Regional Geochemical and Mineralogical Data

TREK Project

Interior Plateau, British Columbia

GEOSCIENCE BC REPORT 2014-10

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Table of Contents

INTRODUCTION

The Targeting Resources for Exploration and Knowledge (TREK) Project is focused on providing a new geological understanding of the central part of British Columbia's Interior Plateau through the integration of surface geochemistry, airborne geophysics and geology data. The main objective is to provide a regional data to assess the mineral potential of this region where the prospective Stikine Terrain is overlain by Miocene to Pleistocene aged volcanic rocks and extensive glacial sediment. The surface geochemistry program will compile a comprehensive data set consisting of new and historical geochemical data and the reanalysis results of archived samples.

Presented here are the geochemical and mineralogical data from the first year of the surface geochemistry survey that focused on the eastern portion of the TREK project area. Basal till is the primary sample medium and was targeted using basal potential maps produced for this project (Sacco et al., 2014b-j). Lake sediment samples were collected in areas where basal till is not present. See Sacco et al. (2014a) for surficial geochemistry project details and Clifford (2014) for the TREK Project details.

LOCATION AND PHYSIOGRAPHY

The project area is located in the relatively low relief area of the Interior Plateau (Mathews, 1986), south of Vanderhoof and approximately 60 km west of Quesnel. It occupies parts of NTS 093B, C, F and G and covers more than twenty-eight 1:50 000 scale NTS map areas, a total of approximately 25 000 km^2 (Figure 1). Access to the majority of the project is through a network of forest service roads. Areas beyond the road network are accessed by helicopter.

The project area includes parts of the Nechako Plateau, Fraser Plateau and the Fraser Basin physiographic regions (Holland, 1976; Figure 1). The Nechako Plateau has low to moderate relief between 900 and 1200 m above sea level (asl) and includes the Nechako and Fawnie mountain ranges, which have peaks over 1600 and 2000 m asl, respectively. The Fraser Plateau has moderate to low relief between 1000 and 1500 m and includes the Ilgachuz and Itcha mountain ranges, which have peaks over 2200 m asl. Thick surficial deposits composed dominantly of till obscure most bedrock exposures on plateau surfaces. The Fraser Basin is characterized by low relief between 675 and 1000 m asl. Thick glaciolacustrine units occur over large areas of the Fraser Basin in the study area. The project area is dissected by several major rivers including the West Road (Blackwater), Baezaeko, Clisbako, Chilcotin, Clusko and Dean. Most large rivers have incised the plateau surface, exposing combinations of till, glaciofluvial and glaciolacustrine sediments, or bedrock. Major watersheds are the Nechako and West Road rivers systems that drain into the Strait of Georgia via the Fraser River, and the North Coast Rivers system that drains the southwest corner of the TREK Project area into the Pacific Ocean (Figure 1).

BEDROCK GEOLOGY AND MINERAL OCCURRENCES

The regional geological framework was initially established by Tipper (1969), and then compiled by Massey et al. (2005) and recompiled with regional revisions by Riddell (2006) that focused on oil and gas exploration. Bedrock mapping at 1: 50 000 scale has been completed for parts of NTS 093F (Diakow and Webster, 1994; Diakow et al., 1997), NTS 093B (Metcalfe et al., 1998) and NTS 093C (Mihalynuk et al., 2008, 2009). Provided here is a geological summary of the project area from these sources (Figure 2). Basement rocks include the Devonian to Jurassic arc complex of the Stikine Terrane, and in the northeast corner, the Mississippian to Early Jurassic accretionary complex of the Cache Creek Terrane (Monger et al., 1991). The oldest rocks in the project area belong to the Permian to Jurassic Cache Creek Complex and the Vanderhoof metamorphic complex. The intrusive Triassic to Jurassic Brooks diorite complex is found in the north-central part of the project area. Jurassic rocks are dominant in the northeastern quadrant of the project area. These include volcanic rocks of the Entiako, Naglico and Nechako formations of the Hazelton Group; Fawnie volcanics and Ashman Formation of the Bowser Lake Group; intrusive rocks of the Stag Lake plutonic and Francois Lake suites of the Endako batholith; and the Laidman batholith. The Eocene

Frank Lake pluton occurs in the northeast. Units from the Cretaceous include the Kasalka Group volcanic rocks in the northwest, the Capoose pluton in the west-central region, and unnamed andesitic volcanic rocks in the southwest. The north and southwest are composed largely of Eocene to Oligocene volcanic rocks of the Nechako Plateau Group including the Endako and Ootsa Lake formations. The southwestern region of the project area is overlain by Miocene to Pleistocene Chilcotin Group volcanic rocks. The Ilgachuz and Itcha ranges in the southwestern part of the project area are composed of the Miocene to Pleistocene Anahim volcanics.

The BCGS MINFILE database lists five developed prospects, seven prospects and 39 mineral showings in the TREK Project area (Figure 2). Four of the five developed prospects contain Au, Ag, Zn, Pb and Cu mineralization and include the Blackwater-Davidson intermediate sulphidation epithermal Au-Ag deposit (NTS 093F/02; MINFILE 093F 037; BC Geological Survey, 2013), the Capoose subvolcanic Cu-Ag-Au (As-Sb) and porphyry-related Au deposit (NTS 093F/06; MINFILE 093F 040), and the 3Ts polymetallic Ag-Pb-Zn±Au veins (NTS 093F/03; MINFILE 093F 068) and low-sulphide epithermal Au-Ag-Cu deposit (NTS 093F/03; MINFILE 093F 055). The fifth developed prospect, the CHU deposit, hosts porphyry Mo (low F-type) mineralization (NTS 093F/07; MINFILE 093F 001).

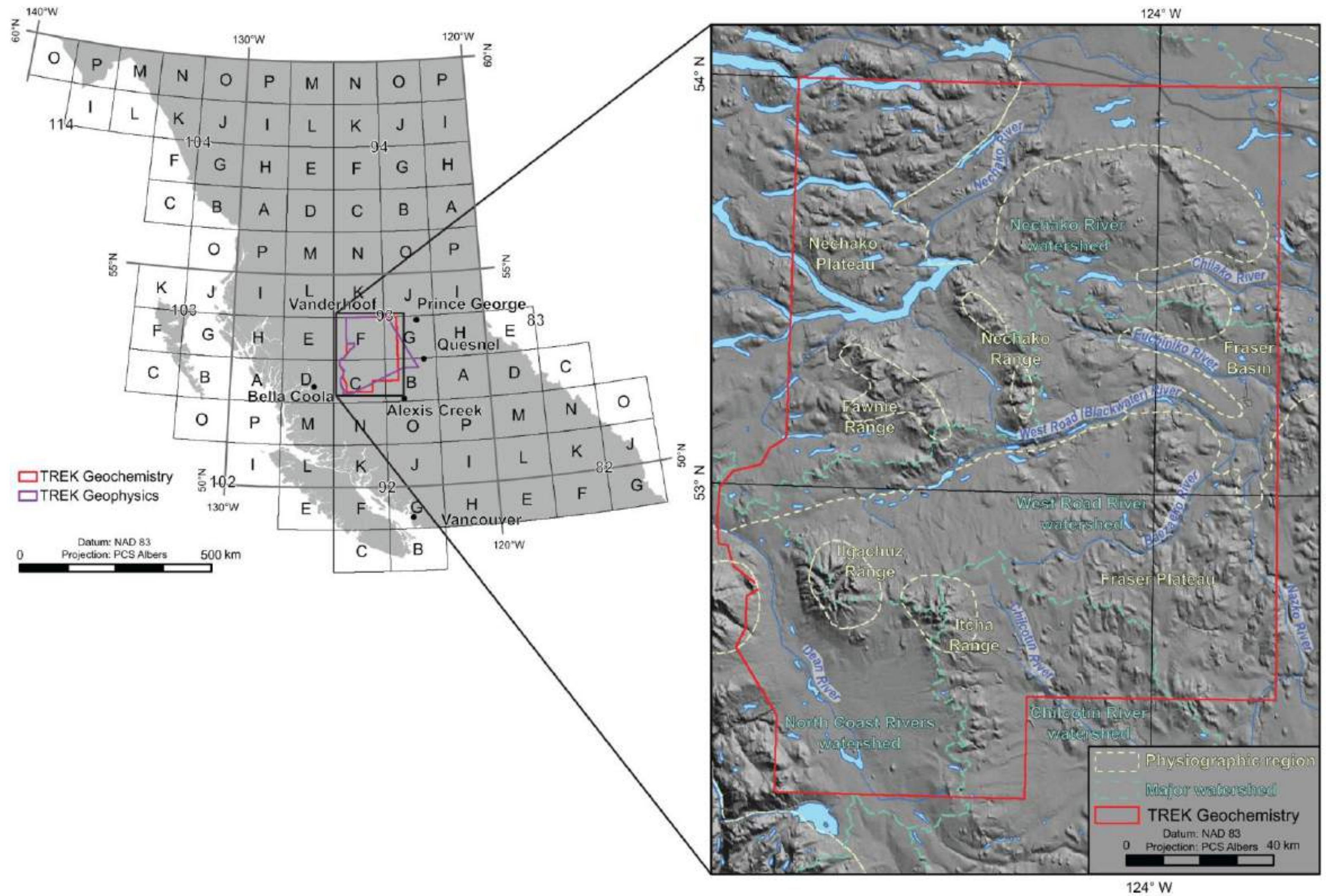

Figure 1: Location, physiographic regions and major drainages of the TREK project area. Digital elevation model from Canadian Digital Elevation Data (GeoBase®, 2007).

QUATERNARY GEOLOGY

Glacial History and Ice flow

British Columbia has repeatedly been covered by a mass of interconnected glaciers collectively known as the Cordilleran Ice Sheet (Armstrong et al., 1965; Flint, 1971; Clague, 1989). Sediments of the most recent glaciation, the Fraser Glaciation, are ubiquitous within the project area; sediments deposited prior to this are rare (e.g. Giles and Kerr, 1993; Plouffe and Levson, 2001). Ice-flow indicators compiled for British Columbia by Ferbey et al. (2013) and measured during this study indicate that dominant ice-flow directions were northeast and east-northeast in the northern part of the project area and towards north-northeast in the southeastern region (Figure 3a). In the southwest, northeast-oriented indicators are overprinted by sparse southeast- and north-oriented indicators (Tipper, 1971; Proudfoot, 1993). The complexity of these landforms indicates that they did not develop contemporaneously, but through different phases of glaciation (Figure 3b). Presented here is a framework for the Fraser Glaciation based on previous work (e.g. Tipper, 1979; Plouffe and Levson, 2001) and investigations during this study. Further stratigraphic investigations and ground-based ice-flow measurements may improve upon this framework.

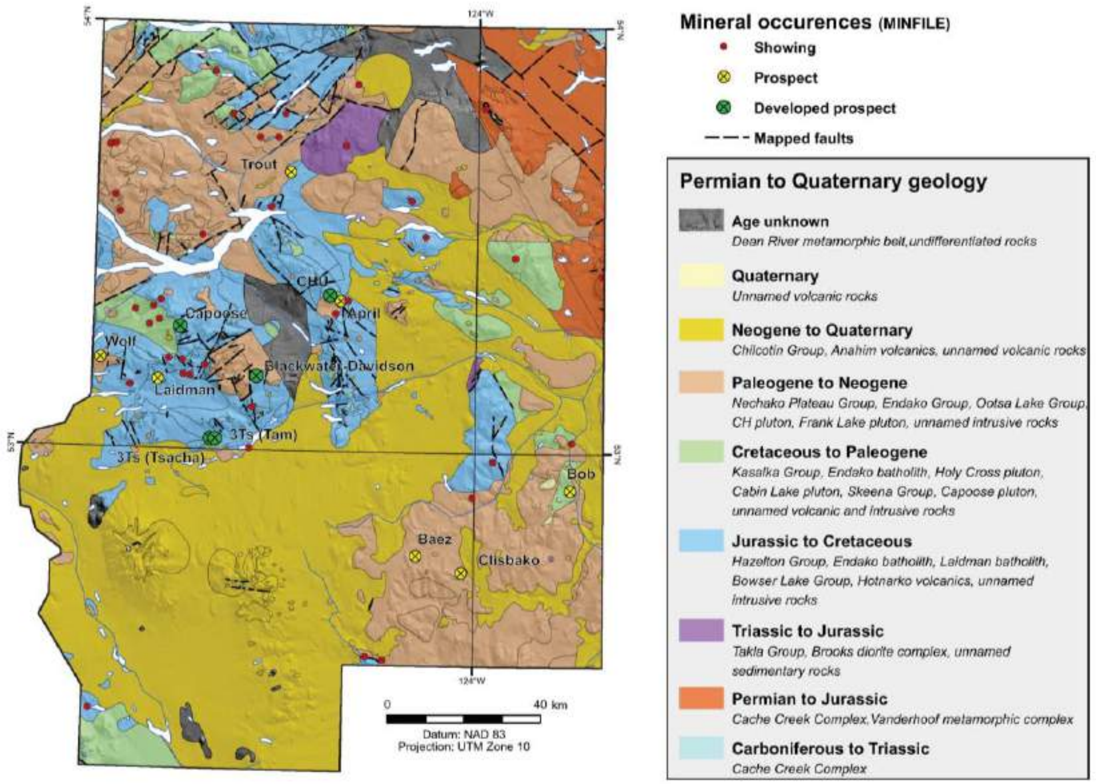

Figure 2: Generalized bedrock geology (after Massey et al., 2005) and mineral occurrences (MINFILE; BC Geological Survey, 2013) of the TREK geochemistry project area. Digital elevation model from Canadian Digital Elevation Data (GeoBase®, 2007).

During the onset of the Fraser Glaciation, ice advanced from the Coast Mountains and across the study area in a northeast direction (Figure 3b; green arrows). Striations trending ~40˚ on lee surfaces of bedrock indicate this initial ice advance reached at least the northeast quadrant of NTS 093F/08 before it was redirected by easterly advancing ice from farther north in the Coast Mountains. Striations on the upper surfaces of these outcrops indicate a later ice-flow direction of ~80˚. The second flow direction matches the orientation of local macroforms and may be related to the eastward shifting of the glacial divide from the Coast Mountains to the plateau during the glacial maximum (Stumpf et al., 2000). Glaciers flowing from the Cariboo Mountains and possibly the southern Coast Mountains caused northerly deflections in the southeast part of the study area. These patterns likely continued through the glacial maximum (Figure 3b; black arrows).

Retreat from the glacial maximum in this region is thought to be dominantly by frontal retreat with detached ice masses stagnating within valleys and depressions (Tipper, 1971). During this time, large glacial lakes formed in the Fraser Basin, the North Coast Rivers watershed and locally within tributary valleys were drainage was impeded by ice. Subglacial meltwater channels and eskers developed under the ice and units of glaciofluvial sand and gravel were deposited in channels and outwash plains in front of the ice. Ice-flow patterns may have become increasingly affected by topography as the ice thinned (*cf.* Fulton, 1991); however, these late glacial changes are not always recorded by the macroforms due to thinning and reduced activity of the ice.

A readvance occurred late during the deglacial period (Tipper, 1971; Proudfoot, 1993; Giles and Kerr, 1993). In the project area, ice again flowed northeast down the valleys of the Pacific Ranges near Bella Coola, and spread northeast and northwest through topographic lows west and north of the Itcha and Ilgachuz mountains, and east and southeast, south of the mountains (Figure 3b; red arrows). The extent of this advance was mapped by Tipper (1971) and is roughly delineated by the extent of ablation till, and ice marginal features. Final deglaciation was likely a combination of frontal retreat along the periphery followed by widespread stagnation (e.g. Giles and Kerr, 1993; Proudfoot, 1993). A glacial lake may have developed again in the North Coast Rivers watershed during the melting of the final retreat.

The ice-flow history is used to determine the transport history of basal till. The complexity of the ice-flow history may have created palimpsest dispersal patterns (e.g. Plouffe et al., 2011) and the attenuation of geochemical anomalies due to aggradation of till units from separate glacial advances (Stea and Finck, 2001). These concepts must be considered in the interpretation of basal till geochemical data.

Surficial Geology

The surficial geology was determined from air photograph interpretations and ground-truthing exercises. Till is the dominant surficial material in the project area occurring mostly as two facies: 1) basal till, an unsorted diamicton eroded and deposited by lodgment or melt-out processes at the base of a glacier with little or no reworking by water (Dreimanis, 1989; Benn and Evans, 2010); and 2) ablation till, a diamicton deposited during deglaciation through meltout processes and consisting dominantly of far-travelled supraglacial and englacial material (Benn and Evans, 2010; Figure 4). Ablation till is not a favourable media for geochemical sampling due to its complicated transport history and modification by meltwater during deposition.

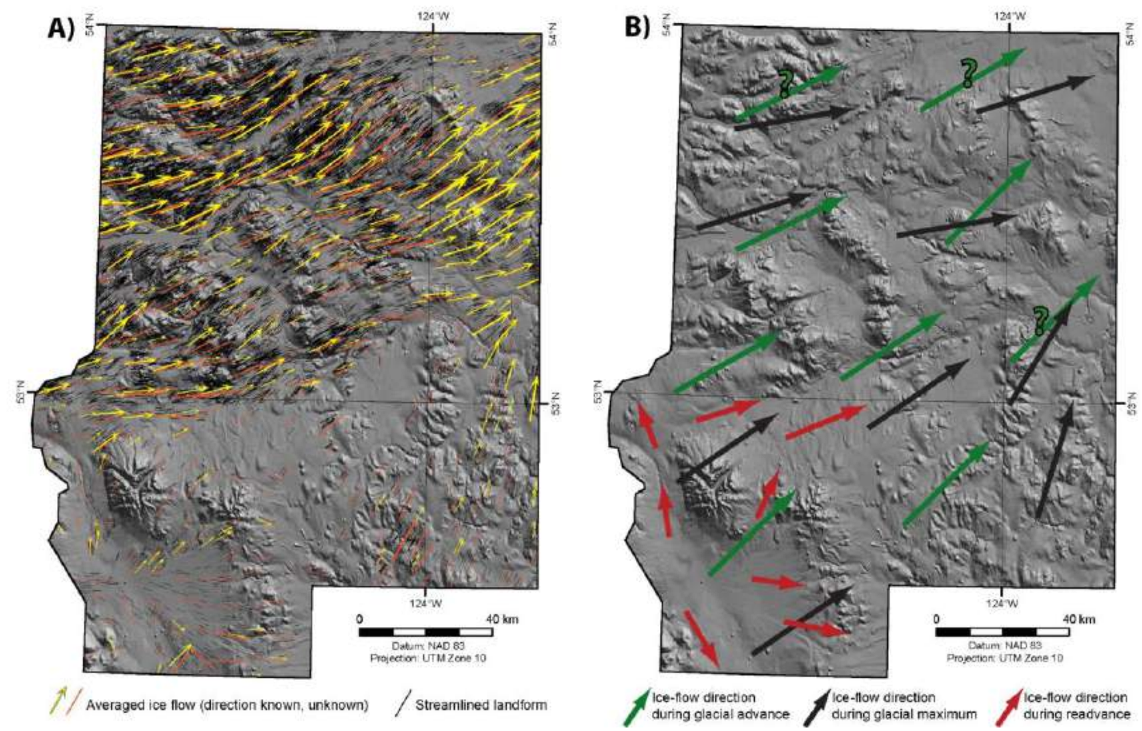

Figure 3: A) Ice-flow directions indicated by streamlined landforms (black symbols; compiled by Ferbey et al., 2013) for the project area in central British Columbia; generalized ice-flow arrows were produced by averaging azimuth values of streamlined landforms within an 8 km grid cell based on unidirectional (yellow symbol) and bidirectional (red symbol) features. The sizes of the generalized arrows are a function of the density of original streamlined landform data. B) Ice flow model for the TREK Project area through the Fraser Glaciation. During the onset of glaciation ice flowed dominantly to the northeast (green arrows). Coalescence with other advancing glaciers caused easterly deviations in the north, and northerly deviations in the southeast that likely continued through the glacial maximum (black arrows). A late glacial readvance fanned out around the Ilgatchuz and Itcha mountain ranges flowing northeast and northwest, north of the mountains, and east and southeast south of the mountains (red arrows). Digital elevation model from Canadian Digital Elevation Data (GeoBase®, 2007).

Basal till is a dense overconsolidated, matrix-supported diamict. It generally conforms to the underlying topography with thicknesses varying from less than one metre at high elevations in areas of high relief to tens of metres in areas of low relief. Some deposits display a characteristic streamlined surface expression. Ablation till is found in areally small deposits in depressions or basins throughout the project area, and is widespread around the Ilgachuz and Itcha mountains where ice from the late readvance stagnated. Ablation till is differentiated from basal till by its lack of density, and high sand content in the matrix. It is generally matrix supported, shows minor stratification, and may contain sand or gravel lenses, but can also be clast supported or massive. Ablation till typically exhibits a hummocky or undulating surface expression, but in the project area it was observed conforming to the underlying topography near deposit margins.

Other glacial sediments that occur within the project area include well-sorted glaciofluvial sands and gravels commonly found within meltwater channels and on the upper terraces of major rivers. Less sorted glaciofluvial deposits are commonly spatially associated with ablation till. Areally extensive glaciolacustrine deposits occur within the Fraser Basin in the northeastern part of the project area and in the North Coast Rivers watershed in the southwest. Less extensive deposits occur within tributary valleys adjacent to ablation till and ice-contact glaciofluvial deposits. Glaciolacustrine sediments in the project area vary from laminated silt and sand to unsorted diamict. Glaciolacustrine diamict is particularly common near the limits of glacial Lake Fraser (generally confined by the Fraser Basin; Figure 1) in the northeastern part of the project area and are interpreted as undermelt diamict (*cf*. Gravenor et al., 1984). These deposits can be difficult to distinguish from basal till as they commonly part along horizontal planes. In contrast to basal tills, however, they typically lack density and have a matrix composed almost entirely of silt. Aeolian deposits are common around larger glaciolacustrine and glaciofluvial deposits. They occur as veneers (<1 m thick) and extensive dune fields, such as in the southeast corner of NTS 093G/05.

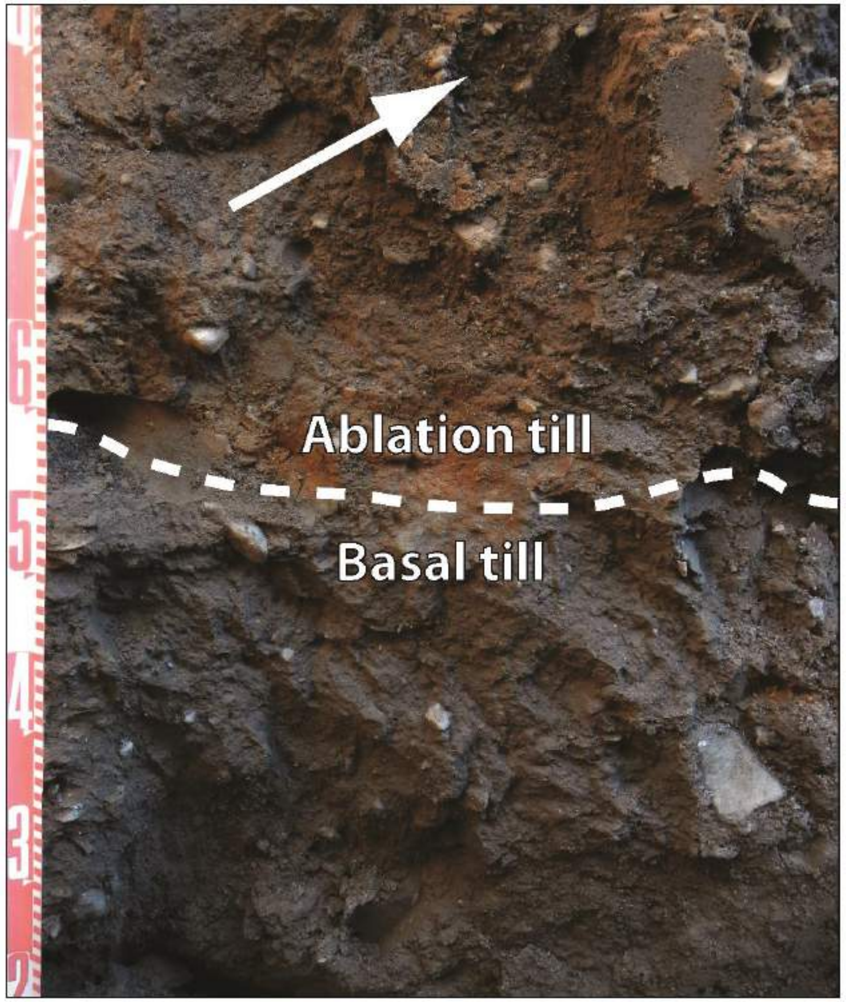

Figure 4: Ablation till overlying basal till in NTS 093F/08. Basal till in the region is typically a massive, dense sandy-silt diamict. Characteristics are inherited from the local bedrock, thus minor variances in composition occur throughout the study area. Ablation till is a sandy loose diamict that may show sorting or stratification (white arrow) and is commonly found overlying basal till.

GEOCHEMICAL SURVEYS

Basal till is the primary target for this geochemical survey because it is a first derivative of bedrock (Schilts, 1993), is transported in the direction of ice flow, and provides a larger anomaly than the original bedrock source (Levson, 2001). Other derivatives of bedrock, such as glaciofluvial, lake, and stream sediments can also provide indications of mineralization; however, their transport histories are more complex making it more difficult to trace the source. See Sacco et al. (2014a) for a comprehensive list of historical surface geochemical surveys conducted in the TREK project area.

Sample Collection

It is important that the sample medium is correctly identified to limit variability within the dataset. For till samples, the texture, structure, density, matrix percentage, and clast mode, shape and presence of stria are recorded (Appendix A). Information regarding the sample site including the type of exposure, soil development, map unit, topographic position, aspect, slope, drainage and any stratigraphic information is also recorded (Appendix A). Till sampling locations are based on a 2 km, staggered grid, aligned with ice flow (see Levson, 2001). Where archive sample density is low, infill sampling was conducted. Samples were collected from natural or anthropogenic exposures (>1 m depth) such as roadcuts, borrow pits, hand and machine dug soil pits, and river and lake cuts.

Six hundred and seventy-seven 2–3 kg basal till samples were collected for major-, minor-, and trace- element geochemical analyses (Figure 5). At approximately every other site, a 10–12 kg sample was collected for mineral separations and gold grain counts (331 samples in total). At every sample site, 50 stones, of large pebble to small cobble size, were collected to provide insight on the direction and distance of glacial transport from bedrock source units. Clast lithologies are grouped into broad categories that reflect the main lithologies of bedrock sources.

Helicopter-supported lake sediment and lake water geochemical sampling was conducted on the east side of the project area, where basal till exposures were limited and lake sediment samples were not previously collected. Survey protocols were based on established guidelines in Cook (1997). A total of 282 samples were collected from 265 lakes (Figure 5). The depth, colour and texture of the sample were recorded (Appendix D). Lake sites were accessed using a float-equipped Bell 206 helicopter. Sediment samples were collected from the deepest part of the lake using a torpedo-style Hornbrook sampler. Lake sediment samples generally represent a 35 cm section of material obtained from below the water-sediment interface. Samples typically consisted of organic gels with varying amounts of inorganic sediment and organic matter. Water samples were collected from the surface in 250 ml bottles.

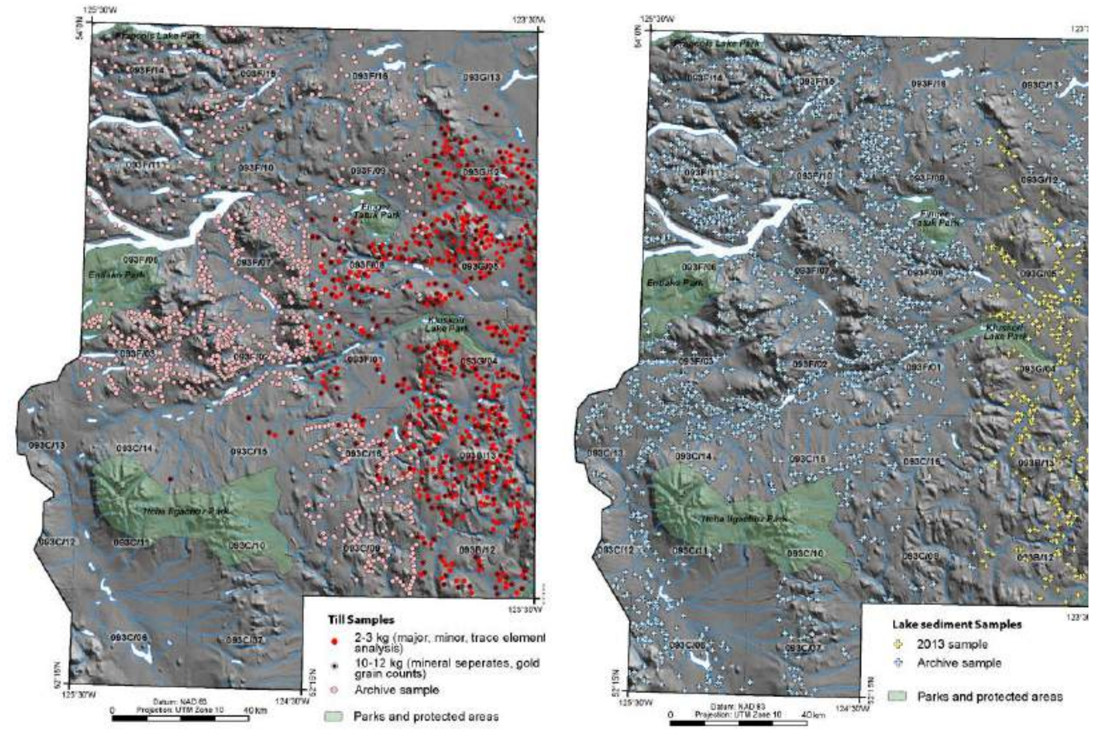

Figure 5: Distribution of new basal till and lake sediment and water sample locations in the project area. Digital elevation model from Canadian Digital Elevation Data (GeoBase®, 2007).

Analytical Methods

Till and lake samples were sent to Acme Analytical Laboratories Ltd. (Vancouver, BC) for preparation. Tills were dried, an archive of the original till sample was generated, and the remaining material was sieved to produce splits of the silt plus clay-sized (<0.063 mm) fraction. Lake sediments were dried and milled with a ceramic ball to <0.0177 mm. Organic content was determined by loss-on-ignition (LOI). The 10–12 kg bulk till samples were sent to Overburden Drilling Management Ltd. (Nepean, ON) where heavy and medium mineral concentrates (0.25–2.0 mm;) and gold grain (<2.0 mm) concentrates were produced using a combination of gravity tables and heavy liquids for picking (Table 1).

Till samples were analyzed for minor and trace elements by ICP-MS following aqua-regia digestion, and by INAA for total gold plus 34 elements (Table 2). Major and minor elements were determined for till samples by ICP-ES following a lithium metaborate/tetraborate fusion and dilute acid digestion. This analytical package included loss on ignition by weight difference after ignition at 1000ºC, plus total carbon and sulphur by Leco. (Table 2). Lake sediments were analyzed for minor and trace elements by ICP-MS following aqua-regia digestion (Table 2), fluorine by ION analysis, and total gold determinations plus 34 elements by INAA (Table 2). Conductivity and pH were determined for lake water samples. All geochemical analyses were completed at Acme Analytical Laboratories Ltd. (Vancouver, BC), except INAA, which was conducted at Becquerel Laboratories Inc. (Mississauga, ON).

Quality Control

Quality control for analytical determinations includes the use of field duplicates, analytical duplicates, reference standards and blanks, based on established protocols (Spirito et al., 2011). For every 17 routine samples, one field duplicate (taken at a randomly selected sample site), one analytical duplicate (a sample split during the preparation process), and one reference standard was included to make a block of 20 submitted for geochemical analyses. Reference standards are CANMET till 1 and 4, TREK till standards A and B, and NVI 1, 2, 3 and 4. TREK and NVI standards were produced by homogenizing and sieving till with a known range of element values and elevated key metal values (e.g., Cu, Au, Mo). Duplicate samples determine sampling and analytical variability and reference standards measure the accuracy and precision of the analytical methods. Blanks are introduced throughout the sample stream to determine if there is any cross-contamination between samples.

Table 1: Minerals picked from bulk basal till samples.

SULPHIDE PORPHYRY INDICATOR MINERALS	
Chalcopyrite	$CuFeS_2$
Pyrite	FeS_2
Goethite	$HFeO_2$
SILICATE PORPHYRY INDICATOR MINERALS	
Andradite (Fe, Mn, Mn-garnet)	$Ca_3Fe_2 (SiO_4)_3$
Maganite	MnO OH
Red Rutile	TiO_2
Blond titanite	$CaTiSiO_5$
Anatase	TiO_2
Kyanite/silimanite	Al_2SiO_3
Tourmaline	$Na(Mg,Fe,Mn,Li,Al)_3 Al_6[Si_6O_{18}](BO_3)_3(OH,F)_4$
Staurolite	$(Fe^{2+},Mg)_2(Al, Fe^{3+})_9O_6[SiO_4]_4 (O, OH)_2$
Olivine	$Mg_2(Si_2O_4)$ [Forsterite]to $Fe_2(SiO_4)$ [Fayalite]
Orthopyroxene	$(Mg,Fe) SiO_3$
Chromite	$Fe^{2+}Cr_2O_4$
Hercynite	$Fe^{2+}Al_2O_4$
Cr-spinel	$Fe^{2+}Cr_2O_4$
Apatite	$Ca_5(PO_4)_3(OH,F,Cl)$
Monazite	$(Ce,La,Th)PO_4$
Rose zircon	$ZrSiO_4$
MAJOR SULPHATE PORPHYRY INDICATOR MINERALS	
Jarosite	$KFe_3(SO_4)_2(OH)_6$
Alunite	$KAl_3(SO_4)_2(OH)_6$
Epidote	$Ca_2(Al,Fe)_3 Si_3O_{12}(OH)$

Table 2: Analytical methods, elements and their lower detection limits used for this program.

Abbreviations: ICP-ES, inductively coupled plasma–emission spectrometry; ICP-MS, inductively coupled plasma–mass spectrometry; INAA, instrumental neutron activation analysis; GRAV, gravimetric; ION, ion selective electrode; OCE, orion conductivity electrode; GCE, glass combination electrode; D.L., detection limit; ppm, parts per million; ppb, parts per billion; pct, percent.

ELEMENT		D.L.		METHOD	ELEMENT		D.L.		METHOD
Aluminum	Al	0.01	pct	ICP-MS	Strontium	Sr	0.5	ppm	ICP-MS
Antimony	Sb	0.02	ppm	ICP-MS	Sulphur	S	0.02	pct	ICP-MS
Arsenic	As	0.1	ppm	ICP-MS	Tellurium	Te	0.02	ppm	ICP-MS
Barium	Ba	0.5	ppm	ICP-MS	Thallium	Tl	0.02	ppm	ICP-MS
Bismuth	Bi	0.02	ppm	ICP-MS	Thorium	Th	0.1	ppm	ICP-MS
Boron	B	20	ppm	ICP-MS	Titanium	Ti	0.001	pct	ICP-MS
Cadmium	Cd	0.01	ppm	ICP-MS	Tungsten	W	0.05	ppm	ICP-MS
Calcium	Ca	0.01	pct	ICP-MS	Uranium	U	0.05	ppm	ICP-MS
Chromium	Cr	0.5	ppm	ICP-MS	Vanadium	V	2	ppm	ICP-MS
Cobalt	Co	0.1	ppm	ICP-MS	Zinc	Zn	0.1	ppm	ICP-MS
Copper	Cu	0.01	ppm	ICP-MS	Beryllium	Be	0.1	ppm	ICP-MS
Gallium	Ga	0.1	ppm	ICP-MS	Cerium	Ce	0.1	ppm	ICP-MS
Gold	Au	0.2	ppb	ICP-MS	Cesiun	Cs	0.02	ppm	ICP-MS
Iron	Fe	0.01	pct	ICP-MS	Germanium	Ge	0.1	ppm	ICP-MS
Lanthanum	La	0.5	ppm	ICP-MS	Hafnium	Hf	0.02	ppm	ICP-MS
Lead	Pb	0.01	ppm	ICP-MS	Indium	In	0.02	ppm	ICP-MS
Magnesium	Mg	0.01	pct	ICP-MS	Lithium	Li	0.1	ppm	ICP-MS
Manganese	Mn	1	ppm	ICP-MS	Niobium	Nb	0.02	ppm	ICP-MS
Mercury	Hg	5	ppb	ICP-MS	Rhenium	Re	1	ppb	ICP-MS
Molybdenum	Mo	0.01	ppm	ICP-MS	Rubidium	Rb	0.1	ppm	ICP-MS
Nickel	Ni	0.1	ppm	ICP-MS	Tantalum	Ta	0.05	ppm	ICP-MS
Phosphorus	P	0.001	pct	ICP-MS	Tin	Sn	0.1	ppm	ICP-MS
Potassium	K	0.01	pct	ICP-MS	Yttrium	Y	0.01	ppm	ICP-MS
Scandium	Sc	0.1	ppm	ICP-MS	Zirconium	Zr	0.1	ppm	ICP-MS
Selenium	Se	0.1	ppm	ICP-MS	Platinum	Pt	2	ppb	ICP-MS
Silver	Ag	2	ppb	ICP-MS	Palladium	Pd	10	ppb	ICP-MS
Sodium	Na	0.001	pct	ICP-MS					

ELEMENT		D.L.		METHOD	ELEMENT		D.L.		METHOD
Silicon dioxide	SiO_2	0.01	pct	ICP-ES	Cobalt	Co	20	ppm	ICP-ES
Aluminium oxide	Al_2O_3	0.01	pct	ICP-ES	Copper	Cu	5	ppm	ICP-ES
Iron(III) oxide	Fe_2O_3	0.04	pct	ICP-ES	Nickel	Ni	20	ppm	ICP-ES
Magnesium oxide	MgO	0.01	pct	ICP-ES	Niobium	Nb	5	ppm	ICP-ES
Calcium oxide	CaO	0.01	pct	ICP-ES	Scandium	Sc	1	ppm	ICP-ES
Sodium oxide	Na_2O	0.01	pct	ICP-ES	Strontium	Sr	2	ppm	ICP-ES
Potassium oxide	K_2O	0.01	pct	ICP-ES	Yttrium	Y	3	ppm	ICP-ES
Titanium dioxide	TiO_2	0.01	pct	ICP-ES	Zinc	Zn	5	ppm	ICP-ES
Phosphorus pentoxide	P_2O_5	0.01	pct	ICP-ES	Zirconium	Zr	5	ppm	ICP-ES
Manganese oxide	MnO	0.01	pct	ICP-ES	Loss on Ignition	LOI	0.1	pct	GRAV
Chromium(III) oxide	Cr_2O_3	0.002	pct	ICP-ES	Total/C	C	0.02	pct	Leco
Barium	Ba	5	ppm	ICP-ES	Total/S	S	0.02	pct	Leco
Cerium	Ce	30	ppm	ICP-ES					

ELEMENT		D.L.		METHOD	ELEMENT		D.L.		METHOD
Antimony	Sb	0.1	ppm	INAA	Scandium	Sc	0.2	ppm	INAA
Arsenic	As	0.5	ppm	INAA	Selenium	Se	5	ppm	INAA
Barium	Ba	50	ppm	INAA	Silver	Ag	2	ppm	INAA
Bromine	Br	0.5	ppm	INAA	Sodium	Na	0.02	pct	INAA
Cadnium	Cd	5	ppm	INAA	Tantalum	Ta	0.5	ppm	INAA
Cerium	Ce	5	ppm	INAA	Tellurium	Te	10	ppm	INAA
Cesium	Cs	0.5	ppm	INAA	Terbium	Tb	0.5	ppm	INAA
Chromium	Cr	20	ppm	INAA	Thorium	Th	0.2	ppm	INAA
Cobalt	Co	5	ppm	INAA	Tin	Sn	100	ppm	INAA
Europium	Eu	1	ppm	INAA	Titanium	Ti	500	ppm	INAA
Gold	Au	2	ppb	INAA	Tungsten	W	1	ppm	INAA
Hafnium	Hf	1	ppm	INAA	Uranium	U	0.2	ppm	INAA
Iron	Fe	0.2	pct	INAA	Ytterbium	Yb	2	ppm	INAA
Iridium	Ir	50	ppm	INAA	Zinc	Zn	100	ppm	INAA
Lanthanum	La	2	ppm	INAA	Zirconium	Zr	200	ppm	INAA
Lutetium	Lu	0.2	ppm	INAA	Fluorine	F	10	ppm	ION
Molybdenum	Mo	1	ppm	INAA	Loss on Ignition	LOI	0.1	pct	GRAV
Nickel	Ni	10	ppm	INAA	***LAKE WATER:***				
Rubidium	Rb	5	ppm	INAA	Conductivity	CND	1	uS	OCE
Samarium	Sm	0.1	ppm	INAA	pH	PH	0.1		GCE

DATA PRESENTATION

Information compiled in this report includes field and analytical results from basal till, lake sediment and lake water samples collected during the 2013 TREK project conducted in parts of the Interior Plateau. Field observations and analytical results from this work have been determined to be complete and accurate. A selection of the data is presented in the following appendices and a complete listing in digital data files:

Appendix A and D:

This section lists recorded field observations and raw analytical data for both the 2013 basal till and the lake sediment and water surveys. Definitions for field observation codes and abbreviations are provided at the beginning of the section.

Appendix B and E:

This section presents summary statistics for individual elements determined by the various analytical methods for each sample media collected. Refer to notes at the beginning of the section for specific details on the methods used.

Appendix C and F:

This section includes sample location and proportional symbol maps for a selection of metals. Colour and proportional symbol size reflects data ranges that are based on percentiles calculated from the raw data sets listed in Appendix B and D. Maximum symbol size is assigned to highest values. Portraying high values with larger symbols and bright colours helps highlight regional geochemical trends and areas that may host anomalous results.

Digital Data:

The data summary presented in this package is not considered exhaustive. In order to accommodate more detailed assessments, raw digital data files for each data set have been included in Microsoft® Excel (XLS) format. Refer to the README.PDF file for details on the data files.

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