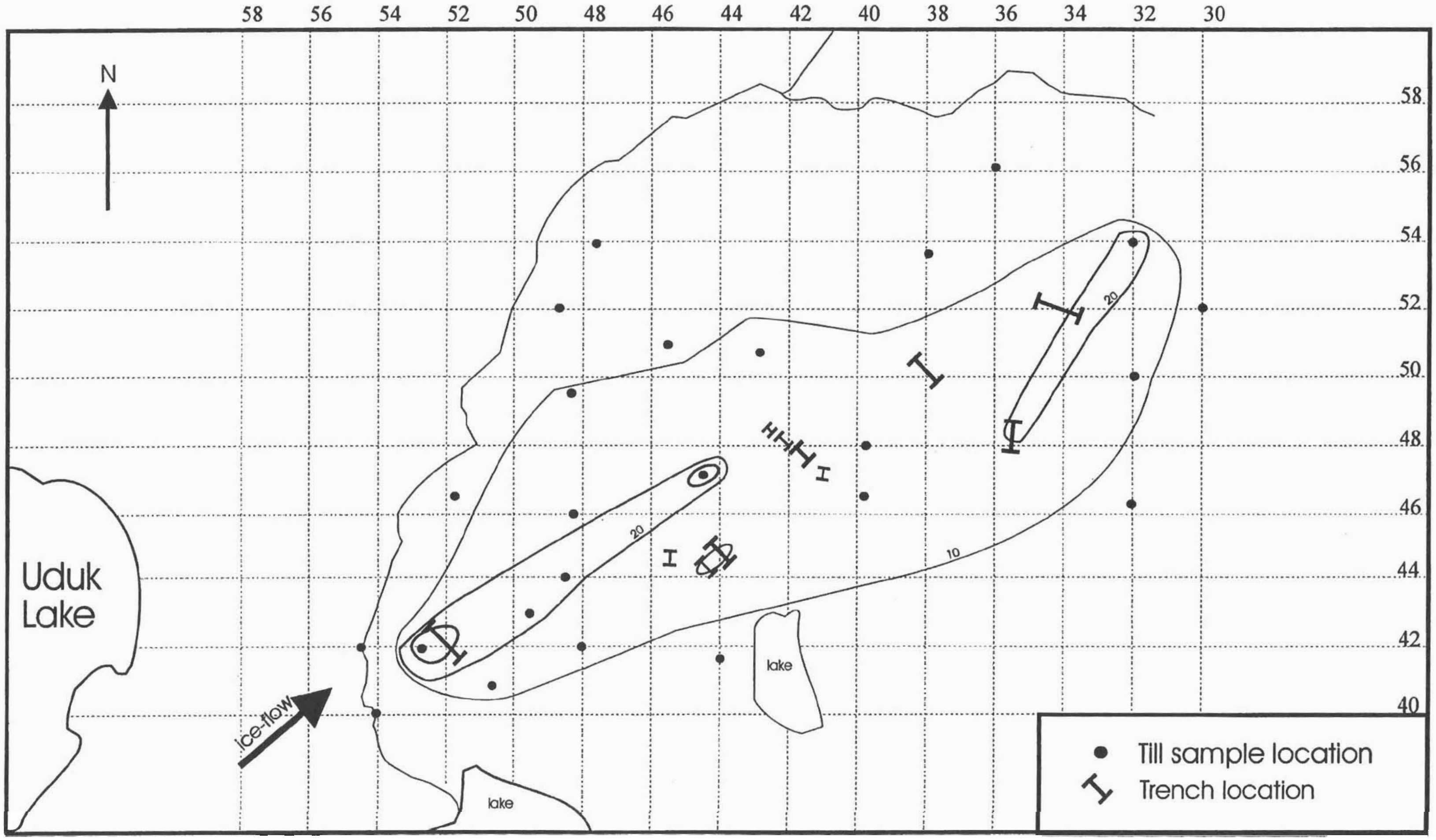


Figure 39: Anomaly plot of gold (Au) in till contoured at 10, 20 and 100 ppb, Duk claims. Note: grid lines are spaced 200 m apart.

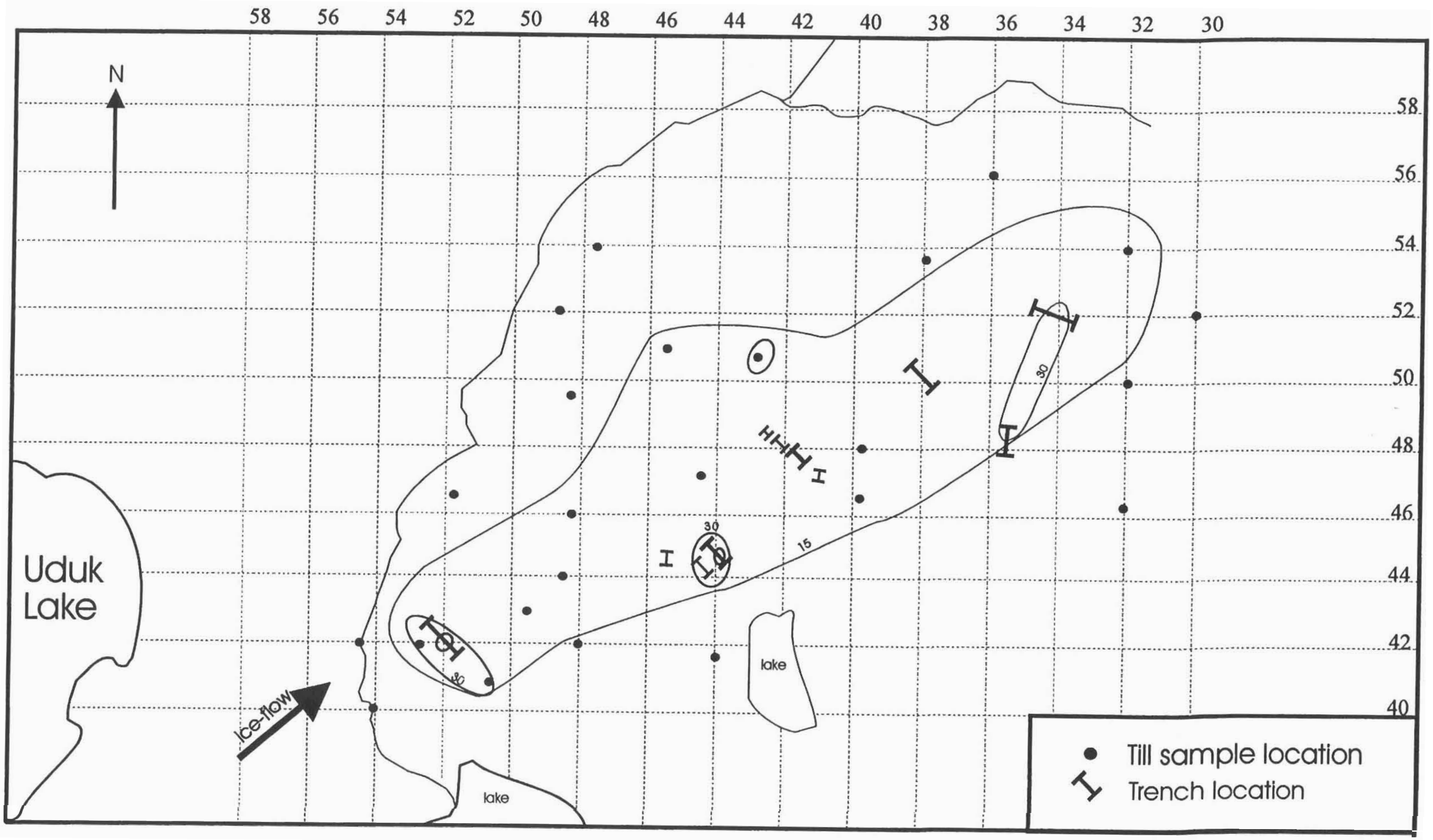


Figure 40: Anomaly plot of arsenic (As) in till contoured at 15, 30 and 50 ppb, Duk claims. Note: grid lines are spaced 200 m apart.

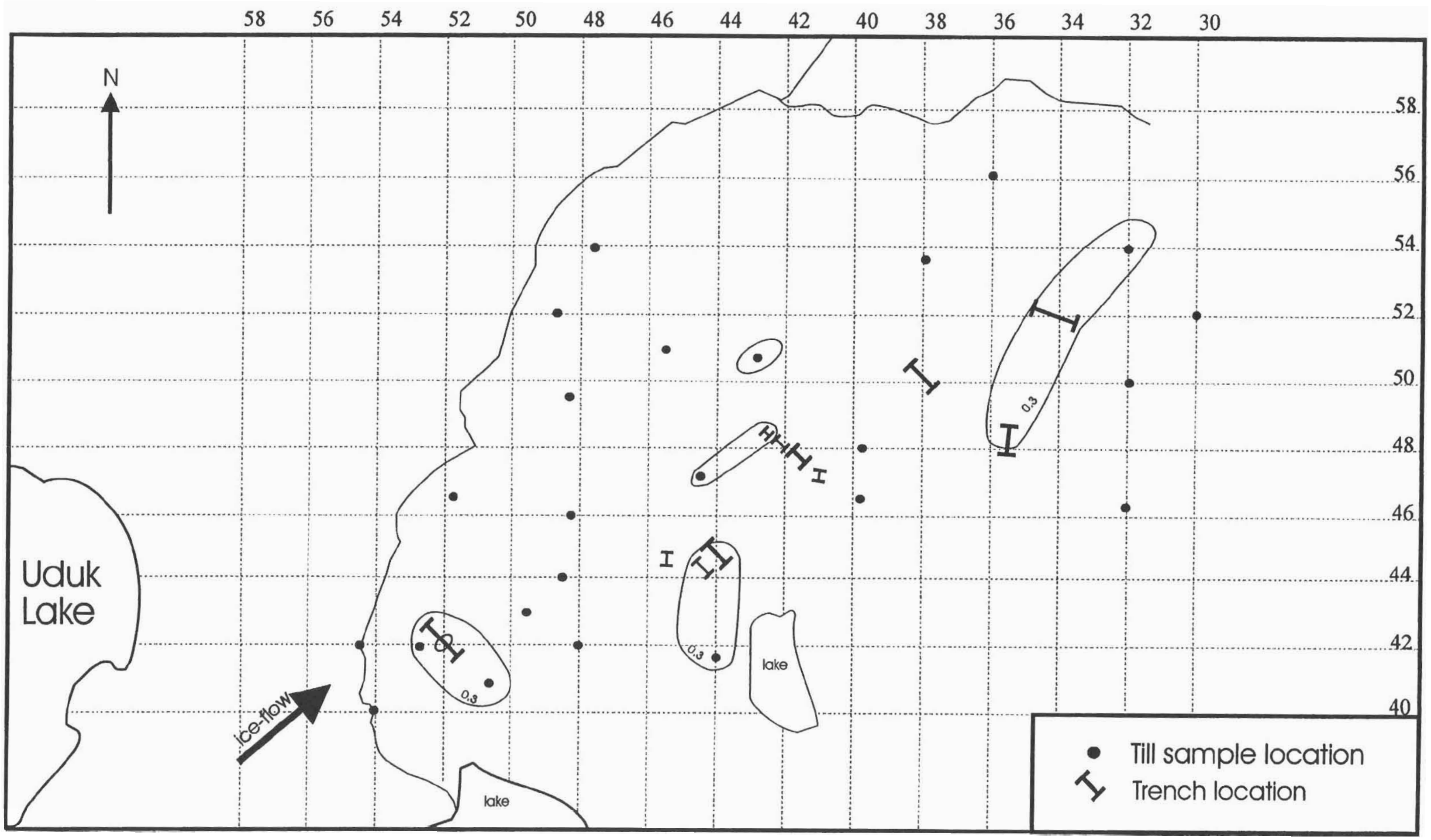


Figure 41: Anomaly plot of silver (Ag) in till contoured at 0.3 and 2 ppm, Duk claims. Note: grid lines are spaced 200 m apart.

variability is common for Au, As, Ag and Sb over distances as small as 1 m. Although the fine fraction of till is the most homogeneous fraction (May and Dreimanis, 1976), there will be "inherited" geochemical variability from the source rock. Finally, a third factor that may be responsible for geochemical variability in the till unit may be due local variations in the glacial dynamics (Shilts, 1993).

TILL AND ROCK GEOCHEMISTRY

Geochemical results from the till survey were compared to rock chip samples collected at 1 m intervals in five of the six trenches encountering bedrock (Tupper and St. Clair Dunn, 1994). A cross-section trending approximately to the northeast, through trenches 3, 2, 4, 5 and 6 contains geochemical values from the rock chips, till and where present, colluvium or glaciolacustrine units (Figure 42). By plotting the geochemistry of the rock and till it is possible to map the down-ice dispersal of the till. The colluvial sediments were likely derived from up-slope bedrock sources.

The dispersal pattern for As, Au, Sb and Ag show comparable patterns in the till unit. A well-developed multi-element down-ice dispersal pattern begins in trench 3, and continues through trench 2 (Figure 42). Geochemical values in till, for Au As and Sb at the head of the anomaly, are greater than the values in the rock chip sample, suggesting the source for these anomalies is likely slightly up-ice of trench 3 (Figure 42). The bedrock geochemical values in trench 4 are very anomalous, but the overlying till samples have background or slightly anomalous values. This suggests that the till unit does not reflect the geochemistry of the underlying bedrock, but instead an up-ice source. Trench 4 on average, contains the highest geochemical values from the rock chip survey, but the till overlying trench 4 does not have the highest values. This observation further supports the theory that till geochemistry reflects up-ice bedrock. Trench 5 also has very anomalous bedrock chip samples, but till samples generally record lower values.

Till and rock geochemical analyses indicate that values from the basal till unit generally do not correlate exactly with values of the directly underlying bedrock. This is likely because although the till is local, it has been mixed with material from other bedrock sources. It is likely that transport distances were low, since the majority of the clasts in the till unit are sub-angular and mainly rhyolitic, which is the local bedrock in the area. Till anomalies tend to occur down-ice of mineralized bedrock, suggesting the overburden anomalies reflect a nearby mineral source.

The source for the anomalies in the uppermost colluvial unit may be different than the source of lower units, since geochemical values from each unit do not always correlate. However, the upper colluvial unit is locally-derived and the source is likely slightly up-slope.

Results from the soil and till surveys further suggest geochemical anomalies occur in areas where overburden is generally less than a meter thick. Therefore, samples collected in areas with thin overburden provide the most accurate reflection of the local bedrock geochemical signature. In areas with thicker overburden, till samples collected immediately overlying bedrock most accurately reflect the local bedrock geochemistry. Thus, the most favorable location for till sample collection is directly over bedrock.

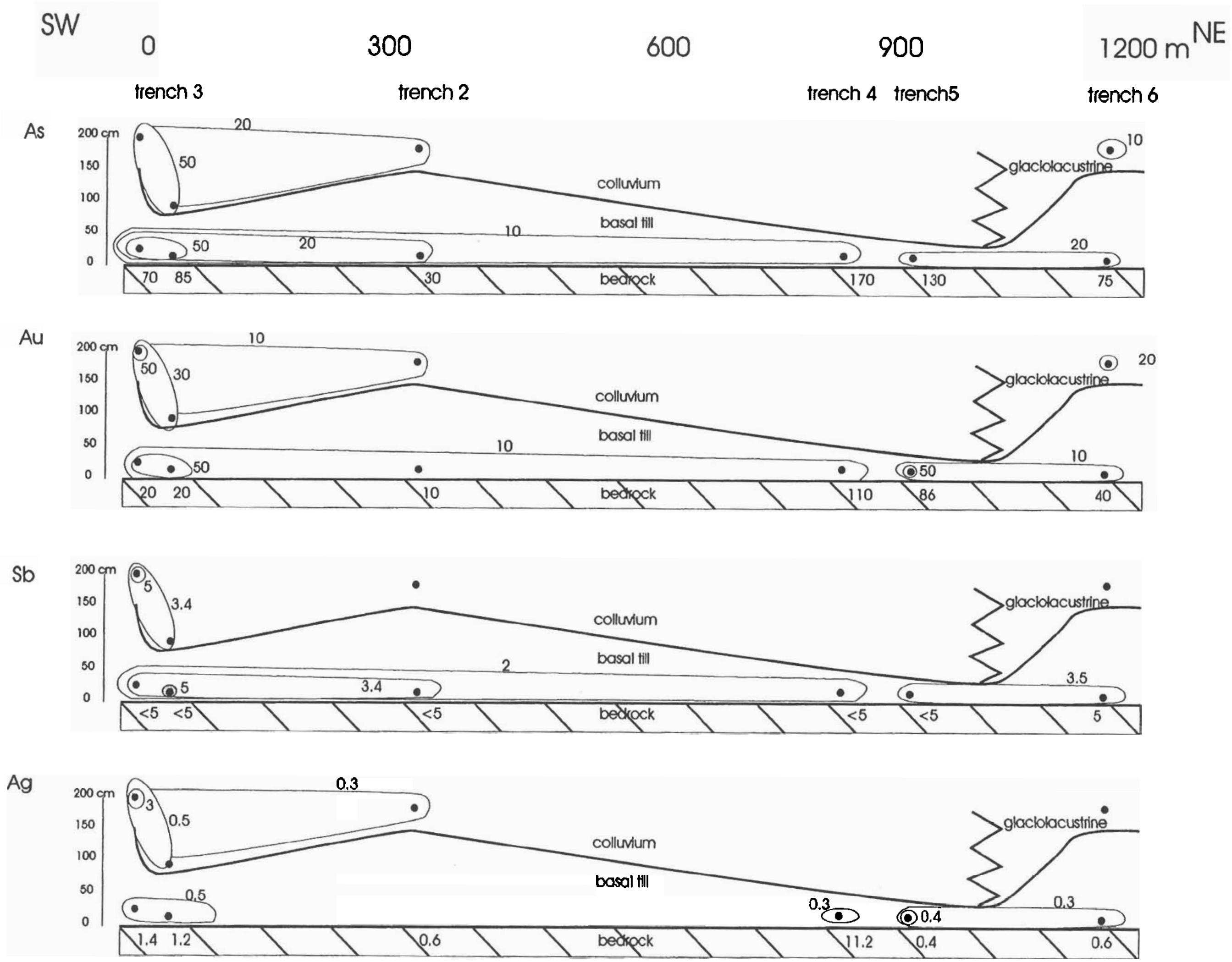


Figure 42: Two dimensional cross-section with dispersal patterns for As, Au (ppb), Sb and Ag (in ppm), using bedrock as a datum, Duk 2 and 3 claims, Uduk Lake property. Bedrock samples for geochemical assays collected approximately underlying the overburden samples.

DISCUSSION

COMPARISON OF TILL DISPERSAL PATTERNS OF THE THREE MINERAL PROPERTIES

In the study areas, only one dominant ice-flow direction was recorded which may have varied locally on each property. No evidence of multiple till sheets in the regional area have been documented and the data is believed to represent dispersal within a single till sheet. Glacial conditions were similar throughout the regional area with ice-flow towards the northeast, thus, differences in the till geochemical dispersal patterns can be attributed to: (1) local changes in the glacial dynamics (glacier flow velocity, temperature or, locally, direction); (2) differences in topography; and (3) differences in the source size and orientation, and the susceptibility of bedrock units to erosion (Shilts, 1976). For the purpose of this study, it was assumed that all till samples represent basal till. If this was not the case, some variations in geochemical dispersal patterns could be due to different modes of entrainment and/or depositional processes.

Dispersal trains were identified in basal till samples collected on all three mineral properties. The size, shape and magnitude of the geochemical anomalies were variable for each mineral property, and were of different areal extent for the various elements examined. Dispersal trains were mainly elongated in the direction of the last major ice-flow event, most commonly towards 045-060°. The magnitude of the geochemical anomaly in the dispersal train commonly decreased in the down-ice direction. Some exceptions were documented when more than one bedrock source contributed to the anomaly (*i.e.* Cu, Pb on CH, Figures 13,14; and Au, Ag on Uduk Lake, Figures 39,40).

ANOMALY SHAPE

CH MINERAL CLAIMS

The dispersal trains on the CH mineral property are mainly ribbon-shaped, which is characteristic of linear, unidirectional ice-flow (*cf.* Shilts, 1976), but may fan-out in the down-glacier direction (*e.g.* Cu, Figure 13). The anomaly patterns for several elements are irregular likely due to multiple sources on the property (*cf.* Drake, 1983; *e.g.* Cu, Figure 13; As, Figure 17). Geochemical anomaly plots are well-defined when the sample density is relatively high (> 10 samples per km^2), but become less well-defined with lower sample density (*i.e.* samples collected down-ice of the CH claims).

BLACKWATER-DAVIDSON MINERAL CLAIMS

The shapes of the dispersal patterns on the Blackwater-Davidson mineral property are highly variable. Anomalous samples are concentrated on the central grid on the Pem claims (Figures 26-31). Dispersal patterns are typically defined by less than 15 samples with anomalous geochemical concentrations, which can occasionally form irregular patterns. In this study area, therefore, the shape of the anomaly is highly dependant on the sample spacing and site locations because the sample density is variable, but on average less than 2 samples per km^2.

UDUK LAKE MINERAL CLAIMS

The mineralized bedrock, and the soil and till geochemical anomalies are concentrated in an area trending towards 050°, parallel to ice-flow direction and also parallel to some regional structures and possibly lithologic or alteration trends. If the mineralized area is parallel to the last ice-flow direction, the dispersal train should be elongated in this direction (*cf.* Shilts, 1976), which was the pattern developed for Au and As (Figures 39, 40).

SIZE OF DISPERSAL TRAINS

CH MINERAL CLAIMS

The dimensions of the geochemical dispersal patterns in the CH area, as defined by the threshold value of the 75th percentile of the regional data, were generally very large, some 7 km long and 1-2 km wide. The longest dispersal train was formed by Pb, spanning a distance approximately 10 km. Lead commonly has very low values in the till (*i.e.* regional mean 9.1 ppm for 93 F/7, Weary, 1996) and bedrock in the region. Distinct geochemical components, such as Pb in the CH area, are easier to trace and the dispersal pattern should be well-defined (*cf.* Shilts, 1993). The highly anomalous till samples on the property were often associated with previously identified sources, such as the April showing (*e.g.* Zn, Figure 15) and mineralization of bedrock exposed in trenches on the main grid (*e.g.* Cu, Figure 13). However, sites west and northwest of the April showing also have very anomalous concentrations (*i.e.* Zn, Figure 15; and As, Figure 17) suggesting an additional up-ice source. Similarly, anomalies in samples south and northwest of the mineralized trench in the central grid area (*i.e.* Cu, Figure 13) also indicate that there are more than one source, with the head of the anomaly further to the west than the trench. New geochemical anomalies were identified in this study which may be related to previously undetected mineral sources.

BLACKWATER-DAVIDSON MINERAL CLAIMS

Dispersal trains, using a threshold value based on the 75th percentile from the regional data set, extend to a maximum distance of 5.5 km (Figure 26, 4.9), and are on average 4 km long and 0.5 km wide on the Blackwater-Davidson property. One significant multi-element anomaly was detected on the northwestern quadrant on the Pem grid (Figures 27, 29, 30, 31). This area contained most of the highly anomalous samples of the study area. The head of the Au dispersal anomaly pattern was located 0.3 km to the south (Figure 28).

Positive topographic features, such as Mount Davidson, commonly slow, block, or divert advancing glaciers, thereby altering the dispersal pattern (*cf.* Broster and Huntley, 1995). The glacier's erosive capacity becomes greatly diminished when the flow velocity decreases. Thus, the smaller dimensions of the geochemical dispersal trains on the Blackwater-Davidson claims may be a result of lower abrasion rates due to the high relief and the resulting glacial dynamics (*e.g.* areas of stagnant or slow-flowing ice).

UDUK LAKE MINERAL CLAIMS

On the Duk 2 and 3 claims of the Uduk Lake property, the dispersal trains are 2 km long and 0.5 km wide for Au and As (Figures 39, 40). Rock chip samples collected from trenches on the Duk claims indicate that multiple mineralized bedrock sources probably contribute to the geochemical anomaly (Figure 42). Till anomalies are rarely very anomalous, perhaps a reflection of the low grade in the bedrock source (approximately 1 gram per tonne Au; Tupper and St. Clair Dunn, 1994). Relatively short dispersal patterns on the Duk claims indicate that geochemical homogenization occurred quickly in the till. The geochemical signature of the mineralized rock was quickly diluted within the glacier load. This likely occurred because little bedrock debris was eroded and entrained by the glacier at the Uduk Lake area. Resistant rock types, such as silicified rhyolite (the local bedrock), are more difficult to erode and consequentially less debris is incorporated in the glacier (*cf.* Coker and DiLabio, 1989).

POTENTIAL SOURCES OF THE GEOCHEMICAL ANOMALIES

Drake (1983) and Miller (1984) demonstrated dispersal trains can have abrupt vertical and lateral contacts in till and that trains climb gently to the surface within the till sheet. This is significant for follow-up studies since the source of the highest anomaly may be several hundred meters up-ice. However, in areas of thin till (< 1 m), the source is likely to be just up-ice of the highest geochemical value in the anomaly or of the apex of a fan-shaped dispersal pattern.

CH MINERAL CLAIMS

Several sources for geochemical anomalies on the CH property have been previously identified on the April showing and the main grid area (Edwards and Campbell, 1992). Both of these sources could be recognized in till geochemical dispersal patterns. However, the till geochemical anomalies begin up-ice of these sources. This suggests that other bedrock sources, further up-ice are partly responsible for the anomalies. The potential bedrock source on the property may coincide with part of the geophysical IP anomaly (Figure 5). The geophysical IP anomaly intersects with the head of the the soil anomalies on the central grid area (Figures 7-12), with the head of the Cu anomaly in till (Figure 13) and coincides with many very anomalous Pb, Zn, Ag, As and Au till sample sites (Figure 14-18). However, several of the most anomalous samples occur on the crest of a 15 m high, sediment-cored drumlin (i.e Cu, Figure 13; Pb, Figure 14). This indicates that the source is further to the west than suspected.

Thus, the sources identified by the geochemical dispersal trains in till on the CH claims (Figure 43) are: (1) up-ice and including the April showing; (2) up-ice and including the central grid area; (3) northwest of the central grid area , up to the new logging road, and possibly (4) the multi-element anomaly east of Chutanli Lake, also identified by a lake geochemical survey (Cook, 1996). The fourth target area is very poorly defined because this area is blanketed by very thick (>15 m) surficial deposits, and only a few till samples were collected in this area.

BLACKWATER-DAVIDSON MINERAL CLAIMS

One main broad multi-element (Pb, Zn, Ag, As, Sb) geochemical anomaly was identified in till on the Pem claims (Figures 26, 27, 29, 30, 31). The head of the anomalies, as defined by the highest element concentrations, is generally coincident for Pb, Zn, As and Sb. This suggests a source on the west edge of the Pem grid. Till thickness is critical on this property for estimating the length of a possible down-ice displacement of the anomaly. If the till is very thick, the displacement can be up to 500 m (Levson, personal communication). A displacement of this magnitude would imply the bedrock source area is about 0.5 km southwest of the main drill grid (Figure 20). In addition, because the Pem grid is located on the lee side of Mount Davidson, down-slope modification of the anomaly patterns may also have occurred.

. The Au dispersal anomaly occurs 0.5 km south of the multi-element anomaly, suggesting the possibility of a different source for Au mineralization (Figure 28). Additional till geochemical sampling is required to further define the geochemical anomalies and delineate the source more accurately.

UDUK LAKE MINERAL CLAIMS

Several bedrock sources were identified in chip samples from trenches on the Duk claims. In this area, the till sheet is very thin and it appears that glacial processes were very effective at diluting and homogenizing the bedrock debris. It is estimated that the bedrock sources are likely less than 100 m up-ice of the head of the till anomalies. Although till thickness is locally thin (< 1 m), areas with thicker deposits may mask an anomaly. This is because local glaciofluvial, glaciolacustrine and debris flow units form thick deposits which can mask the geochemical signature of the underlying bedrock.

REASONS FOR DIFFERENCES IN DISPERSAL PATTERNS ON THE THREE MINERAL PROPERTIES

It is inferred that the glacier was warmed-based in all of the study areas, because of the widespread occurrence of glacial erosional features, such as streamlined drumlins, ridges and flutings. The most significant bedrock factors responsible for differences in the size of the geochemical dispersal trains on the three mineral properties are: the size, orientation and susceptibility to erosion of the bedrock sources; the number of bedrock sources; and the amount and type of mineralization.

In the CH claims area, the mineralized bedrock units are sedimentary and intrusive (Figure 4). Multiple sources have been identified and part of the mineralized bedrock may trend perpendicular to ice-flow direction. These conditions were conducive to forming several well-developed, multi-element dispersal trains.

In the Blackwater-Davidson claims area, there appears to be one significant bedrock source, but there is insufficient information about the source rock to completely account for the dispersal patterns. The geochemical dispersal trains form anomalies on the northwestern and southwestern quadrants of the Pem claims, which extend parallel to ice-flow direction. Only sparse outcrop occurs on the Pem claims, thus the source rock of these anomalies may be relatively small. Furthermore, the sample spacing is too sparse to be effective at delineating small mineralized bedrock sources. Finally, in addition to the bedrock factors affecting the dispersal patterns in the Mount Davidson area, high relief may have caused a decrease in glacier flow velocity or partial division of the main flow around the side of the mountain rather than over the top, thereby decreasing abrasion rates and forming smaller dispersal trains than would have occurred under fast-moving ice conditions.

In the Uduk Lake claims area, mineralized bedrock sources occur sporadically over 2 km^2. The bedrock is highly resistant silicified rhyolite, which results in limited erosion and dispersal. The till unit is often very thin (<1 m) and should reflect the local bedrock. Relatively small dispersal trains were

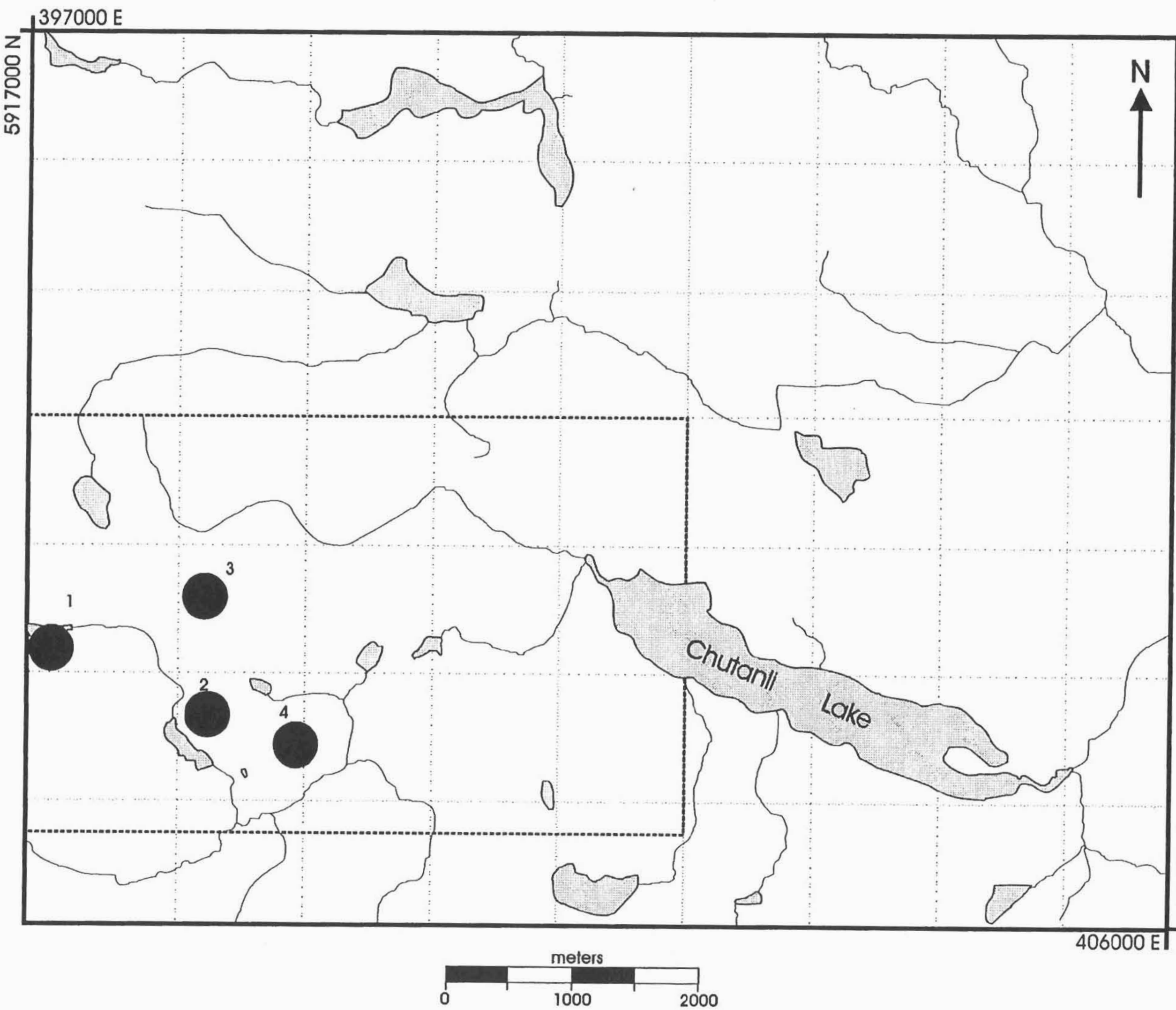


Figure 43: Potential sources for the till geochemical anomalies: (1) northwest, south and near the April showing, (2) west of and on the central grid, (3) northwest of the central grid and (4) east of Chutanli Lake, CH claims.

formed. One possibility to account for the short dispersal trains is that the bedrock was masked by preglacial sediments, protecting the bedrock from erosion. No evidence for this phenomenon was observed, and the abundance of erosional features suggests otherwise. A second possibility to account for the small geochemical dispersal trains is that fast-moving ice was well-lubricated by high volumes of meltwater, effectively sliding over the streamlined features and not incorporating large volumes of local bedrock debris.

TILL AND SOIL GEOCHEMISTRY

A goal of this study is to compare the geochemical results from C-horizon basal till samples with soil samples on a property scale. Industry programs commonly consist of sampling soil from the A or B horizon, along a grid (Kerr, 1995). It has been shown that soil geochemical data can be used to locate the source of mineralized bedrock (Gleeson *et al.*, 1989). However, this type of exploration program was developed in areas covered with residual soil, not in areas of transported soils, as with glacial sediments (Shilts, 1993). Thus, soil geochemical sampling in areas with glacial sediments may not reflect the immediately underlying bedrock, but rather, the up-ice or up-slope bedrock.

SECONDARY FACTORS AFFECTING DISPERSAL TRAINS

Secondary or epigenic dispersion occurs after glaciation, and is the result of chemical remobilization processes (Saarnisto, 1990). Secondary effects must be considered when analyzing geochemical results, since weathered soil may not accurately reflect the local bedrock (Kettles and Shilts, 1990). For example, due to the soil processes active in the B-horizon, it is expected that concentrations will be lower for mobile elements (*i.e.* Cu, As) but more concentrated for immobile elements (*i.e.* Au, Pb) compared to till samples in the C-horizon. Groundwater also leaches and remobilizes certain metals, which are later absorbed onto phyllosilicates, hydroxides or oxides (Levinson, 1974). Groundwater and soil water may remobilize elements down-slope.

Soil geochemistry is a result of a complex exchange of matter between the various soil-horizons, overburden material, underlying bedrock, water and vegetation. Thus, interpreting soil data becomes a difficult task in attempting to decipher the many and variable processes responsible for soil geochemistry (Levson and Giles, 1995). Moreover, areas with thick overburden, complex glacial sediments or variable relief further complicate interpretation of soil data (Hornibrook *et al.*, 1993; Broster and Huntley, 1995).

TILL AND SOIL DISPERSAL ANOMALIES

Comparing the geochemical results of the soil and till media on the three mineral properties involved mapping the surficial geology of the study sites. This was necessary to determine what surficial unit was likely sampled during the soil surveys. Soil samples on the CH and Blackwater-Davidson claims often consisted of B-horizon glaciofluvial and washed till deposits, since sand and gravel, and loose diamicton deposits frequently form a veneer on both properties (Figures 6, 22). The finer sediments of glaciofluvial and washed till deposits may be winnowed and remobilization of the more mobile elements may occur.

In this study, the geochemistry of C-horizon basal till samples was generally compared to the geochemistry of B or C-horizon glaciofluvial samples. The general trend of the dispersal patterns of glaciofluvial sediments was often found to be similar to that of the underlying till. This phenomenon could be attributed to two causes: the glaciofluvial unit is very locally derived and has a geochemical signature to similar to that of the underlying bedrock and basal till or that the glaciofluvial unit is mainly derived from the underlying till. This phenomenon was mainly observed in areas where glaciofluvial units were observed to be relatively thin (< 2 m), which provides support for the second cause, that the glaciofluvial unit is likely reworked till. Soil sampled in areas with channelized meltwater flow or small glaciolacustrine deposits did not share the same anomaly trends as near-by till .

The till and soil geochemical anomaly patterns from the CH, Blackwater Davidson and Uduk Lake mineral properties were compared. The size, shape and magnitude of the geochemical anomalies were often different for several reasons: firstly, differences in the location and density of sample sites; secondly, “anomalous” geochemical concentrations were defined differently for the soil and till data sets; and finally, inconsistent definition of "anomalous" concentrations for the various elements analyzed in the soil surveys, by the property owners.

Dispersal patterns for a given element were frequently found to be different when comparing soil and till geochemical plots. However, till and soil geochemical patterns were sometimes similar and in some cases, the geochemical anomalies for the most elevated till and soil samples occurred in approximately the same vicinity (*i.e.* Zn, Figures 10 and 15 and As, Figures 12 and 17, on the CH claims; and Au, Figures 23 and 28 and Pb, Figures 25 and 26 on the Blackwater-Davison claims; and As, Figures 38 and 40 on the Uduk Lake claims). However, comparisons on the Blackwater-Davidson property may not be statistically valid, since only twelve till samples were collected on the Pem grid.

The dispersal patterns on the CH claims are similar for soil and till in that both define roughly the same anomalous area. Both surveys outline the known areas of mineralization and identify previously undetected prospects. The heads of the soil patterns may be located down ice (or down-slope) of the heads of the till anomalies (*i.e.* Au in the central grid area, Figures 7, 18). This implies that the soil anomaly has been transported relative to the till. The probable cause for this is that the material sampled in the soil survey was washed till or thin glaciofluvial deposits, derived from basal till and transported down-slope. This demonstrates the importance of identifying the surficial materials sampled during a property-based soil survey. Till geochemical surveys sampled only one sample medium and thus likely provide more consistent geochemical results.

The dispersal patterns for the Uduk Lake property are also very similar for the soil and till survey. The soil survey is very detailed and is more proficient at identifying isolated anomalies than the till survey. However, till sampling at a much lower density is more effective than soil-sampling in identifying geochemical anomalies.

CONCLUSIONS

The primary bedrock factors controlling dispersal on the CH, Blackwater-Davidson and Uduk Lake mineral properties are the size of the source, topography and the bedrock's resistance to erosion. Ice conditions were conducive to forming long dispersal trains on the CH mineral property. Meltwaters in the Uduk Lake area lessened the amount of friction between the glacier and underlying substrate. This reduced the glacier's erosive ability which consequentially formed smaller dispersal trains. In the Mount Davidson area, slow moving ice masses are likely responsible for small geochemical dispersal trains.

In addition to the element concentrations, the size and shape of anomaly patterns are dependant on the number of samples and density of sample collection. This dependancy is reduced when geochemical samples are collected at a close (< 2 km apart), evenly-spaced intervals. The sample grid used should be orthogonal to ice-flow to maximize the possibility of encountering a down-ice dispersal train.

From the results herein, it is possible to identify the minimum sample spacing that would have intersected the anomalous concentrations during a regional till sampling program. For example, a till sampling program with a low sample grid (one sample every 6 km) would have intersected the geochemical anomalies in the CH area, an intermediate sample density (one sample every 4 km) would have intersected the Blackwater-Davidson geochemical anomalies and a relatively high sample density (one sample every 2 km) would have intersected the Uduk Lake anomaly.

Relatively low-density sampling surveys of till appear as effective at identifying anomalies on a property grid as very detailed, high-density soil surveys. The main advantage of using basal till samples rather than soil samples is that it is possible to delineate the source of the anomaly with some confidence, since basal till is a first-order derivative product (Shilts, 1976). Common soil-sampling procedures do not attempt to discriminate the surficial unit. Thus, soil overlying colluvium, till, glaciolacustrine and glaciofluvial sediments are collected and compared directly with samples of differing genesis. This creates a major problem when interpreting soil geochemistry data. A second problem with soil is that mobile elements are commonly leached, although the effects of secondary dispersion can be reduced if samples are collected from the C-horizon. However, results from this study demonstrate that soil geochemistry can be effective at defining local geochemical anomalies in different sample mediums (*e.g.* soil formed over colluvium and basal till). Soil anomalies occurred in glaciofluvial or related sediments in areas where the glaciofluvial unit was thin and was locally-derived (<1 km) from bedrock or basal till. Soil geochemistry was not effective for defining local geochemical anomalies in areas overlain by channelized glaciofluvial deposits or glaciolacustrine deposits.

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Till Geochemical Dispersal in Central British Columbia

Open File 1997-12

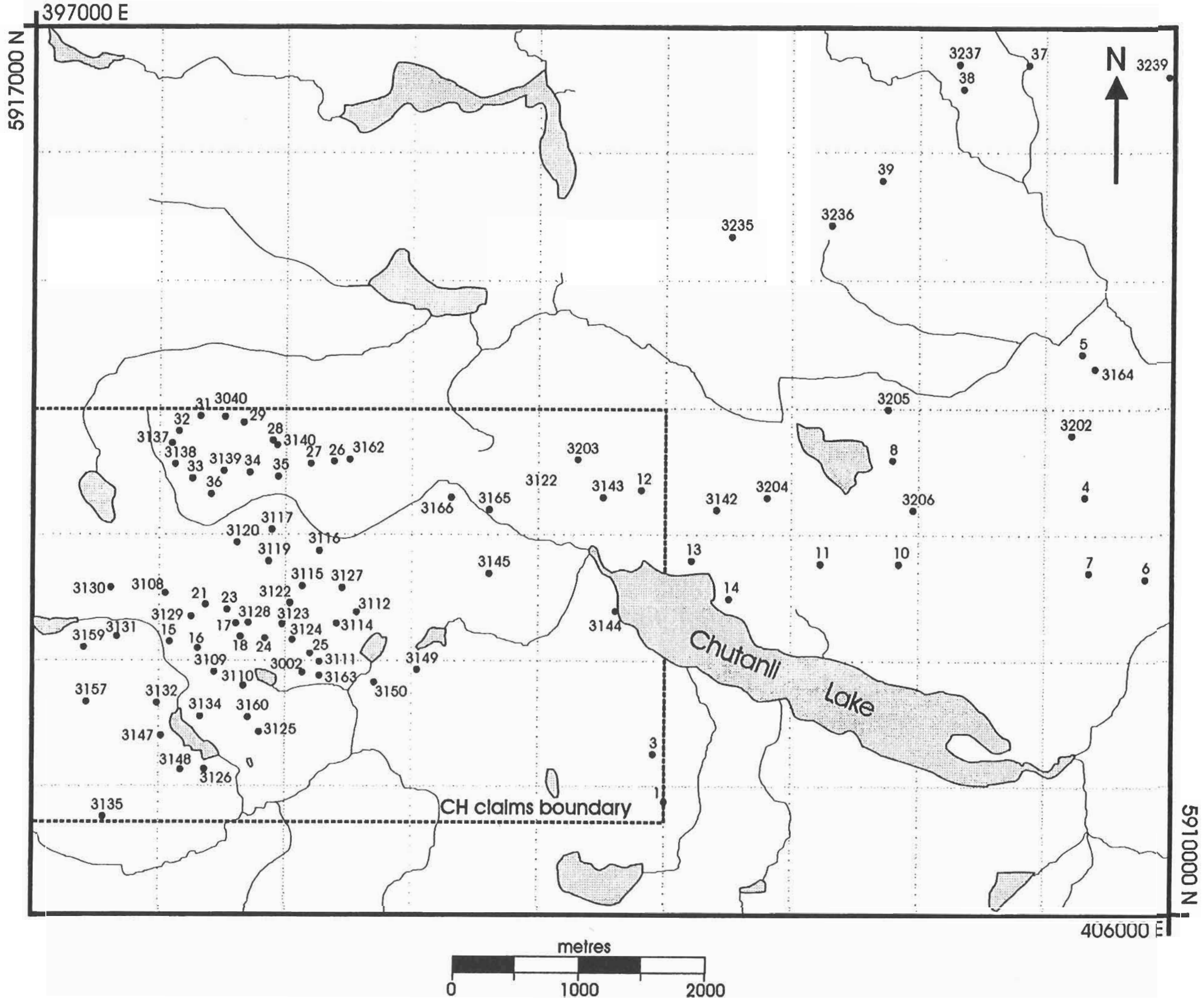
Appendix A

CH Mineral Property

Notes:

Sample site locations: Till geochemical samples were collected in the 1994 and 1995 field seasons in the CH area. The locations are identified by UTM coordinates.

Till Geochemistry: Till geochemical analysis was performed by Activation Laboratories Limited (ACTLAB). Preliminary sample preparation was conducted by the B.C. Geologic Survey. Arsenic plus 45 additional elements (Au, Ba, Br, Ca, Co, Cr, Cs, Fe, Hf, Ir, Mo, Na, Rb, Sb, Sc, Se, Sr, Sn, Ta, Th, U, W, La, Ce, Nd, Sm, Eu, Tb, Yb, Lu, Ag, Al, B, Cu, K, Ni, Zn, Cd, Bi, V, P, Mg, Ti, Mn, Pb) were analysed using instrumental neutron activation analysis (INAA) and inductively coupled plasma emission spectroscopy (aqua regia - ICP analysis).



Appendix A - Figure 1: Numbered sample locations, CH claims area.

UTM's of CH Sample Sites

CH 1994 Sample	UTM North	UTM East
3002	5911906	399127
3040	5913815	398524
3108	5912541	398044
3109	5911910	398433
3110	5911802	398662
3111	5911992	399263
3112	5912391	399558
3114	5912300	399400
3115	5912598	399126
3116	5912876	399261
3117	5913043	398884
3119	5912793	398860
3120	5912940	398610
3122	5912465	399029
3123	5912296	398968
3124	5912169	399048
3125	5911434	398790
3126	5911139	398357
3127	5912585	399444
3128	5912311	398636
3129	5912355	398250
3130	5912586	397612
3131	5912197	397660
3132	5911664	397981
3134	5911558	398323
3135	5910761	397553
3137	5913846	397996
3138	5913562	398118
3139	5913508	398503
3140	5913716	398923
3142	5913200	402400
3143	5913300	401500
3144	5912400	401600

CH 1994 Sample	UTM North	UTM East
3145	5912700	400600
3147	5911406	398015
3148	5911134	398171
3149	5911930	400036
3150	5911827	399699
3157	5911672	397421
3159	5912108	397397
3160	5911550	398700
3162	5913668	399418
3163	5911882	399263
3164	5914320	405380
3165	5913200	400600
3166	5913300	400300
3202	5913800	405200
3203	5913600	401300
3204	5913300	402800
3205	5914000	403750
3206	5913200	403950
3235	5915500	402500
3236	5914900	403700
3237	5916700	404300
3239	5916600	406000

CH 1995 Sample	UTM North	UTM East
CH 95 01	5910881	401990
CH 95 03	5911261	401902
CH 95 04	5913307	405307
CH 95 05	5914435	405280
CH 95 06	5912663	405791
CH 95 07	5912709	405341
CH 95 08	5913598	403786
CH 95 10	5912774	403838
CH 95 11	5912775	403220
CH 95 12	5913356	401802
CH 95 13	5912800	402200
CH 95 14	5912500	402500
CH 95 15	5912154	398078
CH 95 16	5912100	398300
CH 95 17	5912300	398600
CH 95 18	5912194	398636
CH 95 19	5912305	398700
CH 95 21	5912451	398360
CH 95 23	5912411	398533
CH 95 24	5912181	398832
CH 95 25	5912059	399188
CH 95 26	5913585	399376
CH 95 27	5913566	399191
CH 95 29	5913893	398657
CH 95 31	5913943	398315
CH 95 32	5913823	398147
CH 95 33	5913449	398257
CH 95 34	5913497	398708
CH 95 35	5913464	398933
CH 95 36	5913323	398403
CH 95 37	5916694	404849
CH 95 38	5916506	404335
CH 95 39	5915781	403697

CH INA Analytical Data

Element	Au	As	Ba	Br	Co	Cr	Cs	Fe	Hf	Hg	Ir	Mo	Na	Rb	Sb	Sc	Se	Sn	Sr	Ta	Th	U	W	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu	Mass
Units	PPB	PPM	PPM	PPM	PPM	PPM	PPM	%	PPM	PPM	PPB	PPM	%	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	g
Method	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	bal
Lab.	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT
Detection limit	2	0.5	50	0.5	1	5	1	0.02	1	1	5	1	0.01	15	0.1	0.1	3	100	500	0.5	0.5	0.5	1	0.1	3	5	0.1	0.2	0.5	0.2	0.05	
3002	18	36	950	1.9	10	54	3	6.1	8	<1	<5	<1	1.99	70	4.8	14	<3	<100	<500	2	8.3	3	9	37	84	29	6.2	1.7	<0.5	2	0.36	24.81
3040	5	34	1300	2.5	14	120	4	5.56	5	<1	<5	3	1.8	49	5.3	20	<3	<100	<500	<0.5	4.8	2	<1	23	49	22	5.6	1.7	0.7	3.5	0.57	20.17
3108	7	68	720	1.9	10	110	3	4.31	5	<1	<5	<1	1.8	40	6.1	16	<3	<100	<500	<0.5	3.7	1.9	<1	21	40	16	3.5	1.2	0.5	2.3	0.38	29.03
3109	4	4.8	700	<0.5	9	45	1	3.54	4	<1	<5	<1	2.17	36	1.1	13	<3	<100	<500	<0.5	3.3	1.5	<1	17	33	12	2.8	1	<0.5	2.3	0.38	30.11
3110	7	33	500	<0.5	10	90	2	3.73	8	<1	<5	1	2.21	60	1.6	11	<3	<100	<500	<0.5	4.6	2	<1	22	41	16	3.4	1	<0.5	2.4	0.43	29.26
3111	15	19	710	0.9	8	96	3	4.01	6	<1	<5	6	1.97	40	4.2	12	<3	<100	<500	<0.5	4.5	2.5	<1	25	44	18	4.1	1.4	<0.5	2.7	0.44	30.21
3112	85	29	760	<0.5	11	68	3	4.63	6	<1	<5	4	2.03	58	6.3	14	<3	<100	<500	<0.5	3.5	1.5	<1	23	40	19	4.5	1.3	<0.5	2.4	0.36	6.943
3114	84	40	720	<0.5	13	61	4	5.63	5	<1	<5	14	1.83	38	24	12	<3	<100	<500	<0.5	5.3	1.6	<1	29	44	27	5.3	1.8	0.9	2.7	0.41	28.64
3115	20	68	690	2.5	9	72	2	3.71	5	<1	<5	<1	2.01	58	3.7	11	<3	<100	<500	<0.5	4.4	2	<1	22	43	19	3.7	1.2	0.6	2.3	0.39	29.87
3116	3	14	740	2.1	7	65	2	3.13	5	<1	<5	2	2.15	35	2.1	11	<3	<100	<500	1.3	4.1	1.2	<1	21	44	14	3.5	1	<0.5	2.3	0.38	30.21
3117	<2	35	850	1.7	9	56	2	3.68	5	<1	<5	<1	2.3	37	2.4	13	<3	<100	<500	<0.5	5	2.5	<1	22	45	11	3.9	1.3	0.7	2.5	0.42	28.71
3119	20	20	890	10	7	70	3	3.51	6	<1	<5	<1	1.95	68	2.3	16	<3	<100	880	0.8	6	3.6	2	26	45	24	5.2	1.6	0.8	3.7	0.65	24.83
3120	29	34	930	1.8	8	61	2	3.54	5	<1	<5	<1	2.22	45	2.4	11	<3	<100	930	<0.5	4.1	2.6	<1	21	42	15	3.5	1	0.7	2.4	0.38	26.58
3122	11	39	750	<0.5	8	74	2	3.71	6	<1	<5	3	2.38	59	2.7	11	<3	<100	<500	<0.5	4.9	1.6	<1	24	49	15	3.8	1.2	0.5	2.4	0.38	29.86
3123	<2	8	560	1.6	10	110	2	4.35	10	<1	<5	<1	2.16	32	1.5	12	<3	<100	<500	<0.5	5.5	2.7	2	26	53	23	3.9	1.1	0.7	3.1	0.53	30.91
3124	8	9.3	730	<0.5	8	85	2	4.46	8	<1	<5	1	2.14	51	1.5	14	<3	<100	<500	2	5.7	1.6	<1	31	54	25	6	1.7	0.8	3.6	0.59	29.76
3125	14	16	740	<0.5	8	110	2	4.1	9	<1	<5	<1	2.28	46	1.5	14	<3	<100	780	<0.5	6.4	2.9	<1	30	55	23	5.2	1.5	0.8	3.3	0.53	29.96
3126	3	6.7	790	<0.5	7	86	<1	3.62	7	<1	<5	<1	2.28	45	1.6	13	<3	<100	<500	<0.5	5.9	2.9	<1	28	54	22	4.4	1.4	0.9	2.9	0.48	29.26
3127	18	16	640	1.2	7	65	2	3.58	5	<1	<5	<1	2.15	59	5.2	11	<3	<100	<500	1	4.2	1.7	<1	22	44	16	3.6	1.1	0.6	2.5	0.4	29.7
3128	5	80	690	<0.5	7	75	2	3.62	6	<1	<5	1	2.26	41	2.2	11	<3	<100	<500	<0.5	4.8	2.4	<1	22	49	15	3.5	1.1	0.8	2.4	0.4	27.75
3129	2	19	780	2.5	8	71	2	3.45	6	<1	<5	<1	2	51	1.7	11	<3	<100	<500	<0.5	4.2	2.1	<1	20	35	15	3	0.9	<0.5	2.2	0.36	28.5
3130	16	10	840	3.8	11	44	2	4.86	5	<1	<5	4	1.97	34	1.5	14	<3	<100	<500	<0.5	4.5	2.2	<1	19	35	16	3.2	1.1	<0.5	2.4	0.38	24.82
3131	19	10	1000	2.8	7	49	2	4.91	5	<1	<5	<1	1.94	53	1.3	12	<3	<100	<500	1.5	3.2	1.7	<1	16	30	13	2.7	0.9	<0.5	2.3	0.39	28.12
3132	2	4.9	500	2.8	9	72	1	4.69	5	<1	<5	2	2.18	29	1.5	12	<3	<100	<500	<0.5	2.8	1.3	<1	16	32	13	2.8	1	<0.5	2.7	0.44	29.03
3134	2	7.4	680	<0.5	9	78	1	3.6	6	<1	<5	<1	2.15	44	1.3	10	<3	<100	<500	<0.5	4.9	2.3	<1	20	39	9	3	1	<0.5	2.3	0.38	28.99
3135	<2	12	1000	<0.5	10	96	2	3.8	7	<1	<5	<1	2.42	50	1.8	13	<3	<100	<500	<0.5	5.9	2.9	<1	28	57	20	4.7	1.4	1	2.7	0.53	17.86
3137	24	19	910	2.3	10	70	3	4.69	5	<1	<5	2	1.84	58	2.7	17	<3	<100	<500	<0.5	5.4	1.8	2	23	45	19	4.4	1.3	0.6	3	0.5	28.14
3138	11	15	790	1.9	8	65	3	4.19	6	<1	<5	<1	2.02	43	2.5	14	<3	<100	<500	<0.5	5.8	2.2	<1	27	52	21	4.6	1.4	0.9	2.8	0.48	26.1

CH INA Analytical Data

Element	Au	As	Ba	Br	Co	Cr	Cs	Fe	Hf	Hg	Ir	Mo	Na	Rb	Sb	Sc	Se	Sn	Sr	Ta	Th	U	W	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu	Mass
Units	PPB	PPM	PPM	PPM	PPM	PPM	PPM	%	PPM	PPM	PPB	PPM	%	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	g
Method	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	bal
Lab.	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT
Detection limit	2	0.5	50	0.5	1	5	1	0.02	1	1	5	1	0.01	15	0.1	0.1	3	100	500	0.5	0.5	0.5	1	0.1	3	5	0.1	0.2	0.5	0.2	0.05	
3139	11	20	1100	1.7	9	70	2	4.12	5	<1	<5	<1	1.85	44	2.5	14	<3	<100	<500	1.5	5.9	2.5	<1	26	52	27	5.2	1.6	0.8	3.2	0.5	28.87
3140	9	68	1200	4.7	19	92	9	5.95	5	<1	<5	2	1.33	73	11	25	<3	<100	<500	<0.5	7.9	3.5	<1	44	71	48	10	2.9	1.4	4.9	0.76	19.76
3142	11	51	760	1.2	10	61	2	4.17	5	<1	<5	<1	1.67	58	5.1	15	<3	<100	<500	<0.5	4.8	1.8	<1	24	47	23	5.5	1.6	<0.5	3.5	0.57	27.09
3143	11	14	750	<0.5	6	76	2	3.3	6	<1	<5	<1	2.05	42	2.4	12	<3	<100	<500	1.1	5.2	2.6	<1	27	54	23	5.3	1.5	<0.5	2.9	0.41	30.85
3144	16	46	890	<0.5	12	74	4	4.37	5	<1	<5	3	1.44	60	8.3	17	<3	<100	<500	<0.5	6	2	<1	26	59	27	5.7	1.6	1	3.5	0.54	22.55
3145	19	11	570	<0.5	7	73	2	3.61	6	<1	<5	<1	1.91	53	2.2	12	<3	<100	<500	<0.5	5.5	2.2	<1	26	48	25	5.3	1.6	0.7	3	0.5	29.62
3147	11	7.8	640	<0.5	10	180	<1	5.2	14	<1	<5	<1	1.93	37	1.8	13	<3	<100	<500	1.4	9.1	3.7	3	37	80	31	6.1	1.7	1	4	0.71	30.24
3148	<2	6.6	750	<0.5	7	92	2	3.49	7	<1	<5	3	1.92	60	1.4	12	<3	<100	<500	<0.5	6.7	2.5	<1	30	69	21	5.1	1.4	0.8	2.8	0.48	30.24
3149	20	140	620	2.2	16	75	3	6.19	6	<1	<5	2	1.68	25	9.5	14	<3	<100	630	<0.5	5.3	1.5	<1	21	42	20	3.8	1.1	<0.5	2.7	0.44	25.03
3150	34	86	930	1.4	13	95	3	6.7	9	<1	<5	<1	1.74	39	14	15	<3	<100	<500	1.1	8.3	2.9	4	29	62	25	5.4	1.6	<0.5	3.2	0.5	29.49
3157	13	6.8	870	1.9	4	19	2	4.49	5	<1	<5	3	2.42	45	1.2	14	<3	<100	<500	0.9	3.3	1.8	<1	17	40	18	3.8	1.3	<0.5	3.2	0.55	26.42
3159	79	11	1000	4	10	43	2	5.59	5	<1	<5	2	1.63	41	1.1	16	<3	<100	<500	<0.5	4.1	2	<1	21	41	19	3.7	1.3	0.7	2.7	0.49	26.66
3160	5	33	800	1.1	8	83	2	3.52	7	<1	<5	<1	2.09	45	1.9	12	<3	<100	740	1	5.6	2.3	<1	24	49	20	4	1.2	<0.5	2.6	0.46	29.85
3162	<2	11	770	2	9	55	11	3.98	4	<1	<5	<1	1.74	47	3.7	16	<3	<100	<500	0.7	5.1	1.9	<1	23	46	19	5	1.5	0.7	2.8	0.45	27.79
3163	4	11	730	<0.5	7	75	1	3.32	6	<1	<5	<1	2.12	40	2.1	11	<3	<100	680	1.2	5.4	2.1	<1	27	47	19	5	1.3	0.6	2.7	0.43	32.12
3164	5	11	690	<0.5	6	69	1	3.13	5	<1	<5	<1	2.07	48	2.3	11	<3	<100	<500	1.6	4.7	2.3	<1	24	46	20	4.5	1.2	0.6	2.7	0.43	28.09
3165	<2	16	710	<0.5	8	71	1	3.13	5	<1	<5	<1	2.06	55	2.1	11	<3	<100	<500	<0.5	5.4	2.3	<1	22	46	16	3.8	1.1	<0.5	2.4	0.39	28.32
3166	23	100	890	1.5	14	76	3	4.34	5	<1	<5	1	1.7	64	6.9	12	<3	<100	<500	<0.5	4.6	2	<1	21	44	19	3.8	1.1	0.5	2.6	0.44	24.65
3202	9	27	1000	<0.5	12	97	2	4.43	8	<1	<5	<1	2.58	56	4.4	16	<3	<100	<500	<0.5	5.7	2.8	<1	29	60	26	6.2	1.9	1.1	3.9	0.67	29.04
3203	33	74	850	1.6	11	94	2	5.16	9	<1	<5	2	2.35	61	5.9	16	<3	<100	740	<0.5	6.6	2.8	<1	34	68	34	7.2	2.2	1	4.1	0.69	30.02
3204	27	81	900	2.1	12	72	2	5.08	7	<1	<5	2	2.4	54	6	17	<3	<100	<500	<0.5	5.4	2.4	3	30	65	29	6.5	2.1	0.9	4.2	0.72	31.93
3205	15	21	800	1.8	7	63	3	3.16	5	<1	<5	<1	2.01	40	2.6	14	<3	<100	<500	<0.5	4.8	1.7	<1	24	45	22	4.6	1.5	0.8	2.8	0.35	28.35
3206	16	35	670	1.9	8	57	2	3.94	5	<1	<5	<1	2.02	51	3.8	16	<3	<100	<500	<0.5	4	1.8	<1	27	41	26	5.6	1.9	0.8	3.4	0.55	30.4
3235	7	11	760	<0.5	8	75	2	3.32	5	<1	<5	<1	2.3	61	2.2	13	<3	<100	<500	0.8	5	2.4	<1	24	40	19	3.8	1.1	0.7	2.4	0.38	29.66
3236	10	38	810	0.6	10	76	2	4.2	5	<1	<5	<1	2.12	61	3.6	14	<3	<100	<500	0.7	4.7	2.4	<1	24	42	19	4.3	1.4	0.6	2.8	0.44	29.9
3237	<2	16	990	<0.5	15	120	2	5.2	6	<1	<5	<1	2.56	57	2.7	18	<3	<100	<500	<0.5	5.2	1.9	<1	26	48	23	5.5	1.8	1.1	3.7	0.51	14.64
3239	4	12	730	2.8	10	79	2	3.74	5	<1	<5	<1	2.03	50	2.4	15	<3	<100	<500	<0.5	4.2	2	<1	25	41	25	5.1	1.7	1	3.2	0.46	29.84

CH INA Analytical Data

Element	Au	As	Ba	Br	Co	Cr	Cs	Fe	Hf	Hg	Ir	Mo	Na	Rb	Sb	Sc	Se	Sn	Sr	Ta	Th	U	W	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu	Mass
Units	PPB	PPM	PPM	PPM	PPM	PPM	PPM	%	PPM	PPM	PPB	PPM	%	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	g
Method	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	bal
Lab.	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT
Detection limit	2	0.5	50	0.5	1	5	1	0.02	1	1	5	1	0.01	15	0.1	0.1	3	100	500	0.5	0.5	0.5	1	0.1	3	5	0.1	0.2	0.5	0.2	0.05	
CH 95 2	2	8.6	1000	<0.5	10	73	2	3.45	7	<1	<5	<1	2.29	45	1.5	13	<3	<100	960	1.4	5.5	2.9	<1	27	57	26	5	1.5	<0.5	2.7	0.41	24.43
CH 95 3	2	12	950	<0.5	10	67	2	3.71	5	<1	<5	<1	2.33	31	1.8	14	<3	<100	700	<0.5	5.8	2.5	<1	27	57	30	5.3	1.6	<0.5	3.1	0.44	27.26
CH 95 4	5	21	840	<0.5	14	100	2	4.63	6	<1	<5	<1	2.27	49	3	15	<3	<100	730	<0.5	4.9	3	<1	24	47	26	5	1.6	<0.5	2.9	0.44	27.16
CH 95 5	7	13	780	<0.5	8	80	2	3.55	6	<1	<5	4	2.11	56	2.4	13	<3	<100	<500	<0.5	5.4	2.1	<1	24	51	25	4.3	1.3	0.8	2.6	0.4	27.28
CH 95 6	9	19	940	<0.5	8	77	3	3.75	6	<1	<5	<1	2.1	47	3.7	17	<3	<100	960	<0.5	5.7	2.8	<1	29	56	26	6.1	1.8	1	3.5	0.48	26.57
CH 95 7	7	25	840	<0.5	8	74	3	3.79	5	<1	<5	<1	2.09	51	4.2	15	<3	<100	<500	0.5	5.3	1.7	<1	25	55	26	5.1	1.6	0.9	3	0.46	26.18
CH 95 8	17	40	860	2.3	12	85	3	4.6	6	<1	<5	<1	2.07	54	4.4	17	<3	<100	610	0.9	5.1	2.4	<1	29	58	34	6.6	2.1	<0.5	3.5	0.56	26.54
CH 95 10	19	43	990	4	11	84	3	4.83	6	<1	<5	<1	2.06	56	5.2	19	<3	<100	<500	<0.5	5.3	1.9	<1	26	51	25	5.6	1.8	0.8	3.7	0.56	23.5
CH 95 11	4	20	830	<0.5	8	74	2	3.96	5	<1	<5	<1	2.06	50	2.8	16	<3	<100	<500	0.9	6	2.6	<1	28	53	29	5.9	1.8	1.1	3.3	0.48	26.7
CH 95 12	9	24	820	<0.5	10	79	2	4.29	6	<1	<5	<1	2	44	2.9	16	<3	<100	750	<0.5	5.1	2.4	3	24	47	23	5.2	1.6	0.8	3.2	0.52	26.42
CH 95 13	13	36	920	4.3	14	68	2	4.48	5	<1	<5	4	1.74	66	3.8	16	<3	<100	<500	0.9	5.9	2.6	<1	25	49	29	5.7	1.8	0.9	3.5	0.51	23.94
CH 95 14	9	25	990	<0.5	13	76	3	4.06	6	<1	<5	3	1.99	57	2.6	15	<3	<100	<500	<0.5	7	2.2	2	26	53	23	5.1	1.4	0.9	2.9	0.46	20.8
CH 95 15	16	22	930	2.7	15	48	3	5.69	5	<1	<5	5	2.21	34	1.1	18	3	<100	<500	<0.5	4.3	1.9	<1	19	39	20	3.9	1.3	<0.5	3.3	0.5	27.27
CH 95 16	7	8.6	820	<0.5	11	63	1	3.99	5	<1	<5	1	2.19	49	1.4	12	<3	<100	<500	1	5.3	2	<1	21	41	19	3.7	1.1	0.7	2.6	0.42	26.93
CH 95 17	2	5	850	<0.5	10	67	<1	3.5	5	<1	<5	<1	2.34	52	1.3	13	<3	<100	<500	<0.5	5.1	2.5	<1	22	42	20	4.1	1.3	0.7	2.8	0.42	28.8
CH 95 18	2	7.3	740	<0.5	14	63	2	3.72	6	<1	<5	<1	2.34	59	1.6	13	<3	<100	<500	<0.5	4.5	2.1	<1	21	41	21	3.7	1.2	<0.5	2.8	0.42	28.67
CH 95 19	23	200	870	<0.5	11	100	2	4.9	7	<1	<5	<1	2.1	65	3.5	16	<3	<100	<500	<0.5	6.1	3	<1	32	59	36	6.5	1.9	0.9	3.6	0.54	28.38
CH 95 22	12	48	970	1.8	10	95	2	4.14	6	<1	<5	<1	2.28	58	2.9	13	<3	<100	<500	1.3	6.3	2.3	<1	25	56	21	4.5	1.4	0.6	2.9	0.44	25.74
CH 95 23	11	37	790	<0.5	8	79	2	3.79	6	<1	<5	<1	2.22	39	2.8	14	<3	<100	<500	1.4	5.6	2.5	<1	27	50	27	5.6	1.6	0.9	3	0.46	28.2
CH 95 24	10	6.7	790	<0.5	9	93	2	4.35	7	<1	<5	<1	2.3	59	1.9	16	<3	<100	800	1.6	6.4	3.7	<1	29	59	35	5.9	1.8	<0.5	3.7	0.54	27.16
CH 95 25	8	8.8	810	3.6	8	88	1	4.14	6	<1	<5	7	2.27	43	1.5	14	<3	<100	<500	<0.5	5.9	3.1	<1	27	54	28	5.5	1.7	0.8	3.2	0.5	28.93
CH 95 26	42	49	880	<0.5	19	91	6	6.3	5	<1	<5	20	1.78	62	12	17	<3	<100	<500	<0.5	6.8	2.1	<1	25	54	26	4.5	1.3	0.6	3.1	0.45	25.56
CH 95 27	2	25	920	3.6	12	79	6	4.51	5	<1	<5	2	1.54	64	4.6	19	<3	<100	<500	1	5.4	1.8	<1	24	47	31	5.9	1.7	<0.5	3.5	0.52	27.75
CH 95 29	7	11	1100	<0.5	12	60	4	4.44	5	<1	<5	<1	2.38	58	3	16	<3	<100	<500	<0.5	6.7	3.2	<1	26	53	25	5.7	1.7	<0.5	3.1	0.54	24.56
CH 95 31	2	29	1600	<0.5	21	190	6	5.43	5	<1	<5	13	1.49	74	4.4	22	<3	<100	<500	<0.5	7.2	2.2	<1	27	56	35	6.3	1.9	0.8	4	0.66	23.82
CH 95 32	8	14	1200	<0.5	11	62	3	5.28	6	<1	<5	12	2.27	98	2.1	18	<3	<100	<500	<0.5	7	<0.5	<1	27	58	32	5.9	1.7	1	3.6	0.54	24.59
CH 95 33	2	15	1300	<0.5	8	76	5	4.24	6	<1	<5	7	2.07	72	2.6	15	<3	<100	<500	1.1	6.9	2	<1	27	55	28	5.6	1.8	<0.5	3.3	0.47	26.62
CH 95 34	8	37	1100	<0.5	15	110	4	4.94	5	<1	<5	5	1.74	55	6.7	20	<3	<100	<500	<0.5	6	2.7	<1	<0.5	53	31	6.2	1.9	1.1	3.7	0.57	23.95

CH INA Analytical Data

Element	Au	As	Ba	Br	Co	Cr	Cs	Fe	Hf	Hg	Ir	Mo	Na	Rb	Sb	Sc
Units	PPB	PPM	PPM	PPM	PPM	PPM	PPM	%	PPM	PPM	PPB	PPM	%	PPM	PPM	PPM
Method	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Lab.	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT
Detection limit	2	0.5	50	0.5	1	5	1	0.02	1	1	5	1	0.01	15	0.1	0.1
CH 95 35	8	47	1100	<0.5	14	68	8	4.82	5	<1	<5	6	2.07	91	12	19
CH 95 36	2	29	1100	<0.5	13	60	2	5	6	<1	<5	<1	2.27	77	2.4	18
CH 95 37	2	13	950	<0.5	16	110	3	4.54	5	<1	<5	<1	1.99	<15	2.5	16
CH 95 38	2	9.3	880	2.3	9	78	1	4.04	6	<1	<5	5	2.19	64	1.9	15
CH 95 39	2	10	820	2.3	8	89	2	3.49	6	<1	<5	4	2.08	58	2	14

Element	Se	Sn	Sr	Ta	Th	U	W	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu	Mass
Units	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	g
Method	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	bal
Lab.	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT
Detection limit	3	100	500	0.5	0.5	0.5	1	0.1	3	5	0.1	0.2	0.5	0.2	0.05	
CH 95 35	<3	<100	<500	<0.5	5.9	2.2	<1	32	56	45	7.6	2.3	<0.5	3.5	0.47	22.6
CH 95 36	<3	<100	<500	<0.5	6.5	2.4	<1	25	51	31	5.8	1.8	<0.5	3.8	0.6	24.97
CH 95 37	<3	<100	920	<0.5	5.6	3.4	<1	23	48	25	5.2	1.7	<0.5	3.1	0.47	27.14
CH 95 38	<3	<100	<500	<0.5	5.5	2.5	<1	26	55	27	5.6	1.8	0.9	3.5	0.51	27.65
CH 95 39	<3	<100	660	<0.5	5.5	2.1	<1	25	56	30	5	1.5	<0.5	3.3	0.49	25.82

CH ICP Analytical Data

Element	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm
Method	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP
Lab.	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM
Detection limit	1	1	3	1	0.3	1	1	2	0.01	2	5	2	2	1	0.2	2	2	1	0.01	0.001	1	1	0.01	1	0.01	3	0.01	0.01	0.01	2
3002	8	355	55	95	1.2	24	13	206	5.71	37	< 5	<2	5	57	0.3	<2	<2	97	0.63	0.139	25	25	1.01	247	0.13	<3	1.48	0.01	0.44	<2
3040	2	62	20	141	0.5	85	16	666	5.03	37	< 5	<2	2	59	0.2	3	<2	91	0.71	0.081	11	24	1.09	282	0.16	<3	2.08	0.05	0.16	2
3108	1	77	32	351	0.5	28	12	637	4.12	71	< 5	<2	2	55	0.2	3	<2	122	0.62	0.023	11	54	1.4	162	0.22	<3	2.73	0.05	0.19	<2
3109	1	27	7	120	<.3	13	11	512	3.48	4	< 5	<2	2	48	0.2	<2	<2	106	0.34	0.047	9	21	1.03	207	0.28	<3	2.09	0.02	0.51	<2
3110	1	19	8	81	0.3	20	9	311	3.27	33	< 5	<2	2	34	0.2	<2	<2	86	0.37	0.064	10	27	0.3	102	0.21	<3	1.53	0.02	0.09	<2
3111	10	616	21	137	0.4	52	10	316	3.77	19	< 5	<2	3	33	0.6	3	<2	79	0.37	0.052	16	41	0.36	105	0.18	3	1.13	0.02	0.11	<2
3112	4	322	32	90	1	17	11	412	4.83	27	< 5	<2	2	60	0.2	<2	<2	87	0.56	0.07	15	25	0.39	128	0.16	3	1.25	0.04	0.2	<2
3114	24	3450	123	264	1.3	28	16	826	5.91	43	< 5	<2	2	33	1.9	19	7	71	0.43	0.098	23	24	0.35	184	0.16	3	1.17	0.02	0.12	<2
3115	3	95	33	148	0.4	18	10	497	3.54	70	< 5	<2	2	39	0.2	<2	<2	83	0.46	0.075	13	25	0.42	136	0.19	<3	1.69	0.02	0.16	<2
3116	1	35	19	98	<.3	16	8	390	2.97	14	< 5	<2	2	39	0.2	<2	<2	76	0.47	0.071	12	25	0.37	111	0.21	3	1.47	0.02	0.09	<2
3117	1	34	24	83	0.3	16	9	554	3.29	36	< 5	<2	2	51	0.2	<2	<2	86	0.6	0.051	14	25	0.88	126	0.25	3	1.72	0.04	0.18	<2
3119	1	110	21	253	1.7	27	8	825	3.01	19	< 5	<2	2	80	1.8	<2	<2	77	1.06	0.078	16	27	0.97	233	0.16	3	2.16	0.05	0.21	<2
3120	1	27	26	101	0.3	21	10	500	3.33	34	< 5	<2	2	36	0.3	<2	<2	84	0.41	0.063	12	25	0.59	141	0.21	<3	1.78	0.02	0.25	<2
3122	2	106	24	67	0.4	15	8	341	3.09	33	< 5	<2	2	35	0.2	<2	<2	79	0.45	0.055	11	26	0.33	104	0.21	<3	1.12	0.02	0.14	<2
3123	1	20	9	52	<.3	15	9	336	3.71	7	< 5	<2	4	35	0.2	<2	<2	104	0.38	0.04	11	32	0.3	75	0.27	<3	1.4	0.02	0.11	<2
3124	1	25	2	55	<.3	14	8	389	3.88	8	< 5	<2	2	67	0.2	<2	<2	87	0.62	0.078	17	26	0.32	113	0.2	<3	1.15	0.04	0.11	<2
3125	1	31	8	53	<.3	18	8	383	3.53	15	< 5	<2	2	60	0.2	<2	<2	95	0.64	0.083	17	33	0.3	126	0.22	3	1.19	0.04	0.09	<2
3126	1	18	5	41	<.3	15	7	329	3.09	6	< 5	<2	3	42	0.2	<2	<2	84	0.45	0.061	17	30	0.26	115	0.23	3	1.45	0.02	0.06	<2
3127	3	128	20	57	<.3	13	8	321	3.14	15	< 5	<2	2	32	0.2	<2	<2	74	0.4	0.051	12	22	0.3	103	0.18	<3	1	0.02	0.09	<2
3128	1	22	17	80	0.4	15	8	366	3.25	78	< 5	<2	2	42	0.2	<2	<2	85	0.44	0.046	11	29	0.31	87	0.23	3	1.4	0.02	0.12	<2
3129	1	23	21	100	<.3	14	8	345	3.1	13	< 5	<2	2	28	0.3	<2	<2	83	0.28	0.06	9	22	0.38	91	0.19	3	2.18	0.01	0.04	<2
3130	3	76	15	204	<.3	16	13	636	4.48	8	< 5	<2	3	32	0.2	<2	<2	121	0.24	0.059	8	18	1.4	222	0.25	<3	3.57	0.02	0.15	<2
3131	2	47	14	92	0.3	11	8	978	4.69	10	< 5	<2	3	31	0.2	<2	<2	101	0.33	0.061	3	15	1.83	145	0.26	<3	3.06	0.02	0.57	<2
3132	3	41	4	86	0.4	24	10	449	4.45	9	< 5	<2	2	55	0.2	<2	<2	107	0.23	0.097	7	19	1.5	220	0.2	<3	2.99	0.03	0.23	<2
3134	1	33	9	52	<.3	15	9	299	3.2	8	< 5	<2	3	30	0.2	<2	<2	86	0.31	0.033	7	27	0.33	112	0.23	<3	1.6	0.02	0.13	<2
3135	1	22	8	55	<.3	22	10	543	2.96	10	< 5	<2	4	59	0.2	<2	<2	79	0.62	0.088	13	25	0.38	158	0.18	<3	1.23	0.05	0.15	<2
3137	4	58	13	110	<.3	30	11	829	4.3	13	< 5	<2	2	52	0.2	<2	<2	89	0.52	0.058	15	26	0.6	224	0.17	<3	2.1	0.03	0.29	<2
3138	1	38	20	99	<.3	18	8	445	3.81	14	< 5	<2	2	65	0.2	<2	<2	87	0.57	0.075	14	26	0.86	218	0.19	<3	1.94	0.04	0.19	<2

CH ICP Analytical Data

Element	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm
Method	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP
Lab.	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM
Detection limit	1	1	3	1	0.3	1	1	2	0.01	2	5	2	2	1	0.2	2	2	1	0.01	0.001	1	1	0.01	1	0.01	3	0.01	0.01	0.01	2
3139	1	44	21	112	<.3	24	10	648	3.87	15	< 5	<2	2	64	0.2	<2	<2	96	0.72	0.075	13	25	0.96	221	0.21	<3	1.99	0.05	0.22	<2
3140	4	75	47	189	2.1	50	23	1189	5.32	53	< 5	<2	2	52	0.6	4	<2	58	0.65	0.075	29	22	0.34	353	0.02	<3	1.91	0.02	0.19	<2
3142	2	73	18	110	0.4	23	11	733	4.12	48	< 5	<2	2	65	0.5	4	<2	84	2.01	0.073	14	21	0.53	142	0.13	<3	1.49	0.03	0.12	<2
3143	1	64	15	50	<.3	14	6	267	2.85	11	< 5	<2	2	39	0.2	<2	<2	76	0.45	0.056	13	28	0.26	91	0.21	<3	0.98	0.03	0.06	<2
3144	2	122	45	194	0.3	39	15	500	4.16	46	< 5	<2	2	53	0.2	3	<2	97	0.66	0.064	17	37	1.59	268	0.16	<3	2.68	0.04	0.21	<2
3145	1	74	16	65	0.3	15	8	378	3.39	8	< 5	<2	2	45	0.2	<2	<2	76	0.47	0.074	13	27	0.26	108	0.2	<3	1.27	0.02	0.06	<2
3147	1	18	7	61	<.3	19	9	330	4.39	2	< 5	<2	5	39	0.2	<2	<2	131	0.49	0.074	13	44	0.24	126	0.29	<3	1.25	0.02	0.06	<2
3148	1	19	8	40	<.3	15	7	277	3.09	2	< 5	<2	3	40	0.2	<2	<2	85	0.39	0.05	16	31	0.26	148	0.23	<3	1.57	0.01	0.05	<2
3149	3	89	25	115	1.1	29	18	434	5.67	144	< 5	<2	3	41	0.2	8	3	107	0.32	0.113	6	27	0.83	164	0.15	<3	2.56	0.02	0.09	<2
3150	3	218	49	109	0.6	28	13	383	5.83	72	< 5	<2	4	34	0.3	8	3	95	0.27	0.081	14	27	0.41	269	0.16	<3	1.85	0.01	0.09	<2
3157	2	41	8	66	<.3	6	4	561	4.03	3	< 5	<2	2	74	0.2	3	<2	106	0.08	0.055	5	8	1.59	221	0.21	3	2.31	0.02	1.07	<2
3159	4	58	11	117	<.3	12	10	887	4.91	8	< 5	<2	2	45	0.2	<2	<2	131	0.27	0.07	9	18	2.2	244	0.25	<3	3.7	0.02	0.45	<2
3160	1	24	7	56	<.3	13	7	281	2.81	28	< 5	<2	3	28	0.2	<2	<2	75	0.31	0.023	8	23	0.32	78	0.2	<3	1.36	0.01	0.2	<2
3162	1	53	28	66	<.3	17	9	415	3.6	7	< 5	<2	2	53	0.2	<2	<2	83	0.64	0.042	14	24	0.47	132	0.16	<3	2.01	0.03	0.1	<2
3163	2	117	14	74	<.3	14	7	270	2.81	8	< 5	<2	2	46	0.3	<2	<2	67	0.47	0.073	13	24	0.23	128	0.16	<3	0.81	0.03	0.06	<2
3164	1	23	6	41	<.3	13	6	235	2.61	8	< 5	<2	2	35	0.2	<2	<2	70	0.36	0.035	12	24	0.25	86	0.19	<3	1.08	0.02	0.04	<2
3165	1	27	10	85	<.3	17	8	264	2.64	12	< 5	<2	2	29	0.2	<2	<2	67	0.29	0.043	9	24	0.32	117	0.19	3	1.36	0.01	0.09	2
3166	3	142	40	279	0.8	36	15	389	3.88	100	< 5	<2	2	25	0.4	3	4	80	0.24	0.053	9	28	0.78	103	0.14	<3	2.03	0.01	0.18	2
3202	1	32	10	58	<.3	16	7	446	3.1	20	< 5	<2	2	47	0.2	<2	<2	73	0.51	0.078	10	23	0.26	104	0.14	3	1.01	0.03	0.07	<2
3203	2	89	23	75	<.3	17	8	397	3.85	59	< 5	<2	3	38	0.2	<2	<2	78	0.44	0.081	12	26	0.29	125	0.16	<3	1.2	0.02	0.08	<2
3204	1	69	19	74	<.3	15	9	758	3.76	61	7	<2	2	48	0.3	<2	<2	78	0.61	0.08	10	21	0.31	103	0.14	3	1.09	0.04	0.06	<2
3205	1	40	17	66	<.3	14	6	341	2.58	22	< 5	<2	2	43	0.2	<2	4	62	0.51	0.066	11	21	0.42	123	0.16	<3	1.45	0.03	0.1	<2
3206	1	50	13	71	0.3	15	8	448	3.68	34	< 5	<2	2	44	0.2	<2	<2	79	0.52	0.07	18	20	0.35	113	0.12	<3	1.37	0.02	0.07	<2
3235	1	27	11	45	<.3	16	6	298	2.65	8	< 5	<2	2	33	0.2	<2	<2	66	0.38	0.049	11	22	0.28	116	0.18	<3	1.48	0.02	0.08	2
3236	1	68	21	89	0.3	24	10	602	3.81	42	< 5	<2	2	55	0.2	<2	<2	82	0.63	0.083	12	25	0.4	154	0.16	<3	1.4	0.04	0.13	<2
3237	2	40	11	87	<.3	39	12	591	3.75	12	< 5	<2	2	70	0.2	<2	<2	69	0.79	0.085	13	22	0.71	139	0.16	<3	1.6	0.07	0.08	<2
3239	1	39	14	86	<.3	28	9	472	3.22	11	< 5	<2	2	42	0.2	<2	<2	68	0.54	0.05	15	24	0.4	147	0.15	3	1.64	0.03	0.1	<2

CH ICP Analytical Data

Element	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm
Method	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP
Lab.	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM
Detection limit	1	1	3	1	0.3	1	1	2	0.01	2	5	<2	2	1	0.2	2	2	1	0.01	0.001	1	1	0.01	1	0.01	3	0.01	0.01	0.01	2
CH 95 01	< 1	16	7	42	< .3	12	7	308	2.47	3	< 5	< 2	5	44	< .2	< 2	2	53	0.48	0.078	14	22	0.43	132	0.16	< 3	1.31	0.03	0.1	< 2
CH 95 03	< 1	20	6	47	0.3	12	7	391	2.67	7	< 5	< 2	2	61	< .2	< 2	4	56	0.66	0.083	14	20	0.44	148	0.16	< 3	1.04	0.05	0.07	< 2
CH 95 04	1	40	9	70	< .3	24	10	491	3.3	15	< 5	< 2	< 2	54	< .2	< 2	2	58	0.63	0.076	11	24	0.59	122	0.14	< 3	1.13	0.06	0.09	< 2
CH 95 05	1	26	5	46	< .3	17	7	257	2.81	7	< 5	< 2	3	38	< .2	< 2	< 2	57	0.33	0.044	12	26	0.41	113	0.17	< 3	1.53	0.02	0.07	< 2
CH 95 06	1	48	13	64	< .3	16	6	284	2.81	11	< 5	< 2	4	49	< .2	< 2	4	56	0.52	0.075	15	26	0.48	154	0.14	< 3	1.59	0.03	0.08	< 2
CH 95 07	1	49	8	64	< .3	15	6	290	3.05	17	< 5	< 2	3	36	< .2	2	5	61	0.39	0.042	13	24	0.47	122	0.16	< 3	1.37	0.02	0.09	< 2
CH 95 08	1	73	21	87	< .3	20	10	517	3.79	31	< 5	< 2	2	53	0.2	< 2	2	71	0.55	0.082	15	28	0.64	122	0.16	< 3	1.58	0.03	0.15	< 2
CH 95 10	1	75	14	93	0.3	18	8	474	3.88	34	< 5	< 2	3	60	< .2	< 2	< 2	71	0.79	0.081	13	27	0.66	166	0.14	< 3	1.52	0.06	0.13	< 2
CH 95 11	1	46	8	73	< .3	18	6	341	3.13	15	< 5	< 2	3	51	< .2	< 2	< 2	58	0.55	0.074	14	24	0.5	131	0.15	< 3	1.43	0.03	0.11	< 2
CH 95 12	1	44	7	70	< .3	17	8	462	3.42	14	< 5	< 2	< 2	57	< .2	< 2	2	68	0.67	0.066	11	24	0.61	138	0.16	< 3	1.46	0.05	0.1	< 2
CH 95 13	2	85	18	93	0.4	24	11	615	3.76	29	6	< 2	2	54	< .2	< 2	2	72	0.56	0.063	15	27	0.84	181	0.15	< 3	1.92	0.04	0.28	< 2
CH 95 14	1	32	9	61	0.3	20	9	427	3.12	17	< 5	< 2	4	49	0.2	< 2	< 2	64	0.52	0.066	14	28	0.66	136	0.16	< 3	1.62	0.03	0.2	< 2
CH 95 15	2	60	27	282	0.3	13	12	702	4.84	13	< 5	< 2	< 2	44	0.3	< 2	< 2	107	0.24	0.098	5	17	1.56	261	0.24	< 3	3.09	0.02	0.45	< 2
CH 95 16	1	29	23	78	< .3	12	8	353	3.2	3	< 5	< 2	2	36	0.2	< 2	< 2	69	0.34	0.03	8	25	0.63	92	0.22	< 3	1.63	0.02	0.23	< 2
CH 95 17	1	21	10	182	< .3	13	7	333	2.71	2	< 5	< 2	3	37	< .2	< 2	< 2	61	0.38	0.044	9	21	0.6	113	0.21	< 3	1.51	0.02	0.16	< 2
CH 95 18	1	24	< 3	67	< .3	14	11	280	2.96	< 2	< 5	< 2	< 2	38	< .2	< 2	< 2	65	0.37	0.039	8	21	0.56	129	0.21	< 3	1.85	0.02	0.14	< 2
CH 95 19	1	47	48	142	0.3	15	8	573	3.99	183	< 5	< 2	2	54	0.3	< 2	< 2	77	0.57	0.059	17	33	0.67	112	0.2	< 3	1.48	0.04	0.19	< 2
CH 95 21	1	23	25	114	< .3	17	7	397	3.11	43	< 5	< 2	4	45	< .2	< 2	< 2	61	0.41	0.041	10	29	0.52	122	0.19	< 3	1.46	0.02	0.12	< 2
CH 95 23	1	26	12	91	0.4	13	6	361	3.14	34	< 5	< 2	4	64	0.2	< 2	< 2	62	0.59	0.068	14	28	0.51	124	0.18	< 3	1.31	0.05	0.1	< 2
CH 95 24	1	30	13	123	< .3	12	6	448	3.34	8	< 5	< 2	4	51	< .2	< 2	< 2	67	0.53	0.063	13	29	0.53	80	0.21	< 3	1.18	0.04	0.18	< 2
CH 95 25	8	321	< 3	150	0.5	83	6	280	3.24	7	< 5	< 2	5	57	0.9	< 2	< 2	63	0.62	0.067	13	28	0.39	95	0.21	< 3	1.26	0.03	0.08	< 2
CH 95 26	17	974	46	199	0.9	42	15	566	5.11	38	< 5	< 2	5	43	0.3	7	< 2	76	0.31	0.057	11	46	1.17	291	0.19	< 3	2.57	0.02	0.44	< 2
CH 95 27	3	59	12	104	0.9	30	12	626	4.38	22	< 5	< 2	2	62	0.8	2	< 2	54	0.58	0.053	17	23	0.49	274	0.09	< 3	1.65	0.03	0.12	< 2
CH 95 29	1	34	8	72	0.4	14	8	496	3.44	10	< 5	< 2	3	47	< .2	< 2	< 2	69	0.6	0.069	14	26	0.67	128	0.2	< 3	1.41	0.04	0.16	< 2
CH 95 30	1	34	9	71	0.3	14	8	504	3.36	11	< 5	< 2	2	46	< .2	< 2	< 2	66	0.58	0.069	14	25	0.63	127	0.19	< 3	1.36	0.04	0.15	< 2
CH 95 31	4	63	13	164	< .3	73	16	715	4.6	22	< 5	< 2	3	50	0.3	< 2	< 2	58	0.42	0.063	13	31	0.91	173	0.11	< 3	1.77	0.02	0.21	< 2
CH 95 32	6	47	4	76	< .3	13	8	471	3.78	10	< 5	< 2	3	52	< .2	< 2	< 2	74	0.48	0.059	12	21	0.85	188	0.18	< 3	1.88	0.04	0.26	< 2
CH 95 33	1	31	9	86	< .3	14	7	445	3.47	11	< 5	< 2	5	54	< .2	< 2	< 2	62	0.49	0.065	15	25	0.76	174	0.17	< 3	1.68	0.03	0.22	< 2

CH ICP Analytical Data

Element	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm
Method	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP
Lab.	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM
Detection limit	1	1	3	1	0.3	1	1	2	0.01	2	5	<2	2	1	0.2	2	2	1	0.01	0.001	1	1	0.01	1	0.01	3	0.01	0.01	0.01	2
CH 95 34	2	74	88	254	0.5	31	12	839	4.31	30	< 5	< 2	2	41	0.7	2	< 2	72	0.56	0.06	17	28	0.77	220	0.14	< 3	1.78	0.03	0.13	< 2
CH 95 35	2	57	78	156	6	20	11	840	3.84	39	< 5	< 2	2	51	0.2	5	< 2	49	0.61	0.072	20	22	0.52	212	0.11	< 3	1.5	0.03	0.11	< 2
CH 95 36	1	34	8	110	0.3	11	9	887	3.87	23	< 5	< 2	2	70	0.3	2	4	80	0.8	0.07	11	19	1.3	166	0.21	< 3	1.84	0.07	0.24	< 2
CH 95 37	2	46	< 3	91	< .3	33	12	647	3.56	9	< 5	< 2	< 2	74	0.6	< 2	< 2	57	1	0.079	12	29	0.72	145	0.15	< 3	1.62	0.07	0.09	< 2
CH 95 38	1	25	5	50	< .3	18	6	292	2.88	5	< 5	< 2	3	44	< .2	< 2	4	55	0.48	0.053	13	28	0.44	106	0.18	< 3	1.31	0.03	0.07	< 2
CH 95 39	1	22	5	53	< .3	17	6	295	2.62	7	< 5	< 2	4	39	< .2	< 2	2	51	0.45	0.044	13	23	0.45	110	0.15	< 3	1.48	0.02	0.06	< 2

Till Geochemical Dispersal in Central British Columbia

Open File 1997-12

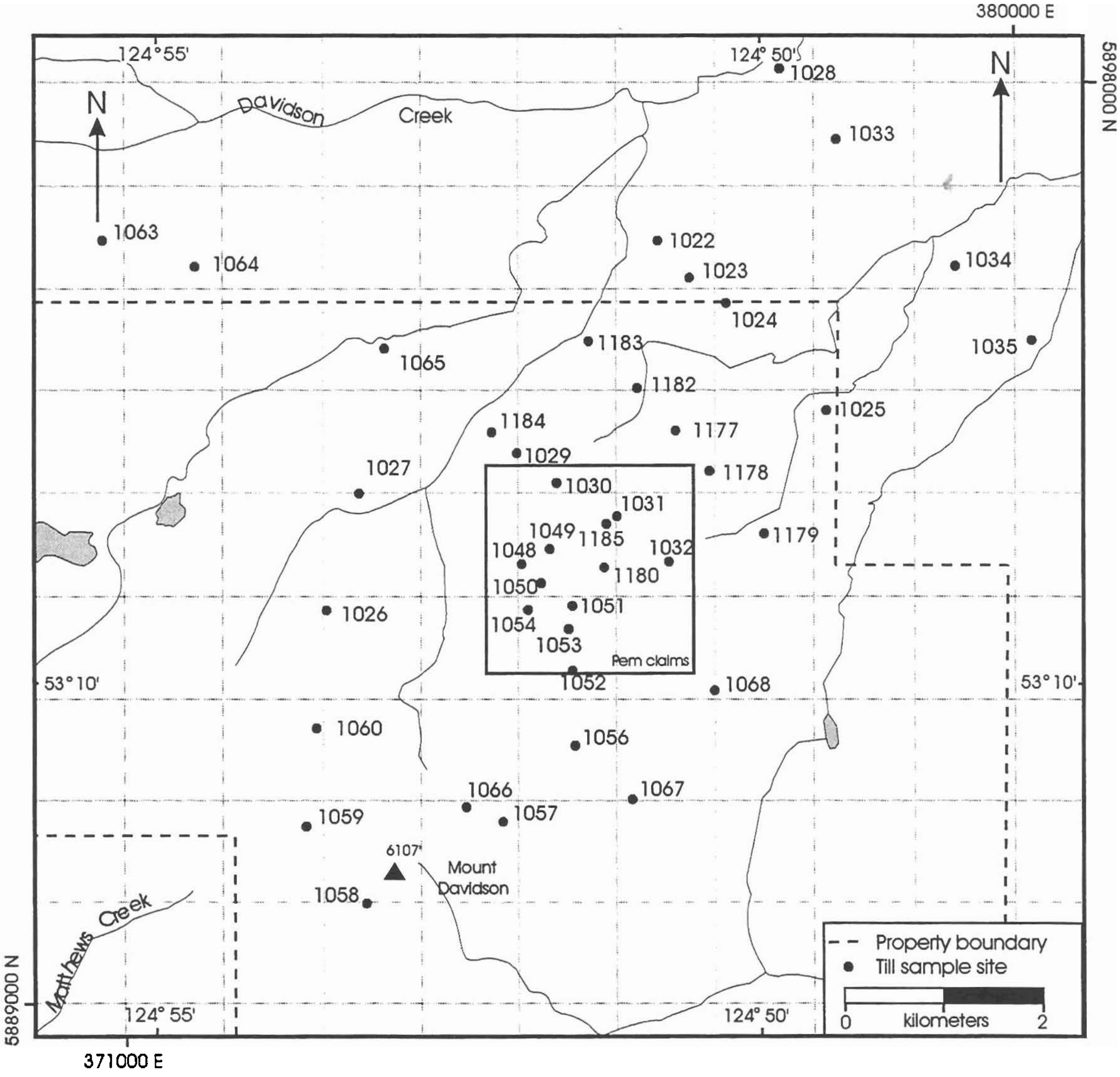
Appendix B

Blackwater-Davidson Mineral Property

Notes:

Sample site locations: Till geochemical samples were collected in the 1994 field season in the Blackwater-Davidson area. The locations are identified by UTM coordinates.

Till Geochemistry: Till geochemical analysis was performed by Activation Laboratories Limited (ACTLAB). Preliminary sample preparation was conducted by the B.C. Geologic Survey. Arsenic plus 45 additional elements (Au, Ba, Br, Ca, Co, Cr, Cs, Fe, Hf, Ir, Mo, Na, Rb, Sb, Sc, Se, Sr, Sn, Ta, Th, U, W, La, Ce, Nd, Sm, Eu, Tb, Yb, Lu, Ag, Al, B, Cu, K, Ni, Zn, Cd, Bi, V, P, Mg, Ti, Mn, Pb) were analysed using instrumental neutron activation analysis (INAA) and inductively coupled plasma emission spectroscopy (aqua regia - ICP analysis).



Appendix B - Figure 1: Numbered till sample locations, Blackwater-Davidson area.

UTM's of Blackwater-Davidson Sample Sites

Davidson sample	UTM North	UTM East
1022	5896471	376434
1023	5896109	376762
1024	5895862	377134
1025	5894812	378142
1026	5892853	373052
1027	5894000	373385
1028	5898149	377676
1029	5894394	375003
1030	5894103	375408
1031	5893775	376013
1032	5893331	376548
1033	5897462	378244
1034	5896224	379441
1035	5895504	380207
1048	5893309	375054
1049	5893457	375337
1050	5893122	375250
1051	5892899	375561
1052	5892264	375563
1053	5892670	375524
1054	5892859	375118

Davidson sample	UTM North	UTM East
1056	5891531	375588
1057	5890785	374857
1058	5889983	373456
1059	5890737	372845
1060	5891699	372948
1062	5895831	367905
1063	5896473	370793
1064	5896216	371729
1065	5895421	373640
1066	5890930	374476
1067	5891006	376166
1068	5892070	377013
1177	5894614	376618
1178	5894219	376965
1179	5893608	377517
1180	5893276	375883
1182	5895034	376218
1183	5895429	375785
1184	5894598	374743
1185	5893700	375907

Blackwater-Davidson INA Analytical Data

Element	Au	As	Ba	Br	Co	Cr	Cs	Fe	Hf	Hg	Ir	Mo	Na	Rb	Sb	Sc	Se	Sn	Sr	Ta	Th	U	W	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu	Mass
Units	PPB	PPM	PPM	PPM	PPM	PPM	PPM	%	PPM	PPM	PPB	PPM	%	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	g
Method	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	bal
Lab.	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT
Detection limit	2	0.5	50	0.5	1	5	1	0.02	1	1	5	1	0.01	15	0.1	0.1	3	100	500	0.5	0.5	0.5	1	0.1	3	5	0.1	0.2	0.5	0.2	0.05	
1022	3	7.8	720	<0.5	7	60	4	2.89	6	<1	<5	<1	2.13	64	1.5	9.7	<3	<100	<500	0.8	7.2	3.4	<1	24	41	17	3.3	1	0.5	2.2	0.33	29.66
1023	16	5.9	730	1.9	6	52	4	2.64	6	<1	<5	<1	2.03	67	1.5	9.5	<3	<100	<500	1.2	6.8	2.9	<1	21	37	18	2.9	0.9	<0.5	2	0.3	28.18
1024	2	7.1	650	3.1	7	54	3	2.95	6	<1	<5	<1	2	57	1.3	9.3	<3	<100	<500	1.2	6.6	2.6	1	20	39	15	2.9	0.9	<0.5	2	0.29	26.19
1025	7	4.5	600	<0.5	7	51	3	2.9	7	<1	<5	<1	2.33	62	1.3	11	<3	<100	<500	1.6	5.2	2.7	<1	20	37	16	3.2	1.2	0.6	2.3	0.35	28.63
1026	3	11	580	1.1	5	48	8	2.6	7	<1	<5	<1	2.2	90	1.3	9.8	<3	<100	<500	1	7.7	5.2	<1	23	41	15	3.2	0.9	0.6	2.3	0.36	25.7
1027	<2	9.8	730	1.7	8	76	5	3.14	6	<1	<5	<1	2.07	74	2.1	10	<3	<100	<500	1.2	7.5	3.2	<1	24	46	17	3.5	1	0.7	2.2	0.33	29.48
1028	3	3.4	660	1.1	8	47	2	2.98	5	<1	<5	<1	2.42	48	0.9	11	<3	<100	<500	0.9	4.7	2.2	<1	20	37	15	3.2	1.2	<0.5	2	0.34	30.91
1029	<2	12	660	2.1	8	61	3	3.2	8	<1	<5	<1	2.3	64	1.5	10	<3	<100	<500	1.1	7.7	3.8	<1	23	45	13	3.3	1	<0.5	2.3	0.3	27.41
1030	<2	9.4	910	2	11	74	33	3.67	7	<1	<5	2	1.88	92	13	12	<3	<100	<500	1.3	9.9	3.4	<1	29	68	27	4.8	1.4	<0.5	2.1	0.31	26.38
1031	18	36	670	1.5	6	59	4	2.93	7	<1	<5	<1	1.93	66	4.5	9.7	<3	<100	<500	<0.5	9	3.2	<1	28	54	22	4.6	1.3	<0.5	2.6	0.41	30.67
1032	12	11	740	<0.5	7	56	5	2.79	7	<1	<5	<1	2.02	71	2.1	10	<3	<100	<500	1.5	8.3	5.3	3	31	58	28	5	1.4	<0.5	2.5	0.39	29.64
1033	<2	4.2	650	1.5	5	52	2	2.25	6	<1	<5	<1	2.21	57	1.2	9.6	<3	<100	<500	1.4	5.8	3	<1	23	42	15	3.4	1.1	<0.5	2.3	0.33	29.89
1034	12	5.8	640	<0.5	5	59	2	2.14	6	<1	<5	<1	2.25	55	1.3	9.7	<3	<100	<500	1.5	6.3	2.6	<1	23	43	19	3.5	1	0.6	2.4	0.39	32.13
1035	5	5	630	<0.5	6	57	2	2.07	7	<1	<5	<1	2.16	61	1.1	9.6	<3	<100	<500	1.3	8.2	4.3	1	28	52	22	4.3	1.2	0.7	2.8	0.35	31.36
1048	5	150	790	<0.5	8	53	5	4.28	7	<1	<5	<1	2.42	110	4.4	11	<3	<100	<500	<0.5	11	6.3	<1	30	60	24	5.1	1.4	<0.5	3.2	0.47	27.4
1049	7	25	670	3.5	4	50	4	2.37	7	<1	<5	<1	2.23	100	5.3	8.6	<3	<100	<500	2	9.6	4.9	<1	22	41	16	3.4	0.9	<0.5	2.3	0.36	27.26
1050	21	150	610	17	7	62	8	3.31	8	<1	<5	<1	2.24	71	2.5	12	<3	<100	<500	1.5	9.9	4.3	<1	33	60	29	6.2	1.8	1.1	3.5	0.56	26.32
1051	15	13	710	1.8	7	59	5	3.37	7	<1	<5	<1	2.26	96	1.9	12	<3	<100	<500	1.4	9	4.9	<1	30	56	25	4.7	1.4	0.8	2.9	0.41	29.46
1052	3	7.1	630	23	9	87	3	3.97	11	<1	<5	<1	1.94	62	1.3	12	<3	<100	<500	1.9	10	4.9	<1	30	56	26	4.6	1.3	0.8	3.2	0.46	23.87
1053	19	13	670	9.3	8	54	3	2.98	7	<1	<5	<1	2.12	79	1.6	10	<3	<100	<500	1.5	9.4	4.5	<1	25	52	21	3.8	1.2	0.5	2.4	0.36	27.52
1054	9	8.4	610	6.1	8	62	3	3.68	8	<1	<5	<1	2.3	63	1.3	11	<3	<100	<500	2.2	9.7	4.1	<1	26	54	20	4.4	1.3	<0.5	2.7	0.42	19.64
1056	8	12	630	1.2	5	33	5	2.33	6	<1	<5	<1	1.82	110	1.3	7.4	<3	<100	<500	1.6	13	6.1	2	29	59	21	4	0.8	0.8	2.3	0.33	29.39
1057	17	7.6	510	12	7	40	4	2.84	6	<1	<5	<1	1.89	82	1.1	8.2	<3	<100	<500	1.6	12	5.3	2	21	43	19	3	0.8	0.6	1.8	0.29	24.61
1058	2	4.6	460	14	6	41	3	2.89	6	<1	<5	<1	1.92	60	1	9.2	<3	<100	<500	1.3	10	4.3	<1	23	43	17	3.4	0.9	0.6	1.9	0.29	26.44
1059	12	13	610	9.6	8	61	4	3.75	9	<1	<5	<1	2.08	58	1.2	12	<3	<100	<500	<0.5	9.8	8.5	<1	32	62	26	5.5	1.7	0.9	3.4	0.52	24.37
1060	6	7.3	520	11	8	63	3	3.73	10	<1	<5	<1	2.19	59	1.1	12	<3	<100	<500	1.7	9.1	6.2	2	26	66	19	4.2	1.3	0.8	3	0.42	28.91
1062	3	9.8	800	<0.5	11	52	5	3.93	7	<1	<5	<1	2.33	73	1.7	13	<3	<100	<500	1.2	7.8	2.7	<1	29	54	26	4.5	1.4	0.9	2.9	0.43	28.78
1063	2	9.4	720	<0.5	8	53	4	3.42	7	<1	<5	<1	2.26	79	1.5	11	<3	<100	<500	1.5	8.2	3.6	<1	32	55	24	4.9	1.5	0.8	2.7	0.43	29.21

Blackwater-Davidson INA Analytical Data

Element	Au	As	Ba	Br	Co	Cr	Cs	Fe	Hf	Hg	Ir	Mo	Na	Rb	Sb	Sc	Se	Sn	Sr	Ta	Th	U	W	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu	Mass
Units	PPB	PPM	PPM	PPM	PPM	PPM	PPM	%	PPM	PPM	PPB	PPM	%	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	g
Method	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	bal
Lab.	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT
Detection limit	2	0.5	50	0.5	1	5	1	0.02	1	1	5	1	0.01	15	0.1	0.1	3	100	500	0.5	0.5	0.5	1	0.1	3	5	0.1	0.2	0.5	0.2	0.05	
1064	5	12	800	<0.5	7	52	5	3.07	7	<1	<5	<1	2.2	56	1.7	11	<3	<100	<500	<0.5	7.7	2.8	<1	28	50	25	4.3	1.2	<0.5	2.5	0.41	29.08
1065	3	10	760	<0.5	7	59	5	3.4	6	<1	<5	<1	1.88	74	2	11	<3	<100	<500	1.2	8.2	4.3	<1	28	52	25	4.5	1.4	0.7	2.3	0.36	28.69
1066	4	8.6	750	2.5	10	81	3	3.84	7	<1	<5	<1	2.21	73	1.2	12	<3	<100	<500	1.1	9.6	3.4	<1	32	65	25	5	1.4	0.8	2.9	0.46	25.27
1067	12	8.4	660	<0.5	7	54	4	3.13	7	<1	<5	<1	2.39	99	1.3	9.7	<3	<100	<500	1.4	8.3	5.4	<1	21	39	16	2.9	0.8	0.5	2.2	0.3	27.65
1068	<2	7.4	540	8	6	50	4	2.66	7	<1	<5	<1	2	86	1.1	9.7	<3	<100	<500	1.7	9.5	5.2	<1	20	40	15	3.2	0.9	0.6	2.3	0.34	24.31
1177	<2	11	640	3.3	6	46	5	2.73	7	<1	<5	<1	1.89	76	2.3	7.5	<3	<100	<500	1.1	7.7	3.7	<1	20	48	14	3	0.9	<0.5	2	0.33	29.49
1178	15	10	690	1.7	7	53	3	2.78	8	<1	<5	<1	1.94	65	2.5	9.5	<3	<100	<500	1	7.1	2.9	<1	26	62	22	4	1.4	<0.5	2.6	0.41	29.81
1179	5	6.3	680	2.6	6	50	2	2.85	8	<1	<5	<1	2.15	78	1.4	10	<3	<100	<500	1.3	7.8	3.4	<1	28	64	23	4.6	1.4	0.6	3	0.46	29.96
1180	17	20	650	2.4	8	57	3	3.3	8	<1	<5	<1	2.04	67	3.7	10	<3	<100	<500	1.3	8.1	3.4	2	27	73	24	4.5	1.4	0.8	2.8	0.46	29.88
1182	7	8.8	630	1.5	6	56	3	2.81	8	<1	<5	<1	2.05	72	1.7	9.1	<3	<100	<500	1.6	6.9	3.1	<1	23	49	15	3.4	1.1	<0.5	2.5	0.4	29.84
1183	7	6.3	670	2.2	5	56	4	2.51	8	<1	<5	<1	1.88	79	1.4	8.7	<3	<100	<500	<0.5	6.9	3.3	4	24	47	18	3.4	1.1	<0.5	2.6	0.4	27.36
1184	5	12	610	1.6	7	63	3	3	9	<1	<5	2	2.13	91	2.1	9	<3	<100	610	2.1	8.1	3.3	<1	27	68	22	4.1	1.3	0.6	3	0.45	30.73
1185	8	26	740	1.9	7	50	5	2.95	7	<1	<5	2	2.03	62	6.3	9.2	<3	<100	<500	1.7	8.3	3	<1	26	66	23	4.1	1.3	0.6	2.4	0.4	31.83

Blackwater-Davidson ICP Analytical Data

Element	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm
Method	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP
Lab.	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM
Detection limit	1	1	3	1	0.3	1	1	2	0.01	2	5	2	2	1	0.2	2	2	1	0.01	0.001	1	1	0.01	1	0.01	3	0.01	0.01	0.01	2
1022	1	15	10	41	<.3	11	6	316	2.37	5	<5	<2	2	25	<0.3	<3	<2	58	0.27	0.039	13	21	0.2	109	0.15	<3	1.39	0.01	0.05	<2
1023	1	14	13	53	<.3	12	6	209	2.08	4	<5	<2	3	23	<0.3	<3	<2	46	0.28	0.045	12	21	0.23	95	0.12	<3	2.02	0.02	0.08	<2
1024	1	9	14	60	<.3	10	6	225	2.42	5	<5	<2	3	19	0.4	3	<2	54	0.19	0.099	10	20	0.18	71	0.15	<3	2.17	0.01	0.04	<2
1025	1	3	27	70	<.3	9	4	226	1.91	4	<5	<2	2	26	<0.3	<3	<2	50	0.34	0.041	7	18	0.23	56	0.28	<3	1.4	0.02	0.04	<2
1026	1	7	19	59	<.3	7	4	185	1.79	11	<5	<2	2	22	<0.3	<3	<2	44	0.18	0.022	10	15	0.2	45	0.13	<3	1.36	0.01	0.05	<2
1027	1	14	13	62	<.3	27	7	327	2.66	10	<5	<2	4	14	0.5	<3	<2	60	0.2	0.068	14	24	0.3	81	0.15	<3	1.47	0.01	0.06	<2
1028	1	5	10	31	<.3	9	6	180	2.22	2	<5	<2	2	34	<0.3	<3	<2	57	0.39	0.05	9	16	0.21	103	0.24	<3	1.64	0.02	0.04	<2
1029	1	7	11	45	<.3	11	7	226	2.43	10	<5	<2	3	14	<0.3	<3	<2	59	0.14	0.049	8	21	0.16	60	0.16	<3	1.4	0.01	0.04	<2
1030	1	62	113	103	0.3	19	10	989	3.13	7	22	<2	4	49	0.6	4	<2	57	0.52	0.1	22	27	0.27	250	0.08	<3	1.67	0.01	0.08	<2
1031	1	14	58	123	0.3	13	6	600	2.62	39	<5	<2	2	28	0.4	<3	<2	60	0.31	0.05	18	23	0.22	68	0.17	<3	1.24	0.02	0.08	<2
1032	1	9	25	94	<.3	10	6	419	2.32	8	<5	<2	3	32	<0.3	<3	<2	56	0.35	0.06	20	22	0.25	80	0.19	<3	1.57	0.02	0.1	<2
1033	1	5	11	35	<.3	7	4	161	1.75	2	<5	<2	2	29	<0.3	<3	<2	47	0.31	0.028	12	15	0.17	58	0.17	<3	1.1	0.01	0.06	<2
1034	1	4	15	39	<.3	9	4	230	1.61	4	<5	<2	2	26	<0.3	<3	<2	47	0.37	0.059	12	17	0.19	64	0.17	<3	1.08	0.02	0.04	<2
1035	1	6	15	34	<.3	8	4	244	1.48	4	<5	<2	5	30	<0.3	<3	<2	40	0.38	0.054	17	19	0.19	51	0.19	<3	0.91	0.02	0.05	<2
1048	3	13	27	399	0.4	11	6	579	3.38	147	<5	<2	5	23	0.3	<3	<2	59	0.33	0.07	16	20	0.18	66	0.16	<3	1.08	0.02	0.11	<2
1049	1	7	53	338	1.8	8	3	265	1.7	23	<5	<2	2	17	<0.3	5	<2	39	0.23	0.042	12	18	0.15	33	0.15	<3	1.47	0.01	0.06	<2
1050	1	37	42	1941	0.6	15	5	948	2.36	154	<5	<2	2	27	5	<3	<2	53	0.35	0.072	19	23	0.17	49	0.14	<3	1.62	0.01	0.06	<2
1051	1	10	21	100	<.3	12	6	460	2.64	14	<5	<2	4	34	<0.3	<3	<2	63	0.4	0.059	17	22	0.25	76	0.2	<3	1.41	0.02	0.07	<2
1052	1	10	6	60	0.4	14	6	320	2.64	8	<5	<2	2	16	<0.3	<3	<2	58	0.2	0.081	12	27	0.24	44	0.18	<3	2.81	0.01	0.05	<2
1053	1	10	15	91	<.3	9	6	315	2.19	12	<5	<2	5	15	<0.3	<3	<2	54	0.16	0.058	12	20	0.17	50	0.18	<3	1.82	0.02	0.06	<2
1054	1	11	8	51	<.3	11	6	332	2.63	9	<5	<2	4	20	<0.3	3	<2	63	0.27	0.068	13	22	0.19	69	0.18	<3	2.03	0.02	0.07	<2
1056	1	23	12	64	<.3	7	5	469	1.94	12	<5	<2	6	25	<0.3	<3	<2	41	0.22	0.03	17	15	0.16	59	0.13	<3	1.6	0.01	0.12	<2
1057	1	15	9	60	<.3	12	6	313	2.43	14	<5	<2	2	18	<0.3	<3	<2	48	0.14	0.099	10	21	0.23	39	0.1	<3	2.91	0.01	0.05	<2
1058	1	16	9	64	<.3	9	5	294	2.39	7	<5	<2	2	25	<0.3	<3	<2	50	0.21	0.068	12	20	0.25	49	0.09	<3	2.44	0.01	0.05	<2
1059	2	19	13	54	<.3	11	6	303	2.49	14	<5	<2	2	25	<0.3	<3	<2	57	0.25	0.05	17	21	0.23	66	0.14	<3	2.12	0.01	0.05	<2
1060	1	8	5	45	<.3	11	6	416	2.66	6	<5	<2	3	20	<0.3	<3	<2	69	0.17	0.058	11	26	0.18	54	0.2	<3	2.07	0.01	0.04	<2
1062	1	18	10	74	<.3	14	10	701	2.87	4	<5	<2	3	43	<0.3	<3	<2	68	0.64	0.072	17	20	0.29	129	0.15	<3	1.26	0.04	0.13	<2
1063	1	13	16	471	<.3	10	6	494	2.38	3	<5	<2	2	33	<0.3	<3	<2	56	0.43	0.058	19	19	0.2	78	0.15	<3	1.13	0.02	0.09	<2

Blackwater-Davidson ICP Analytical Data

Element	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm
Method	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP
Lab.	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM
Detection limit	1	1	3	1	0.3	1	1	2	0.01	2	5	2	2	1	0.2	2	2	1	0.01	0.001	1	1	0.01	1	0.01	3	0.01	0.01	0.01	2
1064	1	16	14	68	<.3	10	6	513	2.32	9	<5	<2	2	37	<0.3	<3	<2	54	0.44	0.061	15	17	0.16	101	0.13	<3	0.87	0.03	0.08	<2
1065	1	15	26	59	<.3	13	6	329	2.7	5	<5	<2	3	35	<0.3	<3	<2	61	0.29	0.047	19	23	0.2	99	0.2	<3	1.5	0.01	0.05	<2
1066	1	18	3	57	<.3	17	8	428	2.87	6	<5	<2	3	30	<0.3	<3	<2	63	0.31	0.058	15	25	0.31	85	0.16	<3	1.9	0.01	0.08	<2
1067	1	11	6	67	<.3	9	5	290	2.34	3	<5	<2	2	27	<0.3	<3	<2	57	0.24	0.025	8	22	0.26	46	0.17	<3	1.54	0.02	0.05	<2
1068	1	12	9	64	<.3	10	4	242	1.84	9	<5	<2	2	15	<0.3	<3	<2	40	0.15	0.034	8	18	0.2	46	0.14	<3	1.92	0.01	0.09	<2
1177	1	14	10	54	0.3	11	6	267	2.53	10	<5	<2	3	11	<0.3	<3	<2	54	0.13	0.068	12	20	0.17	67	0.12	<3	1.64	0.01	0.03	<2
1178	1	11	33	72	<.3	10	5	342	2.27	9	<5	<2	2	17	<0.3	<3	<2	51	0.21	0.053	13	18	0.19	81	0.17	<3	1.64	0.01	0.02	<2
1179	1	11	12	45	<.3	9	5	283	2.17	6	<5	<2	2	27	<0.3	<3	<2	53	0.3	0.049	14	19	0.21	66	0.2	<3	1.34	0.01	0.05	<2
1180	1	14	40	135	0.4	11	6	620	2.8	18	<5	<2	3	19	<0.3	<3	<2	66	0.26	0.071	13	21	0.18	47	0.2	3	1.15	0.01	0.05	<2
1182	1	12	9	42	<.3	9	5	243	2.44	5	<5	<2	2	24	<0.3	<3	<2	60	0.29	0.047	13	21	0.18	66	0.17	<3	1.09	0.01	0.04	<2
1183	1	9	20	99	0.3	9	4	181	2.06	5	<5	<2	2	23	<0.3	<3	<2	47	0.2	0.026	12	16	0.14	98	0.12	<3	1.71	0.01	0.02	<2
1184	1	13	12	46	<.3	11	5	502	2.56	11	<5	<2	2	16	<0.3	<3	<2	62	0.27	0.075	13	21	0.15	49	0.16	<3	0.88	0.01	0.03	<2
1185	1	13	57	215	0.4	11	6	628	2.66	25	<5	<2	3	17	<0.3	<3	<2	59	0.22	0.064	16	21	0.17	61	0.18	<3	1.17	0.01	0.06	<2

Till Geochemical Dispersal in Central British Columbia

Open File 1997-12

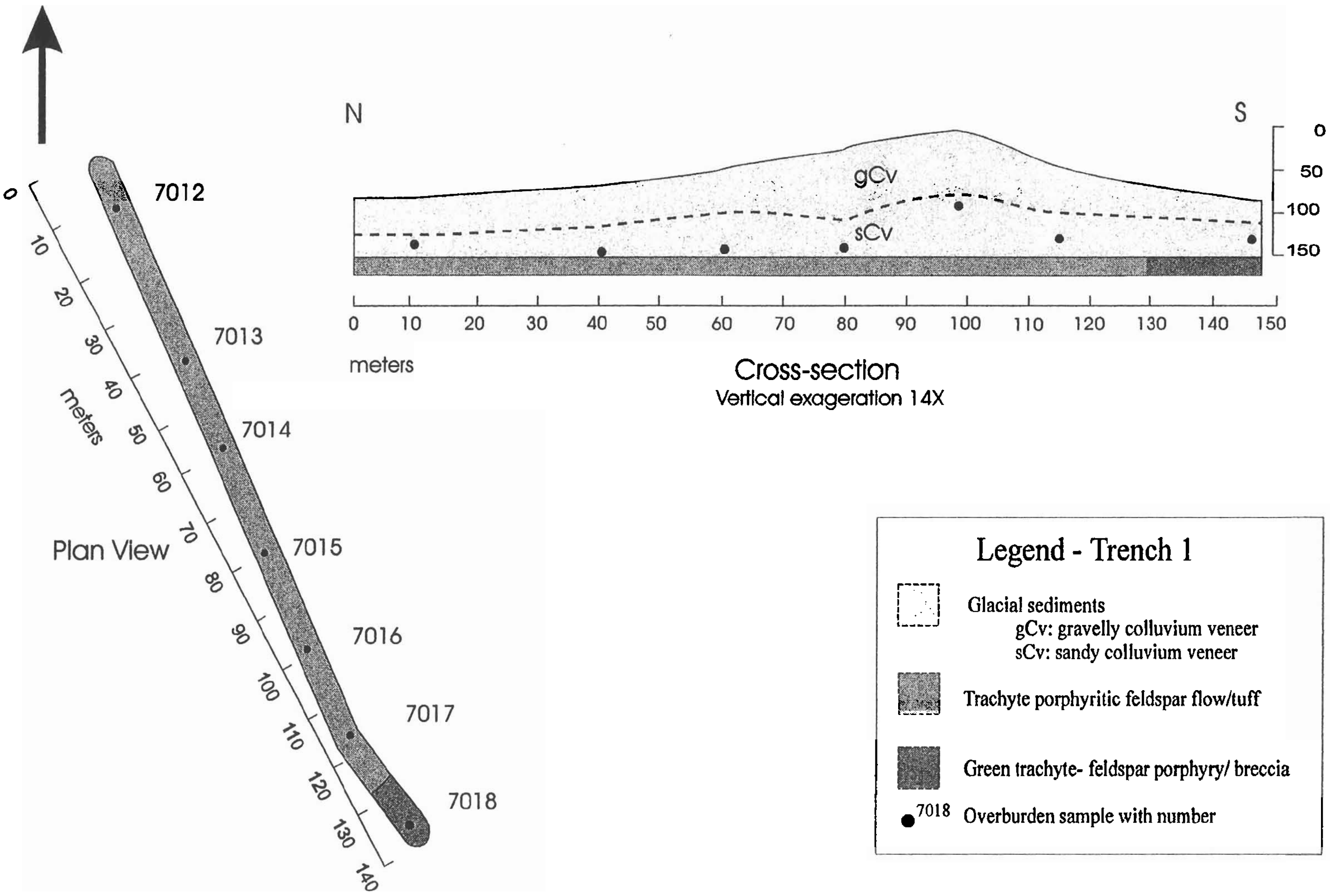
Appendix C

Uduk Lake Mineral Property

Notes:

Sample site locations: Till geochemical samples were collected in the 1994 and 1995 field seasons in the Uduk Lake area. The locations are identified by UTM coordinates.

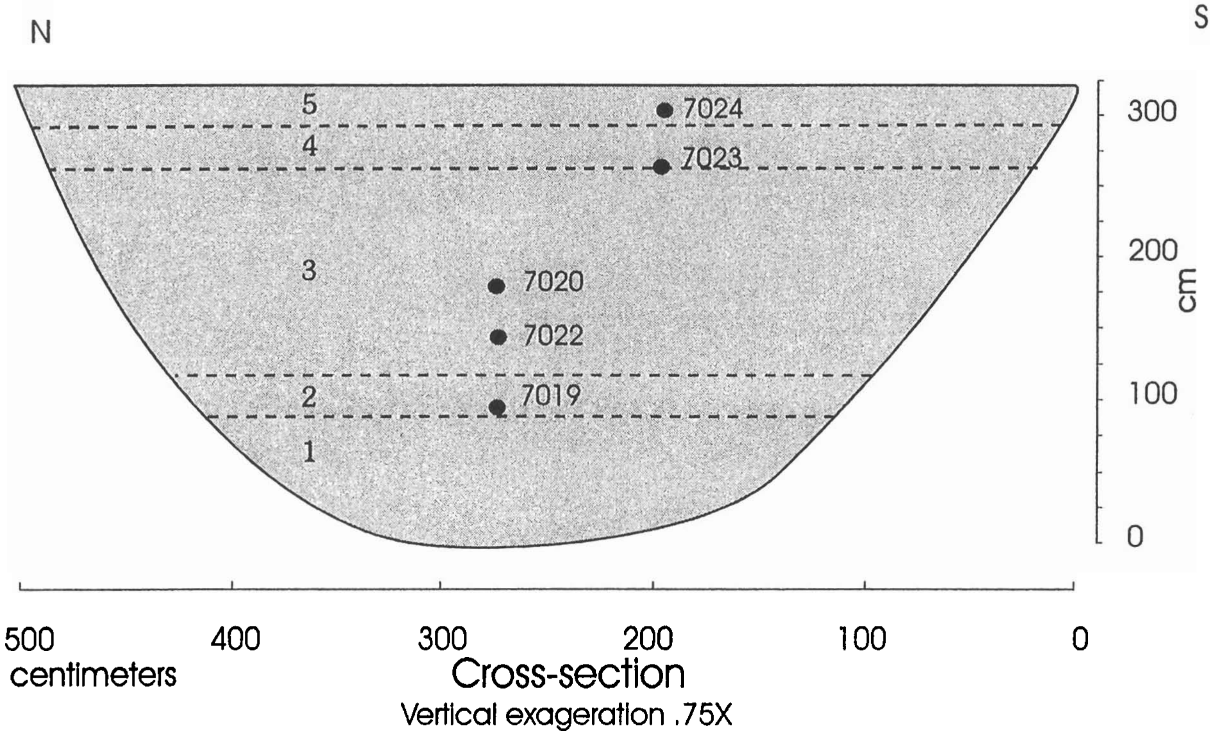
Till Geochemistry: Till geochemical analysis was performed by Activation Laboratories Limited (ACTLAB). Preliminary sample preparation was conducted by the B.C. Geologic Survey. Arsenic plus 45 additional elements (Au, Ba, Br, Ca, Co, Cr, Cs, Fe, Hf, Ir, Mo, Na, Rb, Sb, Sc, Se, Sr, Sn, Ta, Th, U, W, La, Ce, Nd, Sm, Eu, Tb, Yb, Lu, Ag, Al, B, Cu, K, Ni, Zn, Cd, Bi, V, P, Mg, Ti, Mn, Pb) were analysed using instrumental neutron activation analysis (INAA) and inductively coupled plasma emission spectroscopy (aqua regia - ICP analysis).



Appendix C - Figure 1: Plan view and cross-section of trench 1, Uduk Lake property. Note: bedrock was used as a datum.

Legend - Overburden Trench 1

Unit 5: Colluviated diamicton: angular clasts, several rhyolitic, in a silty-sand matrix; gravelly on top
Unit 4: Gravelly sand: loose, crudely laminated; pebble-size clasts, deposited parallel to slope
Unit 3: Silty-sand diamicton: sub-angular to sub-rounded, striated clasts, several rhyolitic
Unit 2: Fine sand and sandy gravel: crude horizontally laminated sands interbedded with poorly-sorted sand, pebbles, gravel and some rhyolitic cobbles
Unit 1: Fractured rhyolitic bedrock infilled with clay, overlain by fragmented angular rhyolitic clasts
● 7019 Over burden sample site with number

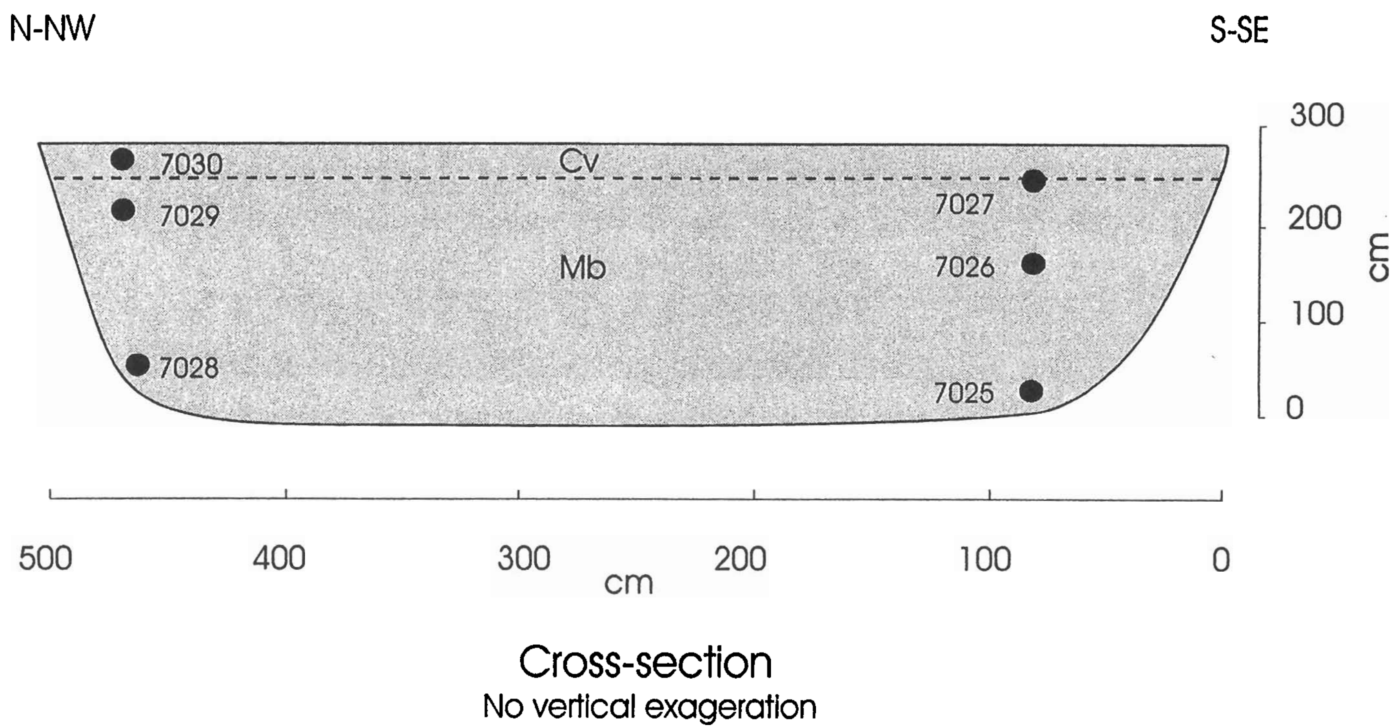


Appendix C- Figure 2: Cross-section of overburden trench 1, Uduk Lake property.

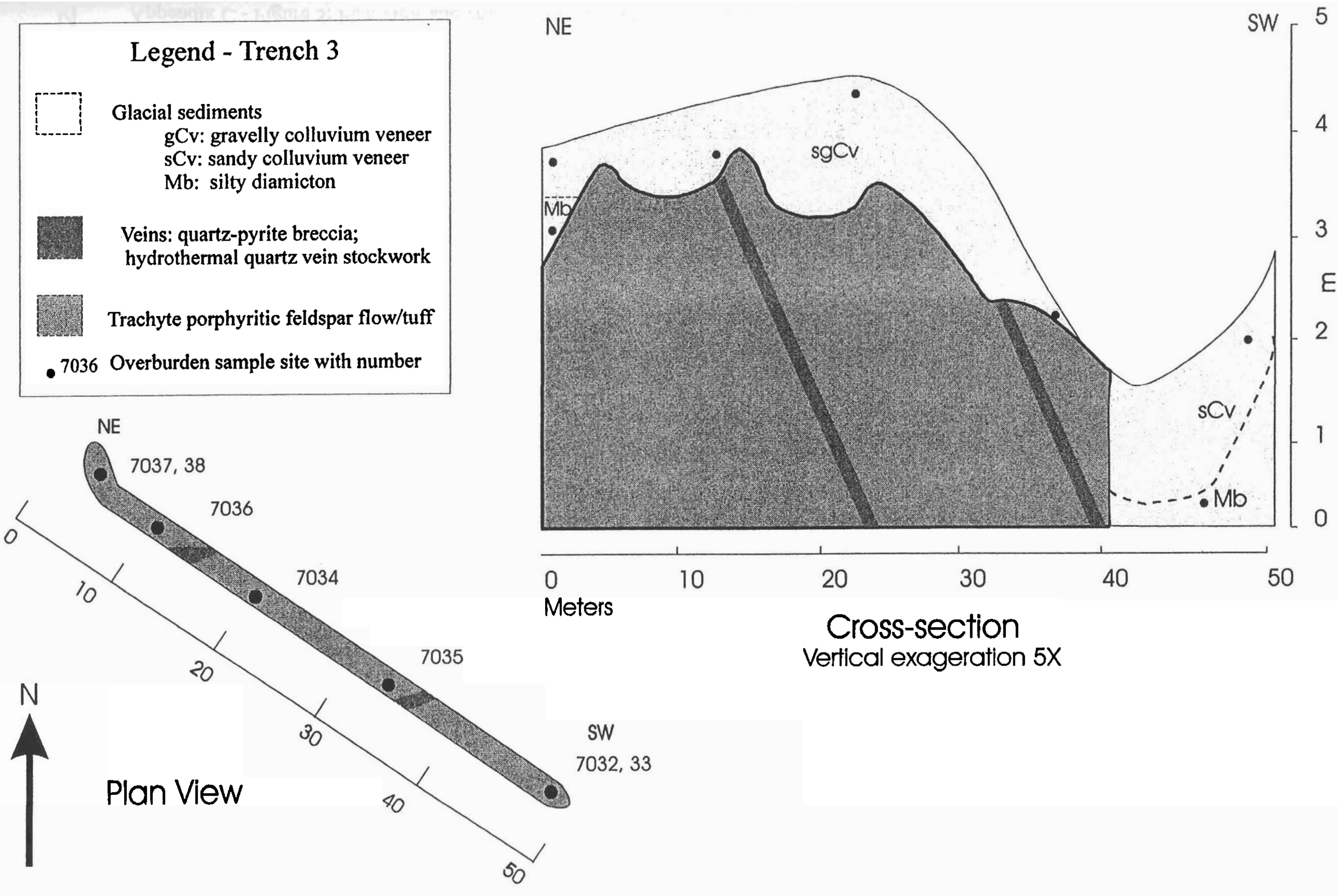
Legend - Overburden Trench 2

Glacial sediments
- Cv: colluvium, veneer (sandy gravel)
- Mb: Morainal blanket (silty diamicton)

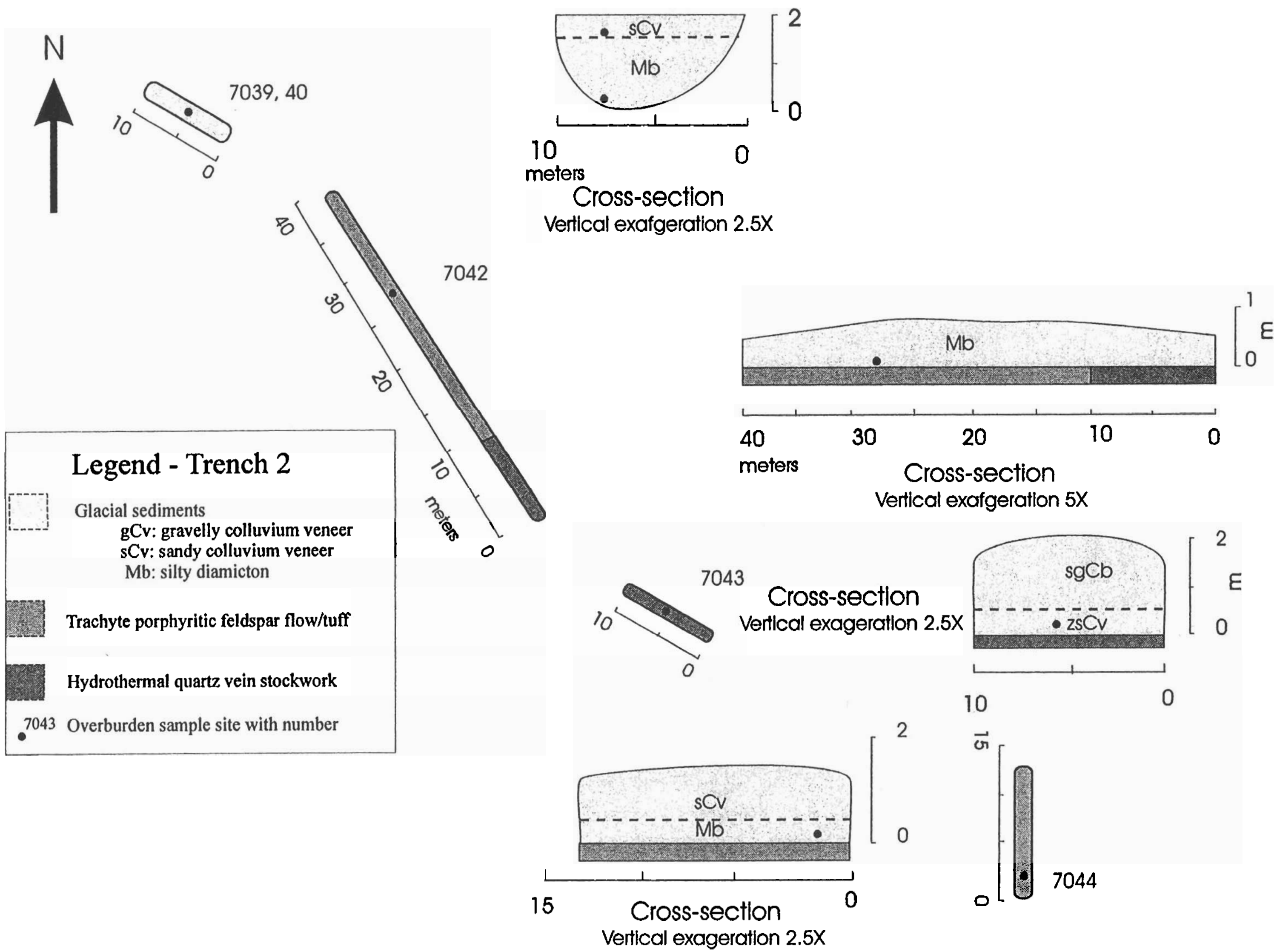
● 7030 Overburden sample site with number



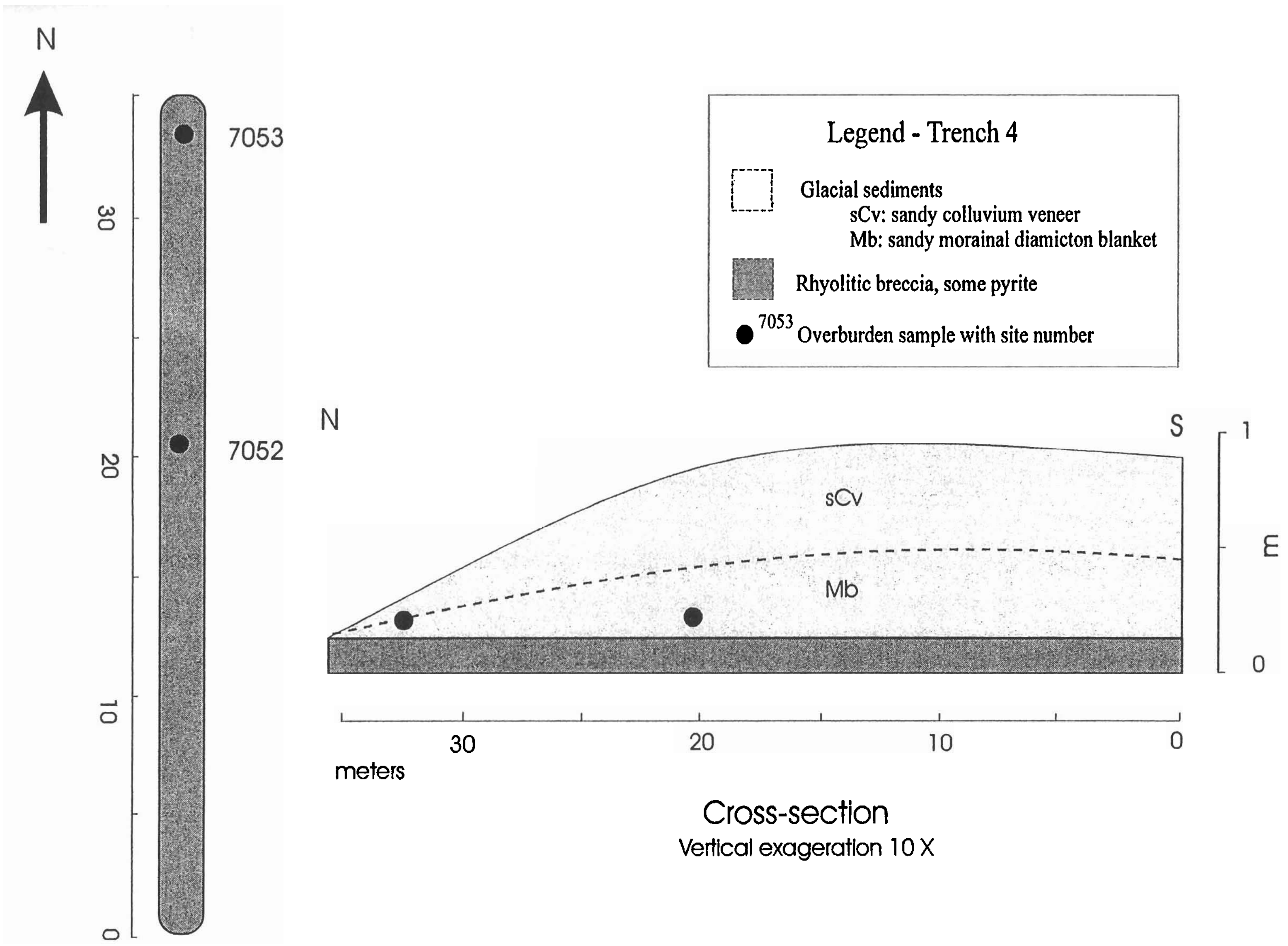
Appendix C - Figure 3: Cross-section of overburden trench 2, Uduk Lake property.



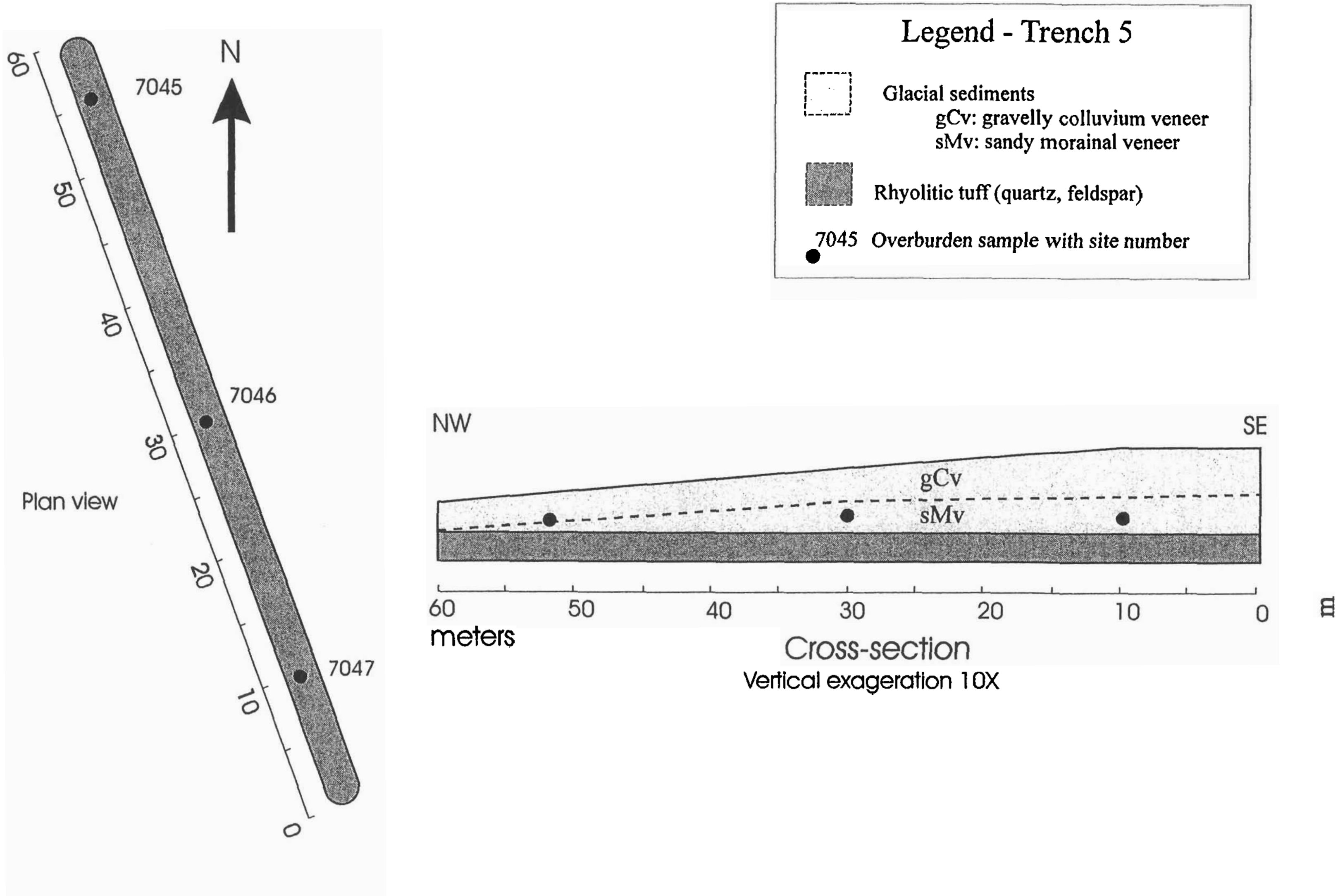
Appendix C - Figure 4: Plan view and cross-section of trench 3, Uduk Lake property.



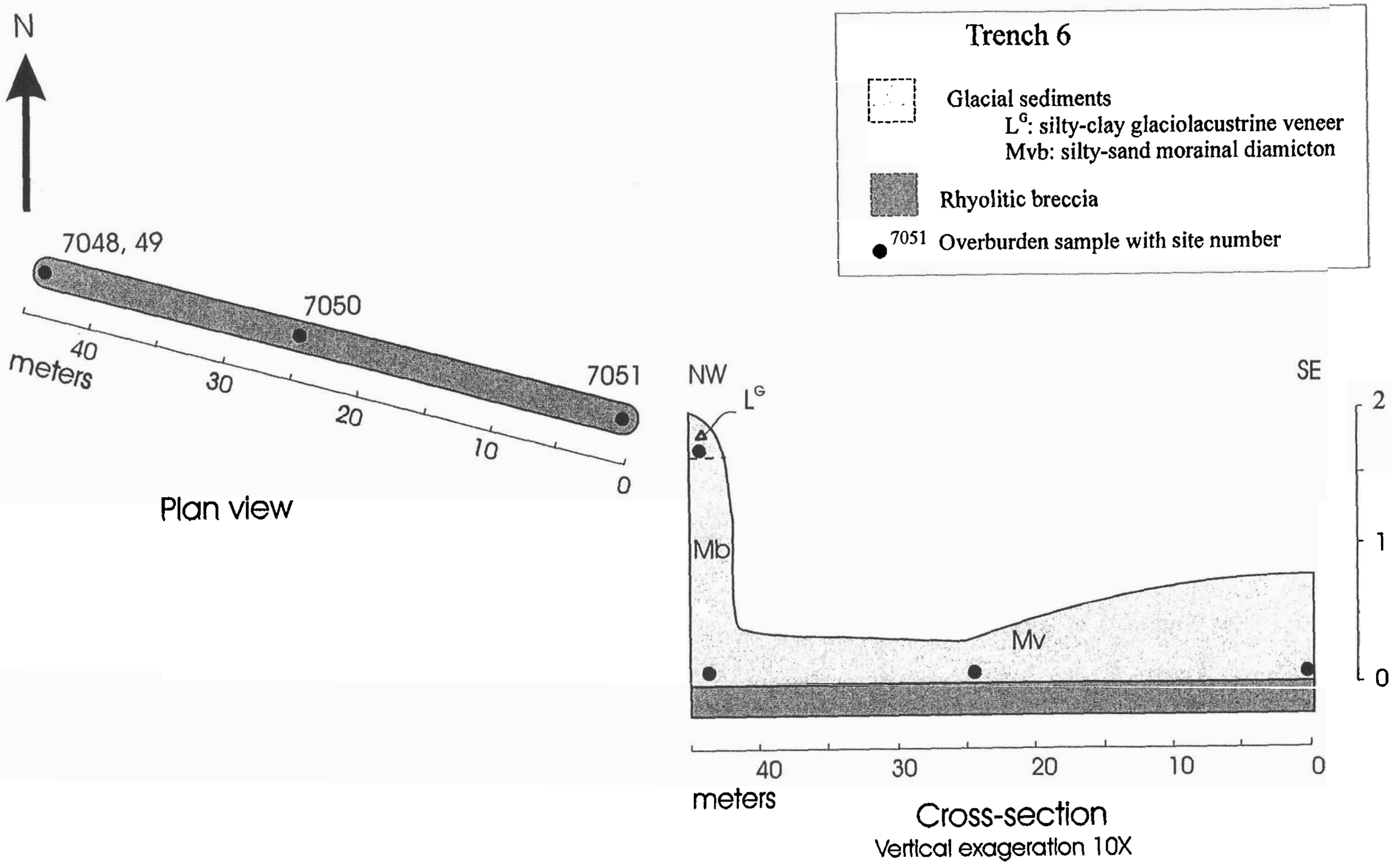
Appendix C - Figure 5: Plan view and cross-section of trench 2, Uduk Lake property. Note: bedrock was used as a datum.



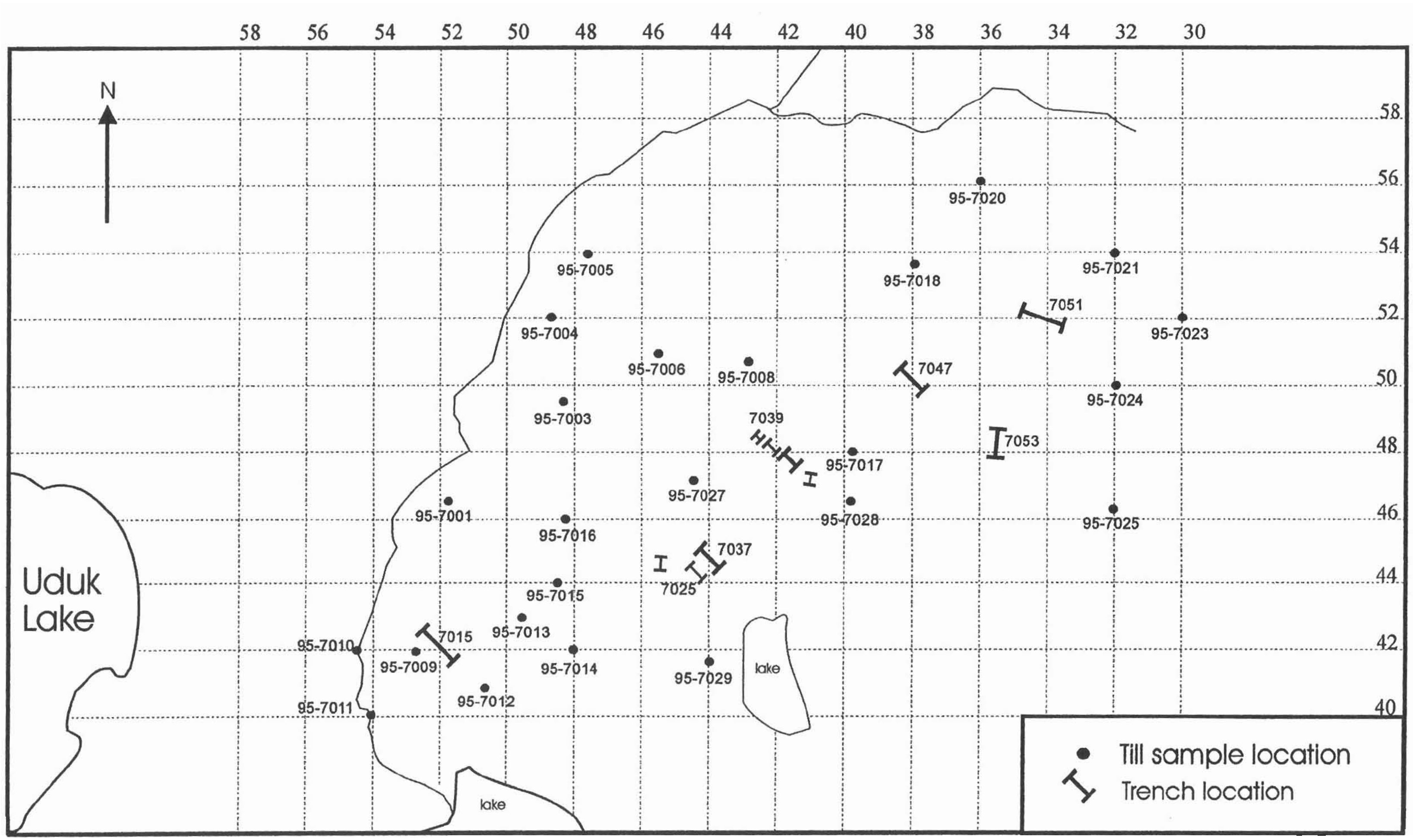
Appendix C - Figure 6: Plan view and cross-section of trench 4, Uduk Lake property. Note: bedrock was used as a datum.



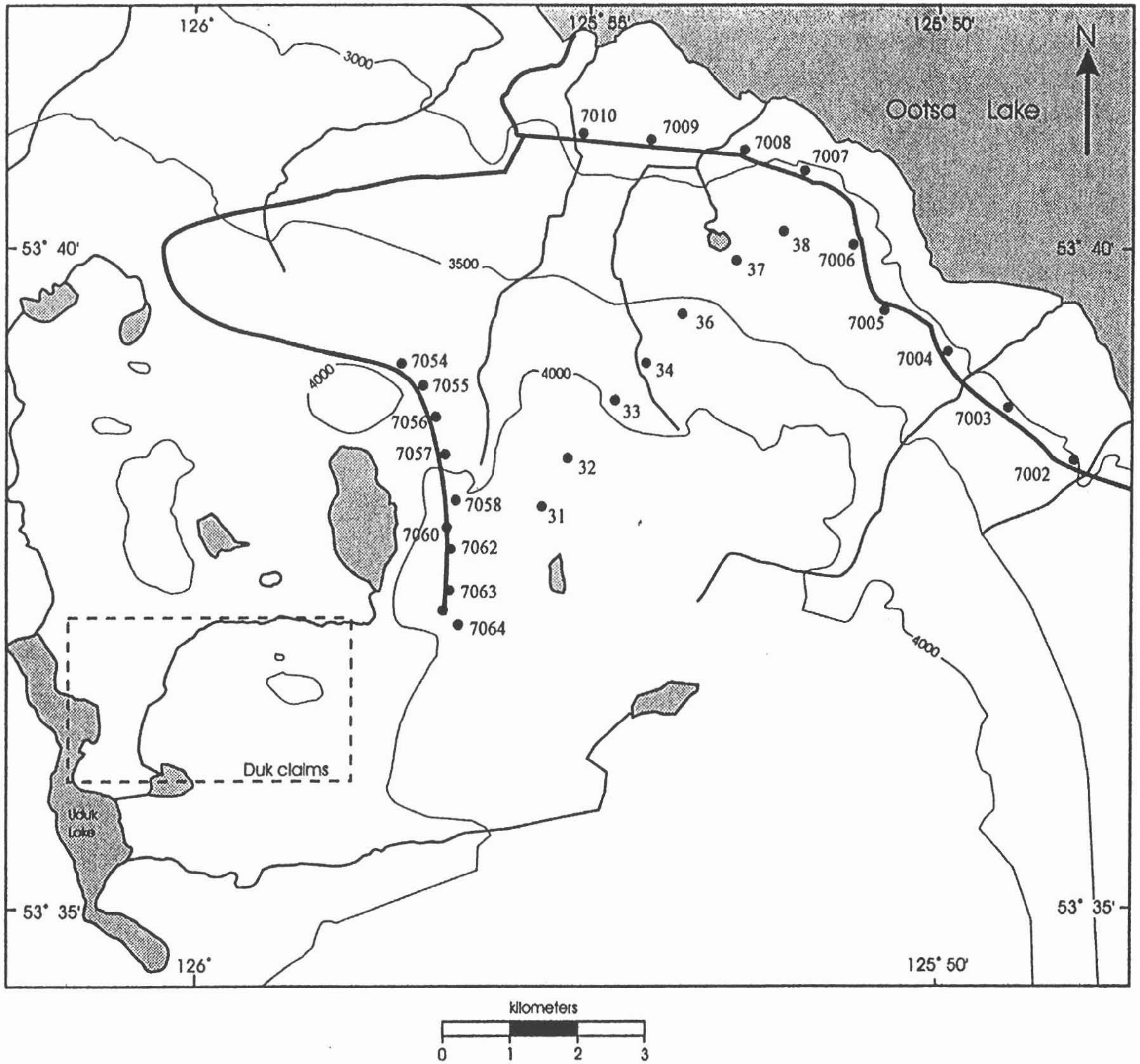
Appendix C - Figure 7: Plan view and cross-section of trench 5, Uduk Lake property. Note: bedrock was used as a datum.



Appendix C - Figure 8: Plan view and cross-section of trench 6, Uduk Lake property. Note: bedrock was used as a datum.



Appendix C - Figure 9 : Numbered till sample locations, Duk 2 and 3 claims, Uduk Lake property. Note: grid lines are spaced 200 m apart.



Appendix C - Figure 10: Numbered till sample locations, Uduk Lake area.

UTM's of Uduk Lake Sample Sites

Uduk 94 Sample	UTM East	UTM North	Grid West	Grid North
7002	313350	5946800	N/A	N/A
7003	312850	5947350	N/A	N/A
7004	311800	5948350	N/A	N/A
7005	311400	5949000	N/A	N/A
7006	310800	5949900	N/A	N/A
7007	310000	5951800	N/A	N/A
7008	309250	5951150	N/A	N/A
7009	308050	5951300	N/A	N/A
7010	307250	5951550	N/A	N/A
7012	301300	5943300	52.8	42.6
7013	301300	5943300	51.8	41.7
7014	301300	5943300	51.7	41.6
7015	301300	5943300	51.6	41.4
7016	301300	5943300	51.5	41.2
7017	301300	5943300	51.4	41.15
7018	301300	5943300	51.3	40.9
7019	302000	5943500	44.4	44.7
7020	302000	5943500	44.4	44.7
7022	302000	5943500	44.4	44.7
7023	302000	5943500	44.4	44.7
7024	302000	5943500	44.4	44.7
7025	302100	5943400	43.9	44.6
7026	302100	5943400	43.9	44.6
7027	302100	5943400	43.9	44.6
7028	302100	5943400	44	44.75
7029	302100	5943400	44	44.75
7030	302100	5943400	44	44.75
7032	302300	5943400	43.3	44.5
7033	302300	5943400	43.3	44.5
7034	302300	5943400	43.5	44.65
7035	302300	5943400	43.4	44.6
7036	302300	5943400	43.6	44.7
7037	302300	5943400	43.7	44.8

Uduk 94 Sample	UTM East	UTM North	Grid West	Grid North
7038	302300	5943400	43.7	44.8
7039	302300	5943800	41.7	48.2
7040	302300	5943800	41.7	48.2
7042	302300	5943700	41.45	47.9
7043	302300	5943600	41.15	47.65
7044	302400	5943600	40.7	47.2
7045	302600	5944100	35.4	48.3
7046	302600	5944100	35.3	48.2
7047	302600	5944100	35.2	48.05

Uduk 95 Sample	UTM East	UTM North	Grid West	Grid North
95-7002	301240	5943658	52.5	46.5
95-7003	301580	5944950	48.5	49.5
95-7004	301580	5945350	48.25	52
95-7005	301640	5944750	47.75	54
95-7006	301900	5944100	45.5	51
95-7008	302120	5944100	42.75	51
95-7009	301120	5943200	52.8	42
95-7010	300900	5943200	54.5	42
95-7011	300000	5943000	54	40
95-7012	300310	5943080	51	41
95-7013	300420	5943280	49.75	43
95-7014	300600	5943200	48	42
95-7015	300250	5943400	48.75	44
95-7016	300550	5943600	48	46
95-7017	302450	5943800	39.5	48
95-7018	302600	5944350	53	37.5
95-7020	302800	5944600	56	35.75
95-7022	303200	5944400	54	32
95-7023	303400	5944200	52	30
95-7024	303200	5944000	32.5	50
95-7025	303220	5943600	32.5	46
95-7026	303650	5944300	N/A	N/A
95-7027	301950	5943700	44.75	47
95-7028	302420	5943650	40.25	46
95-7029	302000	5943150	44	41.75
95-7030	302000	5943180	44	42
95-7031	306600	5946326	N/A	N/A
95-7032	306906	5946971	N/A	N/A
95-7033	307475	5947667	N/A	N/A
95-7034	308000	5948150	N/A	N/A
95-7036	308575	5948838	N/A	N/A
95-7037	309320	5949713	N/A	N/A
95-7038	309865	5950000	N/A	N/A

Uduk Lake INA Analytical Data

Element	Au	As	Ba	Br	Co	Cr	Cs	Fe	Hf	Hg	Ir	Mo	Na	Rb	Sb	Sc	Se	Sn	Sr	Ta	Th	U	W	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu	Mass
Units	PPB	PPM	PPM	PPM	PPM	PPM	PPM	%	PPM	PPM	PPB	PPM	%	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	g
Method	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	bal
Lab.	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT
Detection limit	2	0.5	50	0.5	1	5	1	0.02	1	1	5	1	0.01	15	0.1	0.1	3	100	500	0.5	0.5	0.5	1	0.1	3	5	0.1	0.2	0.5	0.2	0.05	
7002	<2	9.7	940	2	8	72	4	3.8	7	<1	<5	<1	1.92	59	1.2	14	<3	<100	<500	<0.5	6.2	4	2	30	61	25	5.9	1.7	0.6	3.6	0.59	24.67
7003	<2	12	1200	0.9	10	58	6	4.37	8	<1	<5	<1	1.89	66	1.5	15	<3	<100	<500	<0.5	6.7	3	<1	31	60	29	6.1	1.8	1.1	3.7	0.68	24.87
7004	5	12	1000	<0.5	11	59	4	3.63	7	<1	<5	<1	2	73	1.6	12	<3	<100	<500	<0.5	6.2	2.8	<1	29	64	23	5.7	1.6	0.8	3.7	0.57	24.85
7005	4	12	900	<0.5	8	55	4	3.95	7	<1	<5	<1	1.73	76	1.4	14	<3	<100	<500	1.2	6.3	2.2	<1	31	62	25	6.2	1.8	0.8	3.9	0.62	28.65
7006	<2	13	970	<0.5	11	45	3	3.85	7	<1	<5	3	1.9	62	1.4	13	<3	<100	<500	<0.5	6	1.7	<1	27	61	23	5.3	1.5	0.9	3.4	0.53	28.26
7007	<2	8	1100	<0.5	10	78	3	4.08	10	<1	<5	<1	2.08	57	1.3	14	<3	<100	<500	<0.5	6.9	2.7	<1	34	72	33	6.7	2	0.9	4.4	0.67	26.65
7008	3	14	1000	<0.5	11	41	3	3.91	7	<1	<5	<1	1.96	85	1.7	14	<3	<100	<500	<0.5	5.9	2.5	<1	29	65	27	5.8	1.7	<0.5	3.7	0.58	24.79
7009	<2	11	1100	<0.5	10	70	3	4.49	8	<1	<5	<1	1.89	78	1.3	15	<3	<100	<500	<0.5	7.3	2.9	<1	34	72	30	6.9	2	<0.5	4.2	0.64	24.91
7010	3	16	1200	<0.5	9	35	3	3.83	8	<1	<5	<1	2.28	58	1.6	13	<3	<100	<500	0.9	7	3.1	<1	35	74	29	6.7	1.8	0.9	3.9	0.64	24.58
7012	11	8.7	1100	<0.5	7	72	3	3.53	9	<1	<5	<1	1.88	79	1.3	10	<3	<100	<500	<0.5	6.8	3.5	<1	28	57	18	4.3	1.3	<0.5	3.4	0.56	28.71
7013	295	140	1800	1.1	2	14	9	4.4	12	<1	<5	10	1.11	210	7.6	7.5	<3	<100	<500	1.8	11	4.1	7	21	42	15	3.4	1.2	<0.5	3.5	0.55	27.56
7014	270	60	1600	1.3	2	27	12	3.47	12	<1	<5	5	1.59	190	3.1	8.4	<3	<100	<500	<0.5	9.1	3.7	4	24	49	15	4.3	1.2	0.7	4.6	0.8	27.69
7015	1050	620	1500	<0.5	3	32	9	6.23	13	<1	<5	25	1.28	170	24	8.8	<3	<100	<500	1.6	14	5.8	5	53	93	23	5.6	1.8	<0.5	4.3	0.71	17.59
7016	104	23	1700	<0.5	2	22	8	2.4	11	<1	<5	<1	1.75	190	2	7.2	<3	<100	<500	<0.5	8.6	4	6	20	42	17	3.6	1.1	<0.5	3.6	0.6	29.17
7017	208	130	1700	<0.5	2	13	12	3.02	10	<1	<5	4	1.08	230	5.2	8.5	<3	<100	<500	<0.5	11	4.1	6	29	55	20	4.4	1.3	<0.5	3.7	0.55	24.7
7018	27	40	1600	<0.5	<1	11	17	3.17	15	<1	<5	<1	0.98	200	6.3	12	<3	<100	<500	1.2	19	7.4	<1	51	110	42	10	3	1.3	8	1.21	23.64
7019	12	14	1300	<0.5	5	55	3	2.56	10	<1	<5	<1	1.96	99	2	9.2	<3	<100	640	<0.5	7.4	4.1	3	30	68	23	5.9	1.7	0.8	4.4	0.73	29.87
7020	<2	15	1400	<0.5	5	56	3	2.97	10	<1	<5	<1	2.15	87	2.1	9.9	<3	<100	<500	<0.5	6.7	4.3	<1	32	73	29	6.3	2	<0.5	4.6	0.74	31.69
7022	16	24	1200	<0.5	7	44	7	3.53	10	<1	<5	<1	1.71	110	2.5	11	<3	<100	<500	<0.5	9	4	<1	37	90	36	7.6	2	<0.5	4.8	0.74	28.49
7023	23	19	1300	<0.5	5	64	3	2.62	11	<1	<5	<1	1.87	71	2	9.2	<3	<100	<500	<0.5	8.3	4.2	<1	33	77	24	6.6	1.9	0.8	4.7	0.75	27.71
7024	10	37	1300	<0.5	4	44	5	2.88	10	<1	<5	12	1.5	140	2.7	8.1	<3	<100	<500	<0.5	7.9	2.7	4	27	59	18	4.8	1.3	0.9	4.1	0.64	28.83
7025	24	32	1200	<0.5	15	58	7	3.9	9	<1	<5	<1	1.48	110	2.8	14	<3	<100	<500	<0.5	9.6	4	<1	37	86	33	7.1	1.8	1.2	4.6	0.79	24.98
7026	139	140	2000	<0.5	4	21	5	2.62	11	<1	<5	18	0.81	220	8.2	10	<3	<100	<500	<0.5	11	3.7	6	39	80	34	7.4	1.8	<0.5	4.6	0.78	23.33
7027	47	83	1800	0.7	2	40	5	1.91	10	<1	<5	10	0.9	240	2.5	8	<3	<100	<500	<0.5	8.3	3.3	4	26	61	19	4.9	1.4	<0.5	3.8	0.56	24.59
7028	31	23	1500	<0.5	5	48	4	2.79	10	<1	<5	<1	2.01	92	2.4	10	<3	<100	<500	1.9	7.8	3.2	<1	32	70	28	6.4	1.7	0.9	4.8	0.75	29.75
7029	32	35	1400	<0.5	6	56	4	2.95	10	<1	<5	3	1.91	78	2.7	11	<3	<100	<500	<0.5	7.9	4	<1	33	71	31	6.8	2	<0.5	5.1	0.79	27.81
7030	16	39	1500	<0.5	5	56	4	2.51	12	<1	<5	<1	1.79	130	2.1	8.4	<3	<100	<500	<0.5	6.9	2.9	<1	24	55	21	4.4	1.4	<0.5	4	0.7	27.11
7032	63	87	1500	<0.5	5	39	5	2.83	11	<1	<5	11	1.39	130	5.9	10	<3	<100	<500	<0.5	9.1	7	<1	34	76	30	6.6	1.8	1.1	4.9	0.78	26.47

Uduk Lake INA Analytical Data

Element	Au	As	Ba	Br	Co	Cr	Cs	Fe	Hf	Hg	Ir	Mo	Na	Rb	Sb	Sc	Se	Sn	Sr	Ta	Th	U	W	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu	Mass
Units	PPB	PPM	PPM	PPM	PPM	PPM	PPM	%	PPM	PPM	PPB	PPM	%	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	g
Method	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	bal
Lab.	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT
Detection limit	2	0.5	50	0.5	1	5	1	0.02	1	1	5	1	0.01	15	0.1	0.1	3	100	500	0.5	0.5	0.5	1	0.1	3	5	0.1	0.2	0.5	0.2	0.05	
7033	30	86	1600	0.9	4	38	4	2.17	10	<1	<5	6	1.43	150	3.4	7.4	<3	<100	<500	<0.5	7.8	3.8	5	29	63	21	5	1.4	0.8	4.1	0.67	26.09
7034	82	360	2500	<0.5	<1	<5	5	2	12	<1	<5	21	0.17	300	5.6	7.7	<3	<100	<500	0.9	12	5.5	<1	51	110	42	10	2.3	1.7	7.3	1.1	20.58
7035	76	100	1300	<0.5	6	75	3	3.28	10	<1	<5	11	1.38	110	3.2	10	<3	<100	<500	<0.5	9.1	3.1	3	39	80	29	6.2	1.6	0.9	4.2	0.68	27.31
7036	61	110	1700	<0.5	3	37	4	2.21	12	<1	5	4	1.2	150	3.7	7.8	<3	<100	600	<0.5	11	3.8	<1	40	87	35	7.3	1.9	1.1	5.6	0.82	26.82
7037	74	120	1100	<0.5	5	39	6	2.94	10	<1	<5	8	1.15	160	6.3	11	<3	<100	<500	1.3	10	5.6	<1	40	89	34	7.9	1.9	<0.5	5.3	0.84	24.54
7038	86	290	2000	<0.5	1	15	5	2.23	10	<1	<5	22	0.5	230	8.1	6.6	<3	<100	<500	<0.5	9.8	4.4	<1	46	97	36	8.2	1.9	0.9	4.6	0.74	26.72
7039	17	25	1100	<0.5	12	60	4	4.24	8	<1	<5	<1	1.72	93	2.1	15	<3	<100	<500	<0.5	8.5	3.9	<1	37	81	33	7.3	1.9	1.2	4.6	0.75	24.59
7040	21	24	1300	1.4	6	65	3	2.9	12	<1	<5	<1	1.74	98	2.6	9.1	<3	<100	<500	<0.5	7.5	2.7	<1	31	70	25	5.8	1.6	<0.5	4.5	0.7	29.46
7042	23	33	2400	<0.5	1	8	8	2.31	20	<1	<5	<1	0.18	240	3.5	11	<3	<100	<500	1.8	21	8.2	<1	48	120	43	11	2.4	1.8	13.5	2.16	25.69
7043	42	120	3400	<0.5	1	12	16	5.8	16	<1	<5	<1	0.11	300	5.2	13	<3	<100	<500	1.1	18	6.5	<1	49	110	41	9.5	2.2	1.7	10	1.53	21.62
7044	12	28	1100	<0.5	4	32	6	2.48	11	<1	<5	<1	1.02	130	3.6	7.4	<3	<100	<500	1.2	14	5.1	3	53	110	38	8.2	1.5	<0.5	5.7	0.89	29.99
7045	70	17	1400	1.5	4	46	4	2.17	11	<1	<5	<1	1.25	100	3	8.3	<3	<100	<500	<0.5	9.3	4.1	4	44	95	36	8.4	2	1.1	5.5	0.86	24.51
7046	24	18	1200	<0.5	4	41	3	2.29	10	<1	<5	<1	1.36	95	2.7	7.2	<3	<100	<500	<0.5	9.5	4	<1	39	83	32	6.6	1.5	1	4.8	0.73	29.92
7047	55	35	1100	<0.5	5	46	4	3.01	10	<1	<5	<1	1.43	110	4.1	11	<3	<100	<500	<0.5	11	4.5	<1	46	100	37	8.1	1.8	<0.5	5.4	0.81	26.83
7048	13	34	1000	<0.5	9	56	6	4.13	8	<1	<5	<1	1.57	120	3.4	14	<3	<100	500	1.3	8.7	3.4	<1	40	81	35	7.6	1.9	1.2	4.8	0.77	25.57
7049	24	13	1100	<0.5	3	44	4	2.04	9	<1	<5	<1	1.44	110	2.4	9.3	<3	<100	<500	<0.5	8.7	3.5	6	43	92	37	6.9	1.7	1	3.8	0.64	28.84
7050	16	69	950	4.4	9	57	6	3.97	9	<1	<5	5	1.05	130	3.5	12	<3	<100	<500	<0.5	8.8	3.9	7	43	87	28	5.8	1.5	0.9	4	0.62	21.85
7051	50	100	1400	<0.5	5	63	5	5.73	10	<1	<5	5	0.87	110	6.6	13	<3	<100	<500	<0.5	11	3.6	5	79	140	35	6.4	1.6	1.3	4.3	0.64	24.61
7052	22	17	1200	<0.5	6	65	3	3.19	10	<1	<5	<1	1.9	79	2.2	9.6	<3	<100	<500	<0.5	8.6	3.9	<1	33	69	27	5.1	1.4	0.8	4.1	0.67	27.31
7053	48	18	1100	<0.5	7	64	3	3.04	9	<1	<5	<1	1.57	68	2	10	<3	<100	<500	0.8	8.1	3.5	<1	26	58	20	3.5	1.3	0.9	3.8	0.58	29.48
7054	<2	18	1200	<0.5	12	75	5	4.46	8	<1	<5	<1	2.01	63	1.9	15	<3	<100	<500	<0.5	7.8	3.5	<1	34	77	28	6.7	1.9	1.1	4.7	0.72	26.17
7055	7	21	990	1.4	11	71	5	4.75	8	<1	<5	<1	1.88	70	1.8	16	<3	<100	<500	<0.5	7.7	3.4	<1	37	71	25	7.1	2	<0.5	4.4	0.72	26.1
7056	<2	11	1000	1.6	7	70	3	3.18	8	<1	<5	<1	1.98	56	1.4	12	<3	<100	<500	<0.5	6.2	3	<1	30	63	23	5.3	1.5	<0.5	3.7	0.55	29.53
7057	<2	8.5	960	<0.5	7	60	4	2.91	7	<1	<5	<1	1.99	87	1.4	11	<3	<100	<500	1.3	7	3.8	<1	30	66	23	5.6	1.5	<0.5	3.9	0.58	26.96
7058	19	22	1100	<0.5	14	68	6	4.72	8	<1	<5	<1	1.79	78	2.1	16	<3	<100	<500	<0.5	7.6	2.6	<1	34	76	24	6.8	1.9	1.1	4.4	0.69	25.64
7060	3	13	1000	2.9	12	68	5	3.45	8	<1	<5	<1	1.77	58	1.3	12	<3	<100	<500	<0.5	6.5	3.4	<1	28	62	24	5.3	1.5	<0.5	3.6	0.59	24.42
7062	4	6.5	1100	<0.5	5	64	2	2.11	9	<1	<5	<1	2.16	56	1.3	10	<3	<100	<500	1.3	5.4	3.3	<1	27	56	23	4.7	1.4	<0.5	3.5	0.57	27.42
7063	<2	13	1000	1.2	5	67	2	2.64	10	<1	<5	<1	2.15	63	1.8	10	<3	<100	<500	<0.5	7	3.9	<1	32	71	27	5.9	1.6	0.9	4.3	0.66	30.31

Uduk Lake INA Analytical Data

Element	Au	As	Ba	Br	Co	Cr	Cs	Fe	Hf	Hg	Ir	Mo	Na	Rb	Sb	Sc	Se	Sn	Sr	Ta	Th	U	W	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu	Mass
Units	PPB	PPM	PPM	PPM	PPM	PPM	PPM	%	PPM	PPM	PPB	PPM	%	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	g
Method	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	bal
Lab.	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT
Detection limit	2	0.5	50	0.5	1	5	1	0.02	1	1	5	1	0.01	15	0.1	0.1	3	100	500	0.5	0.5	0.5	1	0.1	3	5	0.1	0.2	0.5	0.2	0.05	
7064	5	9.3	1100	2	7	70	5	3.27	8	<1	<5	<1	1.91	83	1.5	13	<3	<100	<500	1.2	6.8	3.6	<1	30	61	24	5.5	1.6	<0.5	3.9	0.62	26.36
95 7001	8	14	1400	<0.5	9	98	2	3.84	11	<1	<5	6	2.29	100	2.2	12	<3	<100	<500	<0.5	8.6	3.4	<1	37	88	31	6.3	2.1	0.8	4.2	0.73	25.55
95 7003	11	13	1200	<0.5	6	70	3	2.93	9	<1	<5	<1	1.85	100	2	10	<3	<100	<500	<0.5	7.1	3.3	<1	30	67	25	4.8	1.7	<0.5	3.5	0.59	26.22
95 7004	3	12	970	<0.5	8	73	3	2.82	10	<1	<5	<1	1.83	98	2.4	8.8	<3	<100	540	1.9	8.6	3.6	<1	35	78	32	5.7	1.6	0.9	4.2	0.68	25.12
95 7005	8	11	1100	<0.5	10	89	3	3.56	10	<1	<5	<1	2.42	80	1.6	12	<3	<100	<500	<0.5	7.9	3.8	<1	33	63	37	5.2	1.7	<0.5	3.7	0.64	23.94
95 7006	<2	16	1100	<0.5	7	76	3	3.12	10	<1	<5	8	1.88	110	2.4	9.3	<3	<100	<500	2.2	9.1	4.1	5	37	78	39	5.4	1.7	<0.5	3.8	0.68	27.38
95 7008	16	30	1000	<0.5	9	56	5	3.64	10	<1	<5	8	1.49	130	3.1	11	<3	<100	<500	1.4	11	2.9	<1	49	110	40	7.9	2.2	1.5	5.2	0.74	23.79
95 7009	176	41	1400	<0.5	10	62	12	4.84	10	<1	<5	<1	1.64	160	2.9	12	5	<100	<500	<0.5	15	6	<1	44	96	30	6.9	2.4	<0.5	5	0.82	21.1
95 7010	8	14	1200	<0.5	9	100	2	3.56	11	<1	<5	3	2.35	63	1.7	12	<3	<100	<500	<0.5	7	2.8	<1	31	72	23	4.8	1.8	0.8	3.8	0.62	27.43
95 7011	3	14	1400	1.5	10	98	2	3.48	10	<1	<5	4	2.13	61	1.8	11	<3	<100	<500	<0.5	7.2	2.9	2	27	59	18	4.2	1.6	0.8	3.6	0.59	28.04
95 7012	19	47	1400	<0.5	6	70	10	3.69	12	<1	<5	24	2.02	130	3.9	10	<3	<100	<500	1.9	8.4	4.4	5	42	76	31	6.8	2.5	1.3	4.5	0.7	23.72
95 7013	22	10	1300	<0.5	7	92	3	2.78	11	<1	<5	6	2.29	110	1.9	11	<3	<100	<500	1.5	8.7	3.4	<1	34	74	31	5.3	1.9	1	4.1	0.7	24.76
95 7014	12	8.5	1700	<0.5	2	19	6	1.49	12	<1	<5	3	1.92	140	1.9	6	<3	<100	<500	1.1	12	3.4	<1	27	61	25	4.7	1.5	1	5.6	0.88	24.61
95 7015	40	19	1500	<0.5	7	70	4	3.18	11	<1	<5	3	1.95	130	2.6	9	3	<100	<500	2.1	9	3.8	<1	32	74	23	4.9	1.8	0.9	4	0.67	23.57
95 7016	3	7.5	1300	<0.5	4	63	3	1.67	11	<1	<5	<1	2.1	120	2.1	8.4	<3	<100	<500	1.7	7.7	3.7	<1	30	62	25	4.6	1.6	0.8	3.9	0.66	25.42
95 7017	14	13	1000	<0.5	6	77	3	2.77	10	<1	<5	5	1.88	100	2.1	9.6	<3	<100	<500	2	8.3	3.2	<1	34	73	32	5.1	1.5	0.9	4	0.64	27.4
95 7018	8	12	1200	<0.5	5	62	3	2.26	11	<1	<5	<1	2.02	110	2.5	9.1	<3	<100	<500	<0.5	10	4.2	<1	39	85	29	6	1.8	0.6	4.4	0.65	23.06
95 7020	8	9.1	1100	2	7	81	2	2.18	11	<1	<5	6	1.94	84	2.1	10	<3	<100	<500	<0.5	7.3	3.1	<1	33	67	32	5.2	1.7	0.6	4.2	0.66	28.78
95 7021	42	30	1100	2.6	8	71	3	3.4	11	<1	<5	2	1.58	91	3.2	9.7	3	<100	<500	1.7	9	3.1	<1	36	80	27	5.7	1.7	1.1	4.5	0.7	22.81
95 7023	7	8.9	1100	2.3	8	76	3	2.85	8	<1	<5	3	1.98	88	1.9	10	<3	<100	<500	<0.5	8.2	3.1	<1	33	70	26	5.1	1.8	1	3.5	0.57	26.04
95 7024	12	9.4	1100	2	8	88	3	3.16	10	<1	<5	4	1.99	93	1.9	11	<3	<100	<500	1.9	7.5	3	<1	31	67	28	4.9	1.6	<0.5	3.7	0.62	26.48
95 7025	6	14	1100	<0.5	6	63	4	2.43	9	<1	<5	7	1.64	110	2.3	8.7	<3	<100	<500	1.1	7.9	3.6	<1	35	71	31	5.3	1.6	0.9	3.8	0.59	22.74
95 7026	3	5.2	1100	<0.5	7	71	3	2.18	9	<1	<5	7	1.97	75	1.6	9.8	<3	<100	<500	<0.5	7.1	3	<1	30	63	26	4.7	1.6	0.6	3.6	0.57	27.13
95 7027	103	21	1200	<0.5	8	99	4	4.05	15	<1	<5	3	1.91	100	2.5	12	<3	<100	<500	1.4	9.3	3.5	<1	34	77	31	5.6	1.8	1.1	4.7	0.77	29.46
95 7028	12	10	1000	1.7	11	90	4	4.08	10	<1	<5	5	1.77	91	1.9	12	<3	<100	<500	<0.5	9.5	3.1	<1	38	81	24	5.6	1.7	<0.5	4.1	0.64	24.81
95 7029	8	8	1100	<0.5	6	75	3	2.83	9	<1	<5	4	2.29	93	2.1	11	<3	<100	620	2.3	8.6	3.1	<1	38	82	32	6.1	2	0.6	4.4	0.68	24.89
95 7030	10	11	1200	<0.5	7	90	3	3.45	11	<1	<5	<1	2.25	100	2.1	11	<3	<100	<500	<0.5	8.5	3.9	<1	35	87	29	5.5	1.9	1	4.4	0.72	28.04
95 7031	<2	14	1200	7.5	10	90	6	3.39	10	<1	<5	7	1.95	90	2	14	<3	<100	<500	1.2	8.9	5.9	<1	39	83	41	6.7	2.4	1.1	4.5	0.75	24.14

Uduk Lake INA Analytical Data

Element	Au	As	Ba	Br	Co	Cr	Cs	Fe	Hf	Hg	Ir	Mo	Na	Rb	Sb	Sc	Se	Sn	Sr	Ta	Th	U	W	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu	Mass
Units	PPB	PPM	PPM	PPM	PPM	PPM	PPM	%	PPM	PPM	PPB	PPM	%	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	g
Method	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	bal
Lab.	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT	ACT
Detection limit	2	0.5	50	0.5	1	5	1	0.02	1	1	5	1	0.01	15	0.1	0.1	3	100	500	0.5	0.5	0.5	1	0.1	3	5	0.1	0.2	0.5	0.2	0.05	
95 7032	<2	9.3	1200	<0.5	9	70	4	3.61	10	<1	<5	4	2.44	53	1.7	14	<3	<100	<500	<0.5	7	3.1	<1	31	77	29	5.2	1.9	0.9	4	0.65	22.72
95 7033	<2	9	1000	<0.5	9	73	3	3.27	8	<1	<5	<1	2.11	89	1.8	11	<3	<100	<500	0.6	7	3.4	<1	32	69	27	4.9	1.6	0.9	3.5	0.57	25.46
95 7034	3	9.9	1200	<0.5	10	88	3	3.7	9	<1	<5	4	2.19	67	1.5	12	<3	<100	<500	1.6	7	3.5	<1	32	64	26	4.9	1.6	<0.5	3.8	0.62	27.02
95 7036	<2	6.4	920	2.5	10	90	2	4.09	8	<1	<5	3	2.18	60	1.3	12	<3	<100	680	<0.5	5.8	2.4	<1	26	59	17	4	1.5	<0.5	3.1	0.53	27.97
95 7037	<2	8.6	1100	<0.5	10	67	3	3.85	7	<1	<5	<1	2.1	85	1.6	11	<3	<100	<500	<0.5	7	3.6	<1	33	67	28	5.1	1.7	0.7	3.7	0.59	24.28
95 7038	<2	8.4	1100	<0.5	8	66	2	3.57	8	<1	<5	<1	2.32	83	1.6	11	<3	<100	<500	1.7	7.2	4.2	<1	33	76	30	5.4	1.9	0.8	3.7	0.6	24.33

Uduk Lake ICP Analytical Data

Element	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm
Method	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP
Lab.	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM
Detection limit	1	1	3	1	0.3	1	1	2	0.01	2	5	2	2	1	0.2	2	2	1	0.01	0.001	1	1	0.01	1	0.01	3	0.01	0.01	0.01	2
7002	1	20	10	53	0.1	21	8	465	3.16	9	8	2	2	67	0.2	2	2	59	0.57	0.071	21	25	0.41	137	0.14	2	1.84	0.04	0.13	< 2
7003	1	34	11	66	0.2	24	10	627	3.67	9	5	2	4	77	0.2	2	3	65	0.66	0.075	22	24	0.49	171	0.09	2	1.97	0.05	0.13	< 2
7004	1	23	13	62	0.2	20	12	788	3.02	12	5	2	2	88	0.2	2	2	57	0.99	0.078	19	19	0.39	140	0.12	2	1.35	0.06	0.13	< 2
7005	1	29	13	63	0.1	22	9	519	3.62	12	5	2	2	67	0.2	2	2	63	0.58	0.071	25	24	0.42	197	0.1	2	1.99	0.04	0.13	< 2
7006	1	28	11	67	0.2	18	11	748	3.29	10	5	2	3	86	0.2	2	2	60	1.57	0.081	18	18	0.45	173	0.08	2	1.61	0.04	0.12	< 2
7007	1	18	12	61	0.1	21	9	493	3.27	8	5	2	2	68	0.2	2	2	65	0.52	0.068	23	28	0.37	142	0.16	2	1.75	0.04	0.08	< 2
7008	1	27	10	69	0.2	17	11	892	3.45	15	7	2	2	58	0.2	2	2	61	0.65	0.083	22	18	0.4	172	0.07	2	1.66	0.04	0.13	< 2
7009	1	23	11	58	0.1	24	10	499	3.66	13	5	2	4	70	0.2	2	2	66	0.57	0.065	26	28	0.47	183	0.12	2	2.19	0.04	0.09	< 2
7010	1	22	15	70	0.1	14	9	528	3.19	15	5	2	2	80	0.2	2	2	59	0.95	0.098	24	18	0.41	160	0.09	2	1.34	0.05	0.12	< 2
7012	1	10	13	48	0.2	14	7	280	3.01	5	5	2	3	33	0.2	2	2	65	0.22	0.03	19	27	0.25	137	0.18	2	1.93	0.01	0.07	< 2
7013	16	3	36	65	1.6	2	2	65	3.89	158	8	2	6	14	0.2	4	2	15	0.05	0.017	20	6	0.03	59	0.02	2	1.01	0.01	0.19	< 2
7014	9	8	28	51	0.9	3	3	90	2.85	64	5	2	5	13	0.2	2	2	26	0.08	0.019	21	9	0.05	85	0.03	2	1.19	0.01	0.1	< 2
7015	32	8	48	50	2.7	4	3	100	5.11	620	6	3	9	42	0.2	15	2	29	0.06	0.026	45	10	0.05	117	0.06	2	0.72	0.06	0.39	< 2
7016	2	5	29	30	0.5	3	2	84	1.71	27	5	2	6	18	0.2	2	2	22	0.11	0.011	19	9	0.05	65	0.05	2	0.88	0.01	0.11	< 2
7017	12	3	62	35	0.5	1	2	54	2.33	143	7	2	5	18	0.2	3	2	16	0.06	0.021	28	4	0.03	81	0.02	2	0.93	0.01	0.19	< 2
7018	7	3	46	52	0.1	2	2	46	1.25	42	12	2	2	25	0.2	6	2	8	0.18	0.01	57	4	0.07	79	0.01	2	0.91	0.01	0.24	< 2
7019	2	11	13	48	0.1	7	5	415	2.11	11	5	2	2	65	0.2	2	2	44	0.4	0.061	24	17	0.11	106	0.14	2	0.67	0.04	0.07	< 2
7020	2	8	14	47	0.1	8	5	450	2.2	13	5	3	2	82	0.2	2	2	46	0.41	0.063	24	18	0.12	108	0.14	2	0.72	0.04	0.08	< 2
7022	3	13	23	64	0.2	10	7	536	2.67	16	6	2	2	57	0.2	2	2	41	0.41	0.055	29	17	0.2	114	0.1	2	1.01	0.04	0.17	< 2
7023	3	6	16	38	0.1	7	4	305	1.93	14	5	2	2	37	0.2	2	2	43	0.27	0.053	24	20	0.09	94	0.13	2	0.71	0.02	0.08	< 2
7024	14	6	23	60	0.3	6	4	131	2.34	36	5	2	2	18	0.4	2	2	39	0.08	0.028	20	16	0.08	104	0.06	2	0.96	0.01	0.11	< 2
7025	4	27	15	79	0.3	27	17	1246	3.22	21	5	2	2	71	0.3	2	2	51	0.55	0.065	29	23	0.36	184	0.08	2	1.57	0.04	0.14	< 2
7026	24	13	20	38	1.1	6	3	162	2.11	148	5	2	2	27	0.2	5	2	26	0.19	0.024	31	11	0.13	255	0.05	2	0.92	0.01	0.21	< 2
7027	9	4	13	40	0.8	4	2	88	1.43	88	6	2	2	10	0.2	2	2	23	0.05	0.023	20	10	0.06	125	0.04	2	0.79	0.01	0.1	< 2
7028	2	10	15	48	0.1	8	5	387	1.99	21	5	2	2	56	0.2	2	2	38	0.4	0.056	24	14	0.15	102	0.11	2	0.68	0.04	0.1	< 2
7029	3	12	12	42	0.1	9	5	290	2.1	28	5	2	2	50	0.2	2	2	39	0.39	0.047	22	16	0.17	135	0.1	2	0.81	0.03	0.09	< 2
7030	4	7	12	36	0.1	7	4	138	1.77	35	5	2	2	11	0.2	2	3	37	0.09	0.032	15	15	0.08	88	0.08	2	1.01	0.01	0.06	< 2
7032	18	17	17	60	0.6	8	6	354	2.22	95	10	2	2	26	0.2	2	2	36	0.17	0.043	27	17	0.14	207	0.1	2	1.28	0.01	0.13	< 2

Uduk Lake ICP Analytical Data

Element	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm
Method	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP
Lab.	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM
Detection limit	1	1	3	1	0.3	1	1	2	0.01	2	5	2	2	1	0.2	2	2	1	0.01	0.001	1	1	0.01	1	0.01	3	0.01	0.01	0.01	2
7033	16	10	18	29	0.5	6	4	146	1.85	92	5	2	2	18	0.2	2	2	33	0.12	0.023	22	15	0.09	127	0.09	2	0.76	0.01	0.1	< 2
7034	31	1	20	13	1.7	1	1	8	1.8	441	13	2	2	16	0.2	3	2	2	0.01	0.018	54	1	0.01	214	0.01	2	0.44	0.01	0.4	< 2
7035	18	9	18	129	1.7	13	5	142	2.55	100	5	2	2	18	0.2	2	2	42	0.09	0.068	22	22	0.16	183	0.08	2	1.53	0.01	0.1	< 2
7036	9	6	24	33	0.9	4	3	100	1.69	114	5	2	2	14	0.2	3	2	27	0.06	0.025	33	11	0.06	149	0.06	2	0.86	0.01	0.12	< 2
7037	12	22	18	47	0.9	9	6	321	2.22	120	8	2	2	45	0.2	2	2	28	0.3	0.036	33	13	0.16	157	0.06	2	0.87	0.02	0.16	< 2
7038	35	2	33	32	3.3	2	2	42	1.93	328	6	2	2	25	0.2	6	2	13	0.03	0.032	39	5	0.02	332	0.02	2	0.66	0.01	0.31	< 2
7039	2	25	17	80	0.3	24	13	842	3.62	17	5	2	3	78	0.3	2	2	66	0.65	0.075	28	28	0.49	138	0.12	2	1.88	0.05	0.15	< 2
7040	2	8	11	70	0.1	10	6	250	2.34	21	5	2	2	21	0.2	2	2	49	0.17	0.033	24	20	0.12	84	0.12	2	1.17	0.01	0.06	< 2
7042	5	1	14	53	0.5	1	1	56	0.94	35	18	2	2	7	0.2	2	2	5	0.05	0.011	46	4	0.02	47	0.01	2	0.64	0.01	0.21	< 2
7043	8	2	94	21	2.6	1	1	19	4.07	124	10	2	2	23	0.4	2	2	7	0.02	0.017	45	3	0.01	48	0.01	2	0.22	0.03	0.76	< 2
7044	3	10	29	49	0.1	5	3	169	1.77	24	9	2	4	38	0.2	2	2	29	0.14	0.029	45	12	0.08	111	0.08	2	0.59	0.01	0.11	< 2
7045	2	5	15	56	4.3	5	3	153	1.45	15	5	2	2	9	0.2	2	2	31	0.08	0.03	34	12	0.08	81	0.06	2	1.06	0.01	0.06	< 2
7046	2	10	11	34	1	6	4	150	1.66	15	5	2	2	12	0.2	2	2	36	0.09	0.034	28	14	0.1	64	0.09	2	0.89	0.01	0.04	< 2
7047	3	12	15	51	0.5	9	5	248	2.22	30	8	2	2	39	0.2	2	2	42	0.26	0.024	36	19	0.19	116	0.11	2	1.11	0.01	0.09	< 2
7048	3	25	13	84	0.4	23	10	530	3.47	28	5	2	3	77	0.4	2	2	60	0.63	0.076	33	24	0.43	133	0.1	2	1.73	0.04	0.16	< 2
7049	1	12	16	27	0.2	7	3	142	1.56	9	5	2	2	23	0.2	2	2	31	0.29	0.073	37	13	0.17	131	0.08	2	1.24	0.01	0.04	< 2
7050	8	25	18	90	2.2	19	9	230	3.14	62	7	2	2	31	0.3	2	2	45	0.14	0.104	35	20	0.24	187	0.02	2	2.95	0.01	0.11	< 2
7051	9	25	24	36	1.7	7	4	177	4.91	106	11	2	2	211	0.2	2	2	58	0.04	0.118	73	22	0.16	125	0.14	2	0.65	0.04	0.39	< 2
7052	1	10	11	40	0.4	10	6	249	2.47	12	5	2	2	26	0.2	2	2	57	0.18	0.021	20	22	0.17	123	0.15	3	1.17	0.01	0.05	< 2
7053	1	13	17	42	1.1	15	8	240	2.59	14	5	2	2	24	0.2	2	2	53	0.16	0.045	19	25	0.22	169	0.11	2	2.31	0.01	0.06	< 2
7054	1	28	15	76	0.2	33	13	745	3.58	13	5	2	2	104	0.2	2	2	67	0.79	0.083	22	29	0.88	149	0.13	2	1.83	0.07	0.1	< 2
7055	1	35	16	74	0.1	32	11	533	3.91	15	5	2	2	89	0.4	2	2	72	0.76	0.083	27	32	0.89	166	0.12	2	2.04	0.06	0.1	< 2
7056	1	10	13	51	0.3	18	8	308	2.81	10	6	2	3	62	0.2	2	2	57	0.55	0.08	23	29	0.5	148	0.15	2	2	0.03	0.06	< 2
7057	1	10	15	47	0.1	15	7	400	2.47	14	5	2	4	54	0.2	2	2	49	0.47	0.058	20	22	0.29	106	0.14	2	1.59	0.03	0.06	< 2
7058	1	38	17	93	0.4	31	17	971	4.19	18	9	2	2	106	0.2	2	6	72	0.81	0.083	26	30	0.74	164	0.11	2	2.21	0.06	0.13	< 2
7060	1	22	17	77	0.2	23	13	522	3.01	15	5	2	2	51	0.2	4	5	55	0.45	0.067	20	24	0.5	161	0.12	3	2.56	0.03	0.08	< 2
7062	1	1	12	35	0.1	10	6	226	1.59	10	5	2	2	31	0.2	2	2	39	0.35	0.047	18	18	0.18	108	0.15	2	1.32	0.02	0.06	< 2
7063	1	4	10	38	0.2	10	5	291	2.12	13	5	2	2	33	0.2	2	2	52	0.35	0.06	23	22	0.18	91	0.16	2	1	0.03	0.06	< 2

Uduk Lake ICP Analytical Data

Element	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm
Method	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP
Lab.	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM
Detection limit	1	1	3	1	0.3	1	1	2	0.01	2	5	2	2	1	0.2	2	2	1	0.01	0.001	1	1	0.01	1	0.01	3	0.01	0.01	0.01	2
7064	3	12	13	52	0.1	16	7	311	2.61	9	5	2	2	53	0.2	2	2	51	0.48	0.048	21	23	0.38	123	0.13	2	1.83	0.03	0.07	< 2
95-7002	1	9	8	40	< .3	10	5	250	2.31	7	< 5	2	7	31	< .2	< 2	< 2	43	0.29	0.049	19	27	0.27	112	0.16	< 3	1.19	0.02	0.05	< 2
95-7003	2	8	13	58	< .3	12	5	178	2.07	9	< 5	2	5	27	< .2	< 2	< 2	33	0.23	0.05	19	21	0.26	136	0.11	< 3	1.54	0.02	0.05	< 2
95-7004	3	6	10	33	< .3	9	5	177	1.92	7	< 5	2	6	22	< .2	< 2	< 2	36	0.22	0.039	21	20	0.2	73	0.13	< 3	0.83	0.02	0.08	< 2
95-7005	1	10	15	39	< .3	10	5	249	2	5	6	2	5	28	< .2	< 2	2	35	0.24	0.013	16	20	0.31	77	0.15	< 3	1.11	0.02	0.06	< 2
95-7006	2	7	10	37	< .3	8	5	195	2.01	9	< 5	2	7	23	0.2	< 2	< 2	37	0.21	0.036	21	20	0.21	80	0.14	< 3	0.89	0.02	0.06	< 2
95-7008	4	13	11	50	0.4	10	6	250	2.42	21	< 5	2	8	36	< .2	< 2	< 2	39	0.32	0.046	35	21	0.28	88	0.11	< 3	0.95	0.02	0.1	< 2
95-7009	3	17	35	134	0.3	12	6	244	3.21	26	< 5	2	13	22	< .2	< 2	< 2	38	0.13	0.032	31	23	0.3	106	0.11	< 3	1.7	0.01	0.13	< 2
95-7010	1	7	6	30	< .3	12	7	210	2.31	10	7	2	7	35	< .2	< 2	< 2	45	0.23	0.038	15	29	0.27	146	0.19	5	1.54	0.02	0.04	2
95-7011	1	6	3	37	< .3	12	7	215	2.47	5	5	2	4	30	< .2	< 2	< 2	47	0.2	0.055	14	26	0.23	204	0.17	6	1.6	0.02	0.04	2
95-7012	24	6	33	57	0.4	6	4	193	2.33	36	< 5	2	5	26	< .2	4	< 2	39	0.17	0.014	28	20	0.18	71	0.12	4	0.78	0.02	0.09	2
95-7013	1	4	11	33	< .3	10	5	172	1.66	3	< 5	2	5	24	< .2	3	< 2	29	0.25	0.044	19	22	0.23	110	0.14	4	1.29	0.02	0.05	< 2
95-7014	1	1	9	28	< .3	2	1	43	0.68	5	< 5	2	5	8	< .2	3	< 2	8	0.07	0.018	21	6	0.05	43	0.02	< 3	0.62	0.01	0.07	< 2
95-7015	2	4	11	42	< .3	9	6	231	2.26	13	5	2	7	17	< .2	2	< 2	42	0.16	0.034	19	24	0.19	91	0.15	5	1.05	0.01	0.08	2
95-7016	1	< 1	16	21	< .3	5	3	109	0.85	3	< 5	2	5	18	< .2	3	< 2	18	0.16	0.017	19	14	0.14	78	0.13	< 3	0.91	0.02	0.04	2
95-7017	2	3	9	33	< .3	8	5	156	1.7	7	< 5	2	6	19	< .2	3	< 2	32	0.18	0.03	20	17	0.22	56	0.12	3	0.77	0.01	0.05	2
95-7018	1	3	12	25	0.3	6	4	160	1.43	7	< 5	2	7	21	< .2	3	< 2	28	0.21	0.027	25	18	0.2	58	0.14	3	0.73	0.02	0.05	2
95-7020	1	3	11	27	< .3	9	6	143	1.24	5	7	2	6	24	< .2	4	< 2	22	0.25	0.046	18	18	0.2	120	0.12	< 3	1.13	0.02	0.05	2
95-7022	3	7	8	41	0.5	10	6	164	2.21	20	< 5	2	7	20	< .2	3	< 2	36	0.13	0.055	21	21	0.17	136	0.09	4	1.45	0.01	0.04	< 2
95-7023	1	6	7	40	< .3	11	6	182	1.88	3	< 5	2	6	24	< .2	2	< 2	33	0.24	0.054	20	20	0.26	113	0.13	3	1.43	0.02	0.05	< 2
95-7024	1	6	7	43	< .3	11	6	196	2.01	4	< 5	2	6	24	< .2	3	< 2	35	0.23	0.041	17	21	0.29	81	0.13	3	1.31	0.02	0.05	< 2
95-7025	2	5	12	30	< .3	7	4	201	1.78	10	< 5	2	7	23	< .2	3	< 2	31	0.18	0.029	23	17	0.32	59	0.11	< 3	0.89	0.01	0.07	2
95-7026	1	4	9	36	< .3	9	5	158	1.36	2	< 5	2	5	23	< .2	3	< 2	25	0.24	0.039	18	18	0.24	101	0.14	< 3	1.33	0.02	0.04	< 2
95-7027	1	7	8	54	0.3	12	6	238	2.62	12	< 5	2	7	29	0.2	3	< 2	49	0.22	0.053	18	29	0.22	135	0.15	3	1.25	0.02	0.06	2
95-7028	1	9	8	93	< .3	17	8	290	2.84	3	7	2	5	30	< .2	2	< 2	46	0.27	0.082	22	26	0.37	120	0.1	4	1.66	0.02	0.08	2
95-7029	1	4	7	34	0.3	7	4	200	1.72	3	8	2	7	36	< .2	3	< 2	35	0.31	0.048	22	20	0.21	87	0.15	< 3	0.77	0.03	0.06	< 2
95-7030	1	6	6	39	< .3	9	6	278	2.25	6	< 5	2	7	32	< .2	2	< 2	43	0.28	0.054	19	24	0.23	108	0.15	3	1.08	0.02	0.06	< 2
95-7031	4	15	11	56	0.4	12	6	201	1.99	5	< 5	2	3	77	< .2	2	< 2	32	0.49	0.026	21	23	0.29	182	0.09	3	1.67	0.02	0.06	< 2

Uduk Lake ICP Analytical Data

Element	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm
Method	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP	AICP
Lab.	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM	ACM
Detection limit	1	1	3	1	0.3	1	1	2	0.01	2	5	2	2	1	0.2	2	2	1	0.01	0.001	1	1	0.01	1	0.01	3	0.01	0.01	0.01	2
95-7032	1	13	4	41	0.4	12	7	263	2.2	3	6	2	4	36	0.4	2	< 2	39	0.29	0.027	15	18	0.38	131	0.11	< 3	1.62	0.02	0.04	< 2
95-7033	1	8	6	40	< .3	11	7	291	2.21	5	< 5	2	4	34	< .2	3	< 2	38	0.33	0.06	17	20	0.33	110	0.12	3	1.42	0.02	0.05	< 2
95-7034	1	9	10	45	< .3	13	8	286	2.42	4	< 5	2	5	35	< .2	3	< 2	45	0.31	0.055	15	24	0.34	116	0.16	3	1.55	0.02	0.05	< 2
95-7036	1	8	4	44	< .3	13	8	288	2.87	< 2	< 5	2	4	35	< .2	3	2	57	0.28	0.035	13	31	0.39	114	0.19	3	1.43	0.02	0.05	2
95-7037	1	10	4	59	0.3	12	8	287	2.71	< 2	< 5	2	5	40	< .2	< 2	2	49	0.36	0.071	18	22	0.41	111	0.15	3	1.37	0.02	0.06	2
95-7038	1	7	6	39	< .3	11	7	322	2.37	4	< 5	2	6	40	< .2	4	< 2	42	0.41	0.072	19	20	0.41	98	0.14	3	1.18	0.03	0.07	< 2