TECHNICAL REPORT FOR THE TARGET EVALUATION OF THE SAMP CLAIM GROUP (105J09) ROSS RIVER AREA, YUKON

SUMMARY

This report summarizes the exploration work completed in July 2017 under the Target Evaluation Program of the Yukon Mineral Exploration Program (YMEP) on the SAMP claim group.

In accordance with the proposed work plan hand pitting/trenching was completed along two grids, a northwestern grid (GNW) and a southwestern grid (GSW) covering the northwestern and southwestern inferred contacts of a quartz monzonite stock, respectively. Additionally, soil samples were collected in the western-most parts of the southwest grid, where soil was developed and no rocks were found. The total number of samples collected is: 27 rock samples on the northwestern grid, 28 rock samples and 12 soils samples on the southwestern grid, and an additional 27 rock samples between the grid sample points and across the Samp claim group.

All samples were submitted to Bureau Veritas Minerals (former ACME analytical labs) for whole rock geochemical analysis by the analytical package GENX10 (9 elements by aqua regia digest with ICP finish; Au content by Fire Assay with atomic absorption finish on 30 g subsample).

Highly anomalous assay results include 3 samples with >100 ppm Ag (above detection limit), and 8 samples with Ag concentrations between 10 and 48 ppm; 4 samples with Au

concentrations ranging from 0.138 – 0.475 ppm and 14 samples with 30 to 88 ppb; 2 samples with Cu contents greater than 1% (above detection limit of 10000 ppm) and 4 samples between 1300 and 2680 ppm Cu; one sample with Zn concentrations greater than 1% (above detection limit of 10000 ppm) and 4 samples ranging between 1100 and 3220 ppm Zn; and one sample with W contents greater than 1% (above detection limit of 10000 ppm) and 10 samples with W between 2166 and 7918 ppm.

The mineralization is closely associated with coarse-grained, sulfide-rich quartz veins in the quartz monzonite and strongly altered (sericitized) selvages (2-20 cm thick) around these quartz veins. While the mineralized structures occur at the margins of the intrusion, they do not form a continuous zone of mineralization. Based on the elemental associations observed in the analytical results, the mineralization is tentatively interpreted as a hydrothermal polymetallic vein-hosted deposit.

The country rocks comprised of shale and subordinate limestone appear to be not significantly mineralized despite the presence of abundant quartz veins at some sample locations. However, sphalerite – Fe-sulfide-bearing quartz veins within a fault-bounded block of limestone yield Zn concentrations above 1%.

INTRODUCTION

This report summarizes the exploration work completed in July 2017 under the Target Evaluation Program of the Yukon Mineral Exploration Program (YMEP) on the SAMP claim group.

The SAMP claims are approximately 145 km northeast of Ross River at 62.6795° N, 130.1123° W, on map sheet 105J/09 (Figs. 1 & 2; Table 1). Access is by helicopter from Ross River.

The SAMP claims were staked by the author in 2012. They belong to Polar Star Explorations Inc., a private company registered in the Yukon Territory (#30024). Kluane Drilling Ltd. is the majority partner in Polar Star Explorations Inc. The author has no formal connection with Polar Star Explorations Inc. or Kluane Drilling Ltd.

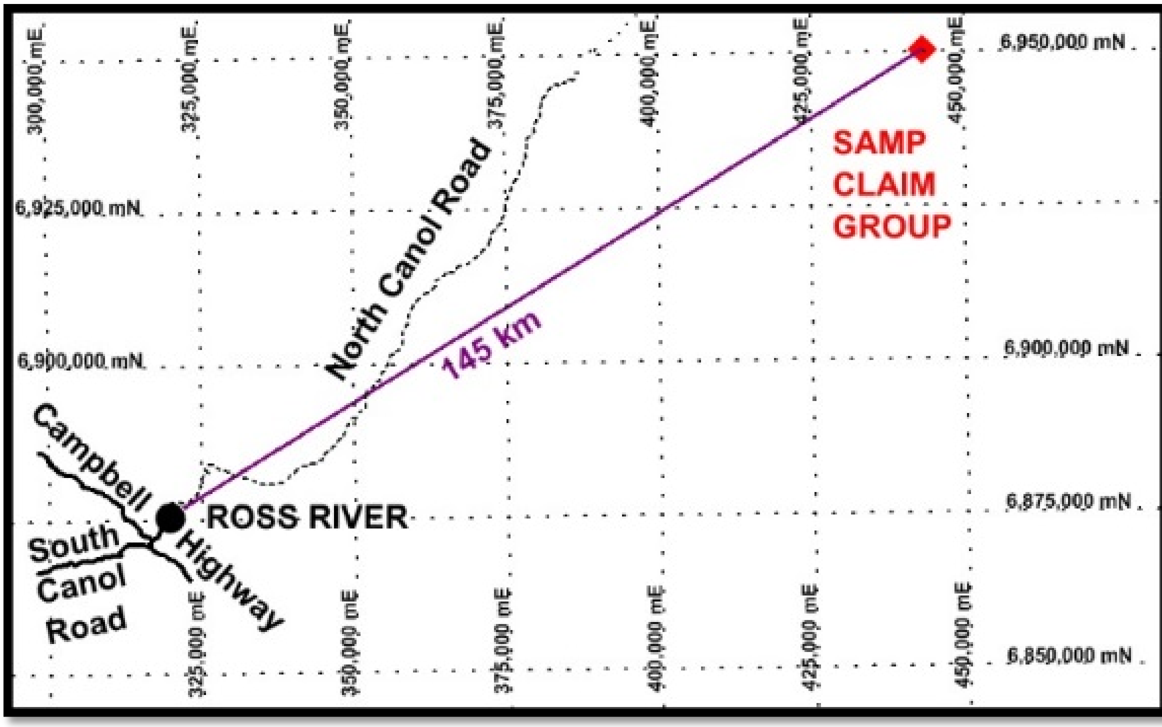

Figure 1: Location of SAMP claims.

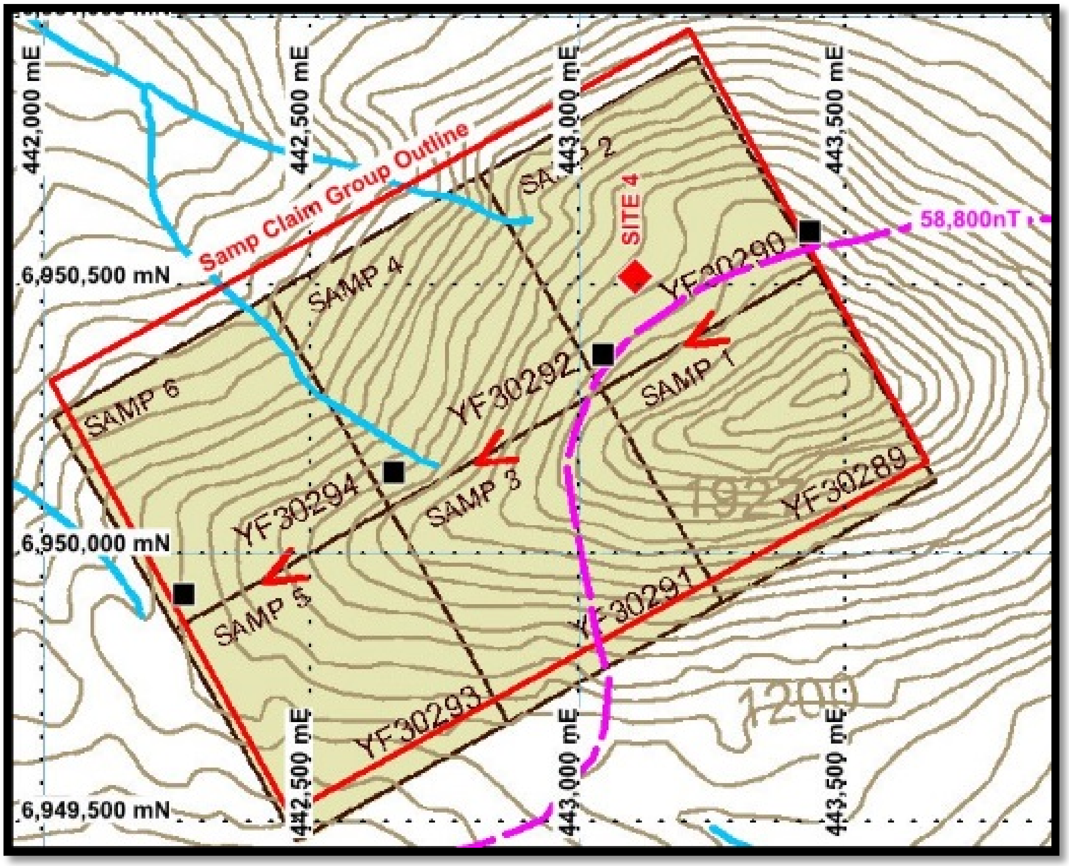

Figure 2: The SAMP claims (1-6). The red boundary is the outline of the claim block adjusted to the actual claim post locations in Table 1. The purple dashed line is the 58,800 nT magnetic contour from federal government magnetics as noted by Godwin (1973).

Table 1: Coordinates of the SAMP claim posts.

Site (Fig. 9)	Claim Numbers	Zone	Easting	Northing	Elevation (m)
11	Start: SAMP 1 and 2	9V	443432	6950606	1060
12	End: SAMP 1 and 2 Start: SAMP 3 and 4	9V	443047	6950376	1200
13	End: SAMP 3 and 4 Start: SAMP 5 and 6	9V	442655	6950156	1200
10	End: SAMP 5 and 6	9V	442266	6949931	1564

GEOLOGICAL SETTING

The local geology (after Gordey & Makepeace 2003) is shown in Figure 3. The majority of the area is underlain by an Ordovician to Lower Devonian (392-510 Ma) clastic/chert/limestone/conglomerate unit which is intruded by a mid-Cretaceous (85 Ma) quartz monzonite stock. A siltstone/sandstone/ conglomerate unit (Upper Devonian and Mississippian: 323 - 375 Ma) outcrops on the west side of the claim group. The extent and size of the quartz monzonite pluton is approximate. According to Godwin (personal communication) distinction between the two clastic units and assignment of ages is speculative.

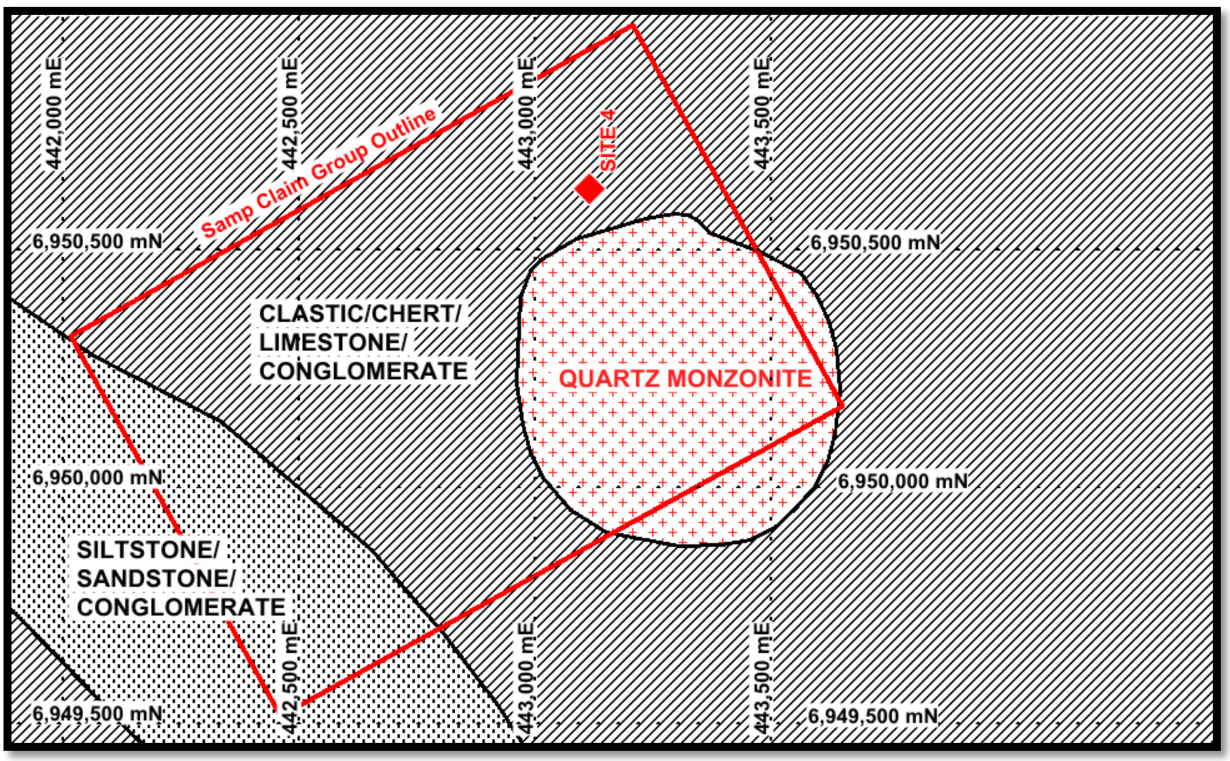

Figure 3: Geological setting of the SAMP claims (Gordey & Makepeace 2003) showing the mid-Cretaceous (85 Ma) quartz monzonite stock, the Ordovician to Lower Devonian (392-510 Ma) clastic chert/limestone/conglomerate unit, and the Upper Devonian and Mississippian (323-375 Ma) siltstone/sandstone/conglomerate unit. The extent and size of the quartz monzonite stock is approximate. The location that produced the most anomalous sample is shown as "Site 4"

PREVIOUS WORK - SUMMARY

The SAMP claims are associated with the same intrusive stock as the "PREVOST" W skarn prospect (at 62.67889° N, 130.09556° W; Yukon MINFILE 105J/014). According to the MINFILE entry the prospect was staked in 1969 by Newmont as the Sean claims. It was restaked by J. Carson in 1972 and was optioned to the Selwyn Project which conducted mapping and grid soil sampling (assaying for copper, lead, and zinc only) in 1973 (Godwin 1973). Carson restaked the prospect in 1980 (as the Dancer claims) and conducted silt, soil, and rock sampling for geochemical assaying (Carson 1981).

The MINFILE record has the following paragraph for geology:

"Scheelite occurs in quartz veins in a porphyritic quartz monzonite stock and in skarn at the contacts. The stock intrudes Ordovician to Lower Devonian shale and phyllite and underlying Cambro-Ordovician limestone. Minor sulphosalt veins have been found near the margins of the stock and variscite is also reported. Specimens of quartz veins and greisen alteration from the intrusion assayed as high as 1.6% WO_3*. A chip sample across 9.1 m of jointed quartz monzonite assayed 0.06%* WO_3*."*

Staking of the current claims was prompted by information in Godwin (1973) and personal communication with the report's author, Dr. Colin Godwin. They suggested that the area could be of interest because of (1) the known occurrence of tungsten in an intrusive stock; (2) the stock and the aeromagnetic anomaly associated with it; (3) anomalous copper, lead, and zinc in soils in a grid near this stock; (4) the occurrence of vegetation-gossan coupled with the occurrence of variscite, a phosphate mineral, and (5) the recent recognition of Carlin-type deposits in the Selwyn Basin.

The staking was done by the author, who was in the area on a research project (barium minerals of the Gun property), on behalf of Polar Star Explorations Inc.

During the staking a number of rock and soil samples were collected. One of the rock samples, an altered granite, yielded 604.5 grams per tonne gold (19.4 ounces per ton gold) and >300 ppm silver. Other samples yielded the following maximum values: Au = 18 ppb; Mo =

55.5 ppm; Pb = 129 ppm, Ag = 5,600 ppm; As = 840 ppm; Bi = 70 ppm; Ba = 8639 ppm; W = >300 ppm; Sn = 45 ppm; Te = 0.73 ppm, and Tl = 3.25 ppm.

These anomalous assays from such a limited sampling program was considered encouraging, especially since they can be characteristic of both Carlin-type and Cretacous intrusive-related gold deposits, and skarn- or greisen-types tungsten deposits.

The author and assistant Dr. Thomas Chudy returned to the SAMP claims in October 2016. Sampling done during the four-day program support the conclusion that this is an area worth investigating in more detail.

PREVIOUS WORK - GEOCHEMISTRY

Silt samples

Three RGS silt samples sample drainages from the Samp claim group. Gold-silver, antimony-arsenic, barium-mercury and tungsten-molybdenum INAA or ICPM analyses are plotted as pairs in Figure 4. Values are in Table 2. Table 2 and Figure 4 indicates that site 105J891262, about 2.5 km northwest and downstream from the SAMP claims, is slightly anomalous in gold, silver, antimony, and barium. It is markedly anomalous in tungsten and molybdenum. All sites are too distant to be significantly diagnostic of mineralization on the SAMP claims.

Table 2: Selected analyses from the RGS silt sample data base that are plotted in Figure 4; slightly anomalous samples are green and strongly anomalous samples are red.

Sample	**Au**	**Ag**	**Ba**	**Hg**	**Sb**	**As**	**W**	**Mo**
Units	ppb	ppm	ppm	ppm	ppb	ppm	ppm	ppm
105J891252	10	0.6	7020	232	4	18	2	6
105J891253	7	0.3	4200	129	4	25	5	7
105J891262	13	0.8	9080	247	9	37	19	12

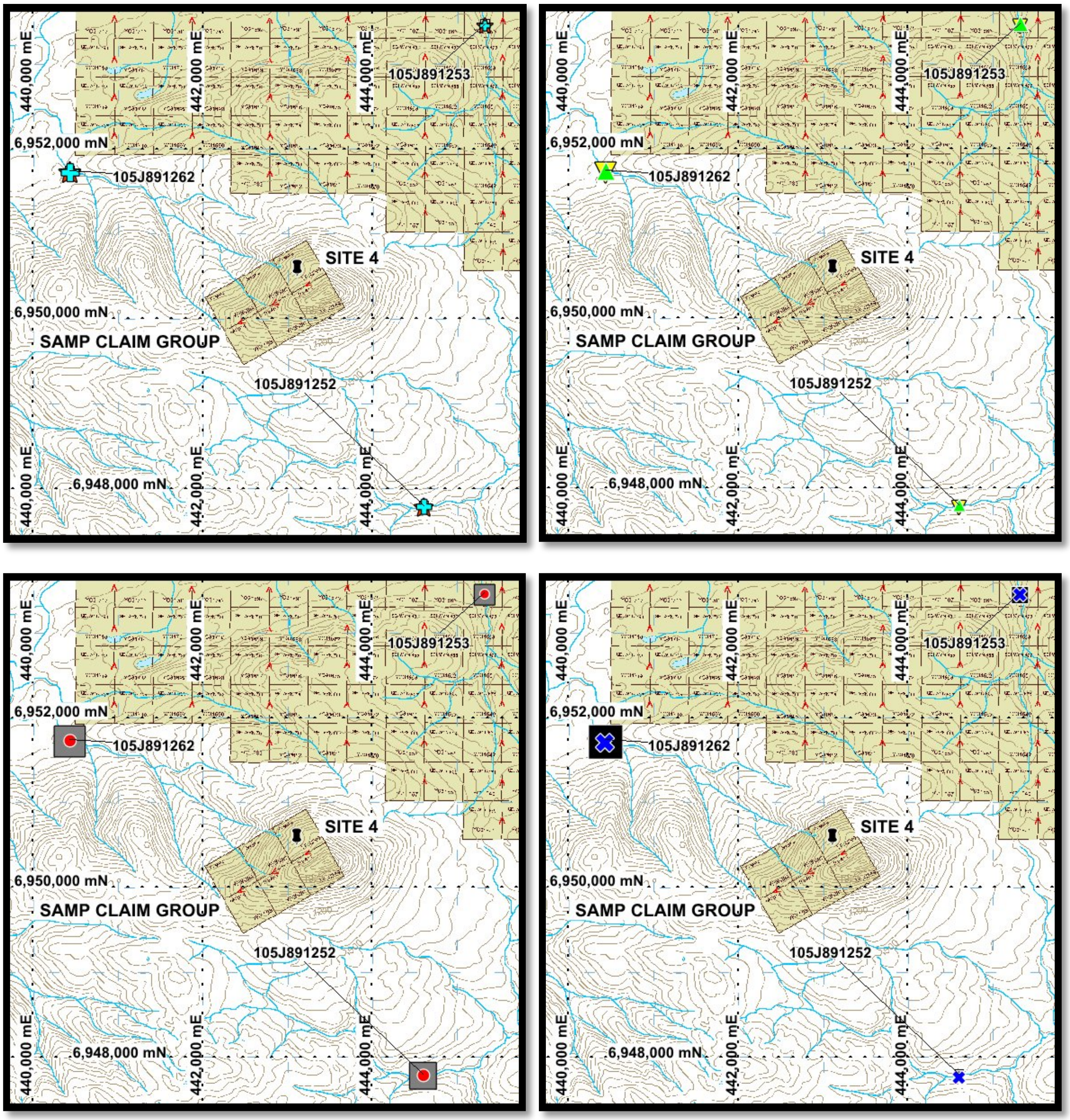

Figure 4: RGS silt geochemistry from drainages related to the Samp claim group (Table 2). Sizes are relative to the values in Table 2. Top left: Au (orange stars) and Ag (blue plus signs). Top right: Sb (yellow down-triangle) and As (green up-triangles). Bottom left: Ba (grey squares) and Hg (red dots). Bottom right: W (black squares) and Mo (blue ×).

Soil samples

Soil geochemistry for copper, lead, and zinc was filed as assessment work by Dynasty Explorations Ltd. (Godwin 1973) and are reported in Figures 5 to 7. Unfortunately, the grid sampled cannot be accurately located with respect to known global positioning points available now. The grid was shifted with reference to the 58,800 nT line recorded by Godwin (1973) and shifted to match the NRCAN magnetic anomaly (see below).

Lead in soil is high in the central-eastern part of the SAMP claim group (Fig. 5). Zinc is high in the center of the SAMP claim group (Fig. 6). Combined by adding copper, lead, and zinc (Fig. 7; summed values in ppm divided by the median for each element) indicate a possible northeasterly trend to these anomalies (grey dashed line in Figs. 5 to 7). Alternatively, these might be two anomalies: an eastern one and a central one.

The flank of the the quartz monzonite pluton is clearly elevated in copper, lead, and zinc (Fig. 7).

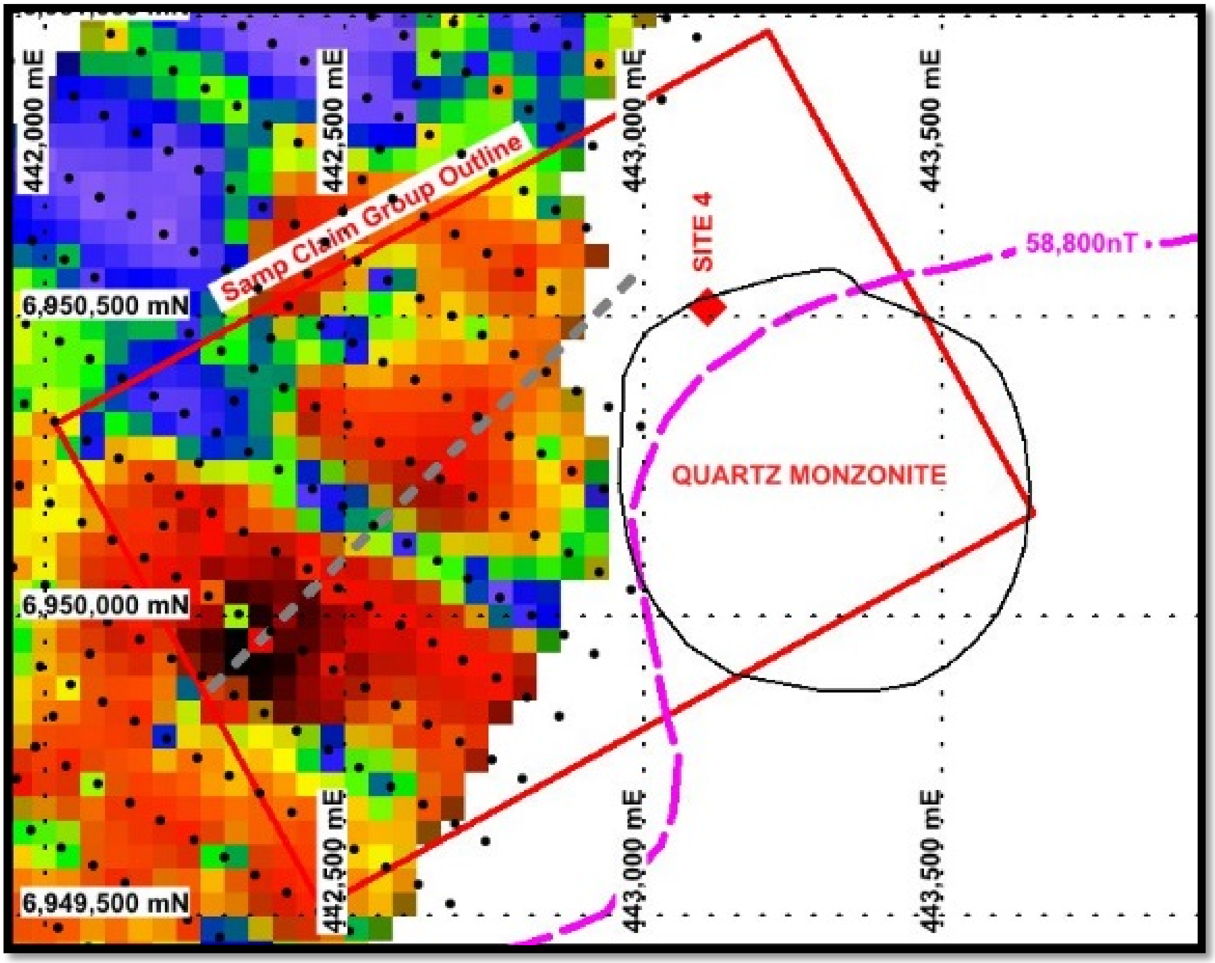

Figure 5: Lead soil geochemistry (sites = dots) re-plotted from Godwin (1973). The location is approximate and based on coincidence of 58,800 nT magnetic contour and the magnetic anomaly in Figure 19 (top). Values for colors are: red ~40 ppm and green ~25 ppm. Actual values are in Table A1. The lead anomaly has a northeast trend (grey dashed line; note that only copper, lead, and zinc were analyzed at that time). A line with low values (blue and green) looks like a systematic sampling error. Alternatively, these might be two anomalies: an eastern one and a central one.

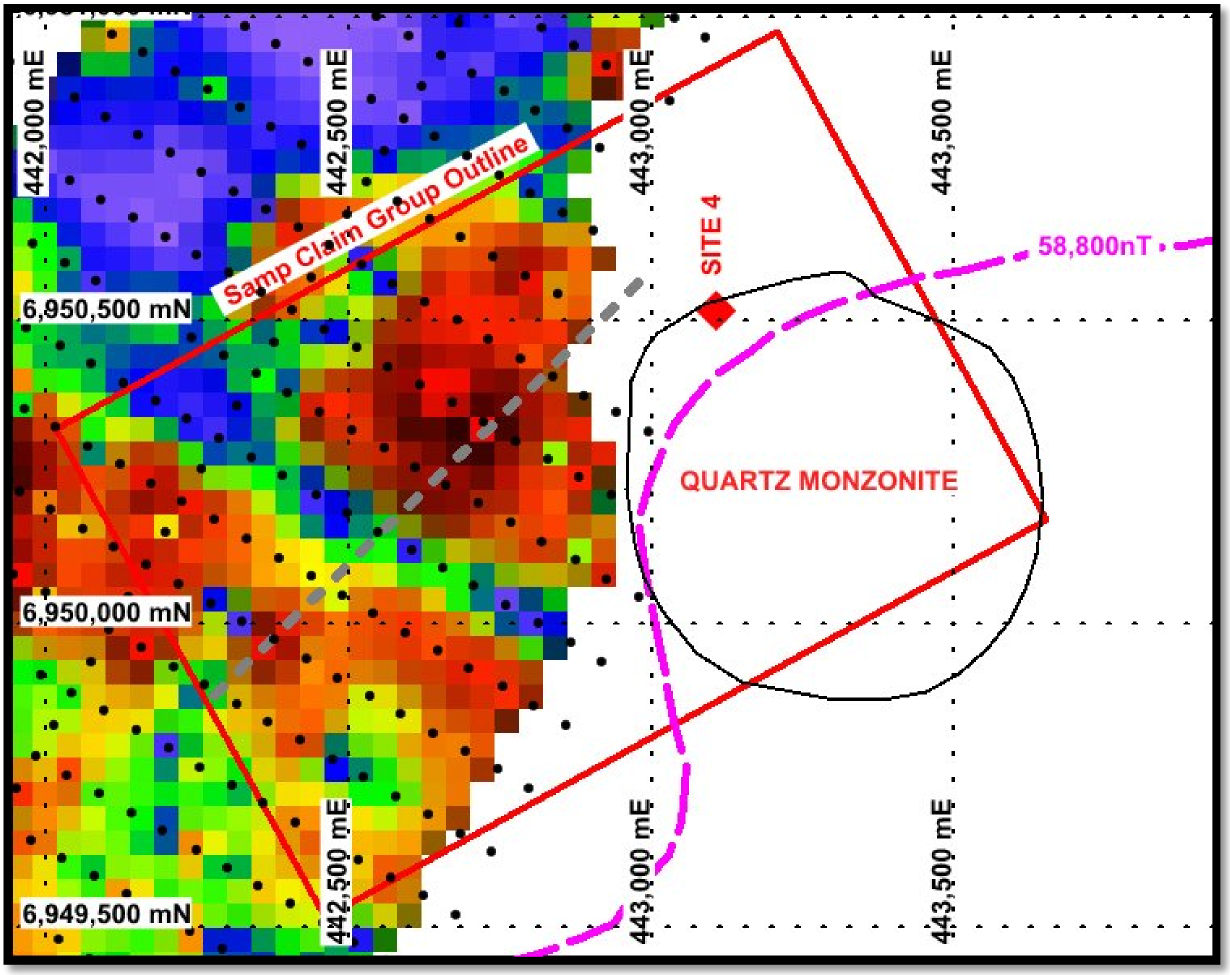

Figure 6: Zinc soil geochemistry (sites = dots) re-plotted from Godwin (1973) soil survey. The location is approximate and based on coincidence of 58,800 nT magnetic contour and the magnetic anomaly in Figure 19 (top). Values for colors are: red ~700 ppm and green~150 ppm. Actual values are in Table A1. The lead anomaly has a northeast trend (grey dashed line; note that only copper, lead, and zinc were analyzed at that time). A line with low values (blue and green) looks like a systematic sampling error. Alternatively, these might be two anomalies: an eastern one and a central one.

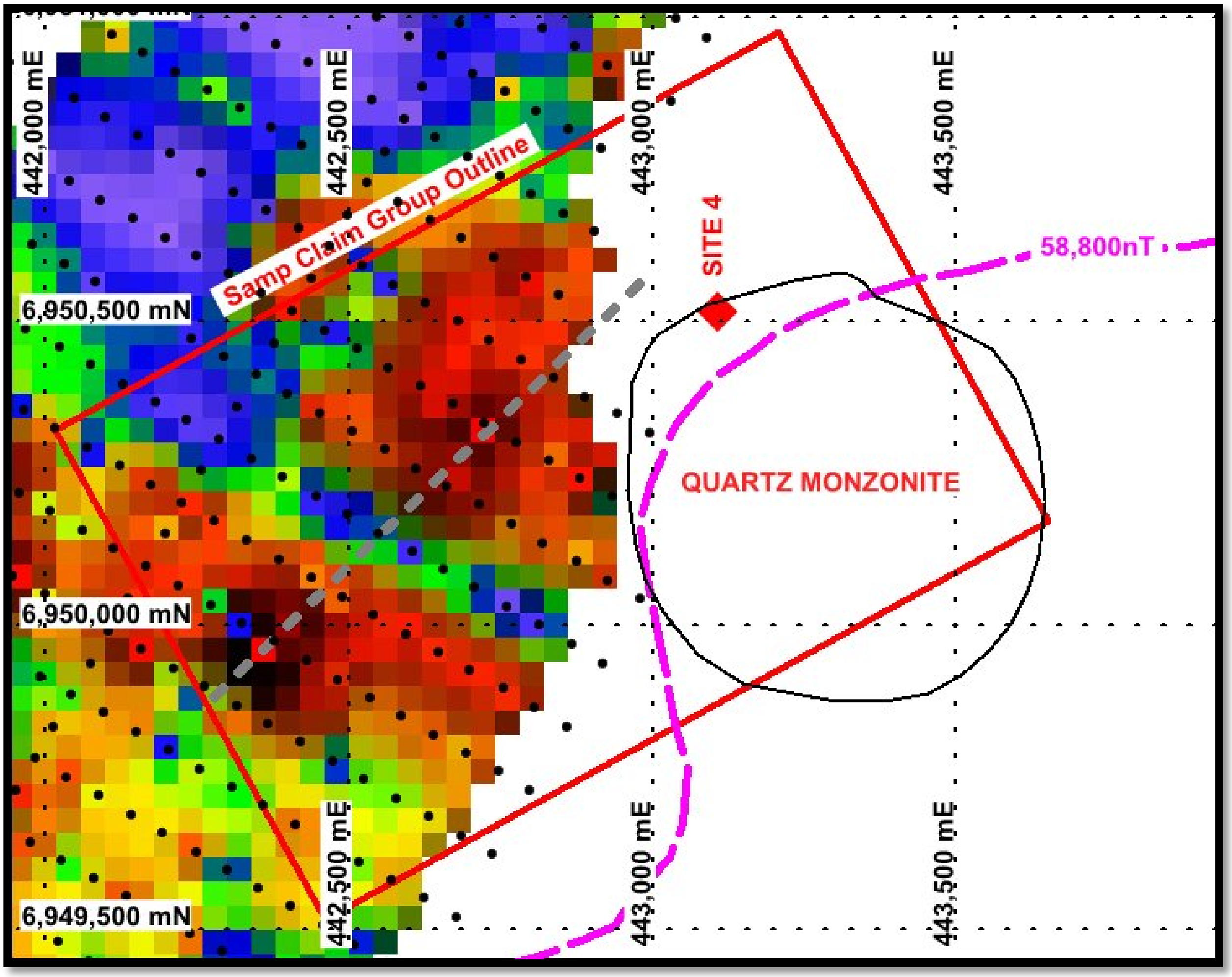

Figure 7: Sum of copper, lead and zinc soil geochemistry (sites = dots) re-plotted from Godwin (1973) soil survey. The location is approximate and based on coincidence of 58,800 nT magnetic contour and the magnetic anomaly in Figure 19 (top). Sum is the added values for copper, lead and zinc, each divided by the median for the given element. Values for colors are: red ~4.5 and green ~2.5. Actual values are in Table A1. The lead anomaly has a northeast trend (grey dashed line; note that only copper, lead and zinc were analyzed at that time). A line with low values (blue and green) looks like a systematic sampling error, but might divide two separate anomalies.

Rock samples

Historical rock geochemical and assay data from Groat (2012), Carson (1981), and Godwin (1973) is compiled in Appendix A and plotted in Figure 8. The Groat (2012) data is accurately located by GPS. The Carson (1981) data was very difficult to locate accurately. Strongly anomalous sites in Figure 8 are: gold 20, 26, 27; silver 10, 11, 37; tungsten 34, 35, 36.

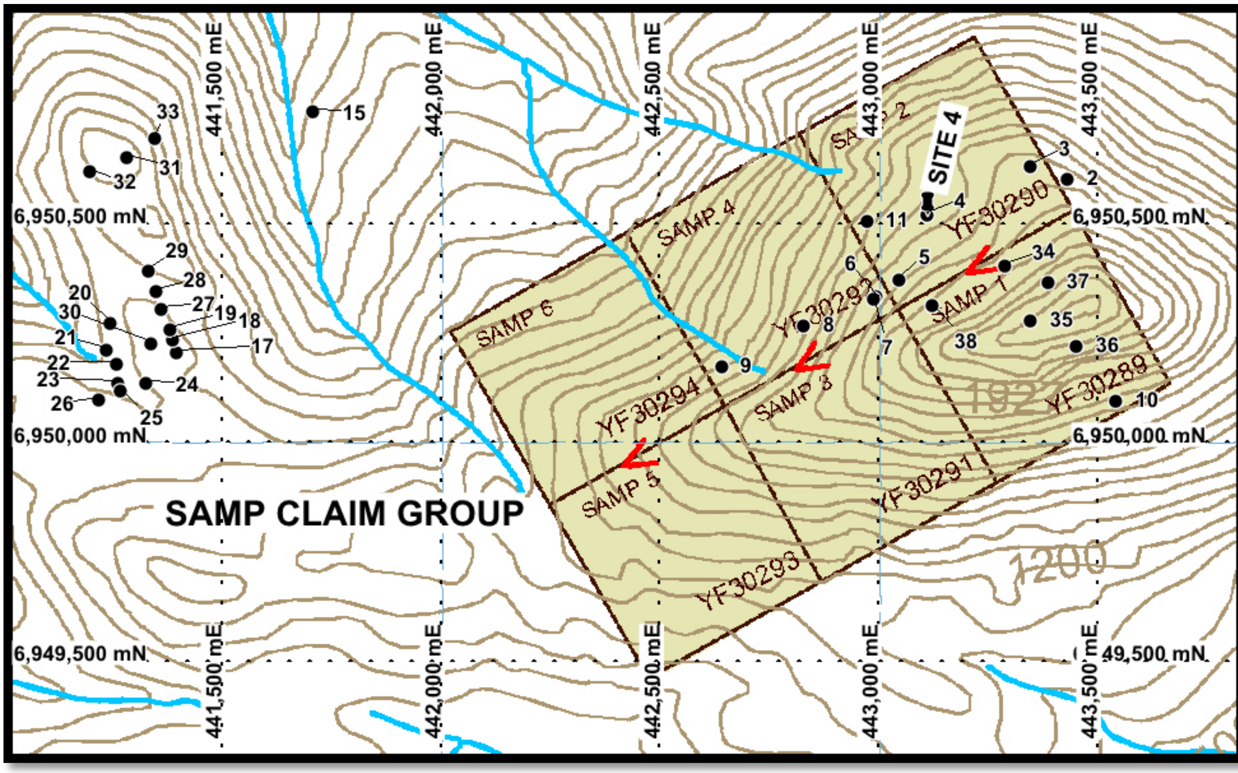

Figure 8: Rock assay samples (Table B1) from the SAMP claims.

Four soil samples and five rock samples were taken by the author while staking the SAMP claim group in 2012. Geochemical results from Acme Laboratories Ltd. are in Appendix B, and the sample sites are located in Figure 9.

Gold-Anomalous Site 4, where a highly altered (greisenized) granite (now mostly quartz and muscovite) was sampled, occurs near the northern border of the quartz monzonite pluton and the clastic/chert/limestone/conglomerate unit. Anomalous Site 4 (Fig. 9 and sample 12-AG-007 in Appendix B) was a rock sample with 604.5 grams per tonne gold (19.4 ounces of gold per ton!). There was no coarse sample reject, because it was all pulverized for the fire assay – gravimetric analyses. The pulp, however, was examined by Dr. R. James Evans with a scanning electron microscope at the University of British Columbia. He noted (pers. communication, 2013-May-09): “The powder was mostly the usual aluminosilicates (plus K, Ca, Mg) with scattered bright particles under BSE [back scattered electrons]. Most of these bright particles were simple Fe sulphide, but there was one large Au-Ag particle….There was one other Fe-S particle…that showed significant peaks for Zn, Cu and Ag….”

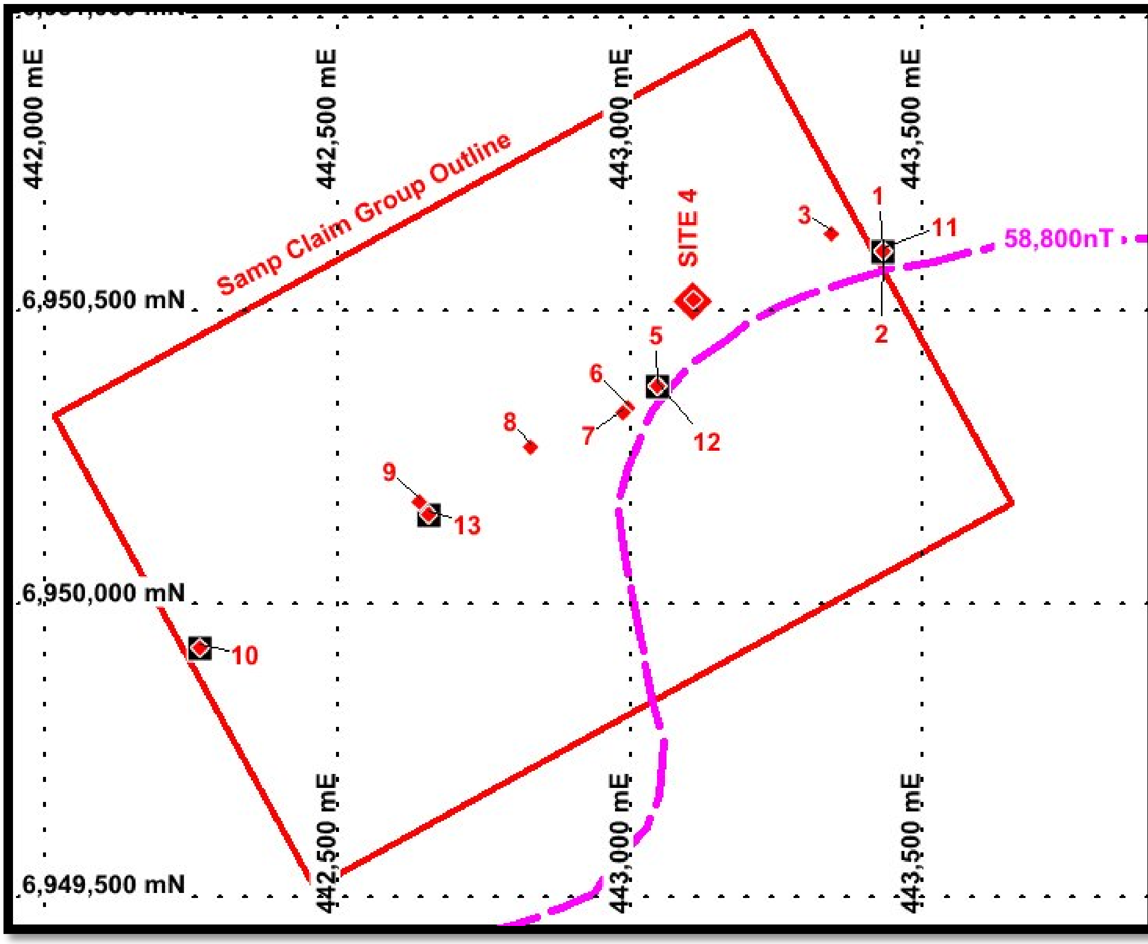

Figure 9: Location of Groat (2012) samples (Appendix B).

The following are significantly high analyses (aside from the above gold analysis) obtained from the limited sampling done by the author (Appendix B): Au = 18 ppb; Mo = 55.5 ppm; Pb = 129 ppm, Ag = 5,600 ppm; As = 840 ppm; Bi = 70 ppm; Ba = 8639 ppm; W = >300 ppm; Sn = 45 ppm; Te = 0.73 ppm, and Tl = 3.25 ppm.

The highly anomalous samples from such a limited sampling program is encouraging. Tungsten is notably high and over analytical limit (>300 ppm).

In the course of 2016 field work related to a research project focusing on the origin of the gold and silver mineralization on the Samp prospect, the author and Dr. Chudy collected additional rock samples for mineralogical study (Fig. 10). From these samples 33 were submitted for whole rock geochemical analysis including fire assay – gravimetric analyses. The data is presented in Appendix C.

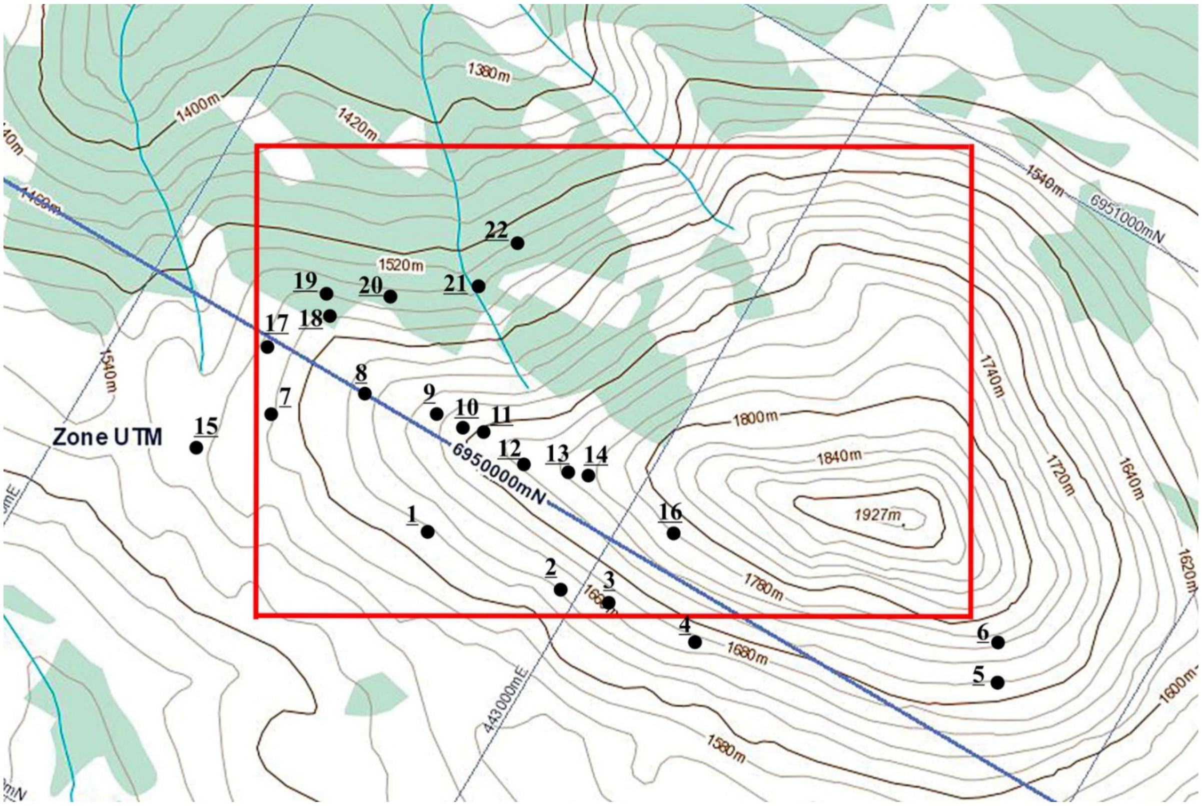

Figure 10: Location of sample points from 2016 field work on the Samp prospect; sample labelling in Appendix C is based on the following scheme: S16-(sample site)_(sample number), e.g., S16-05_1.

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The 2016 geochemical data confirms the historic results from previous years and the following anomalously high analyses were obtained: Au up to 100 ppb; Ag up to 28 ppm; Sb up to 590 ppm; Bi up to 424 ppm; W up to 5800 ppm; and Pb up to 2200 ppm. Significant Gold mineralization was found in 6 out of 8 altered granite (greisens) samples, in two shale samples and in one skarn rock sample. High silver concentrations were observed in two shale samples and one quartz vein. Notably, the highly anomalous samples are concentrated at the western contact of the intrusion (Fig. 11).

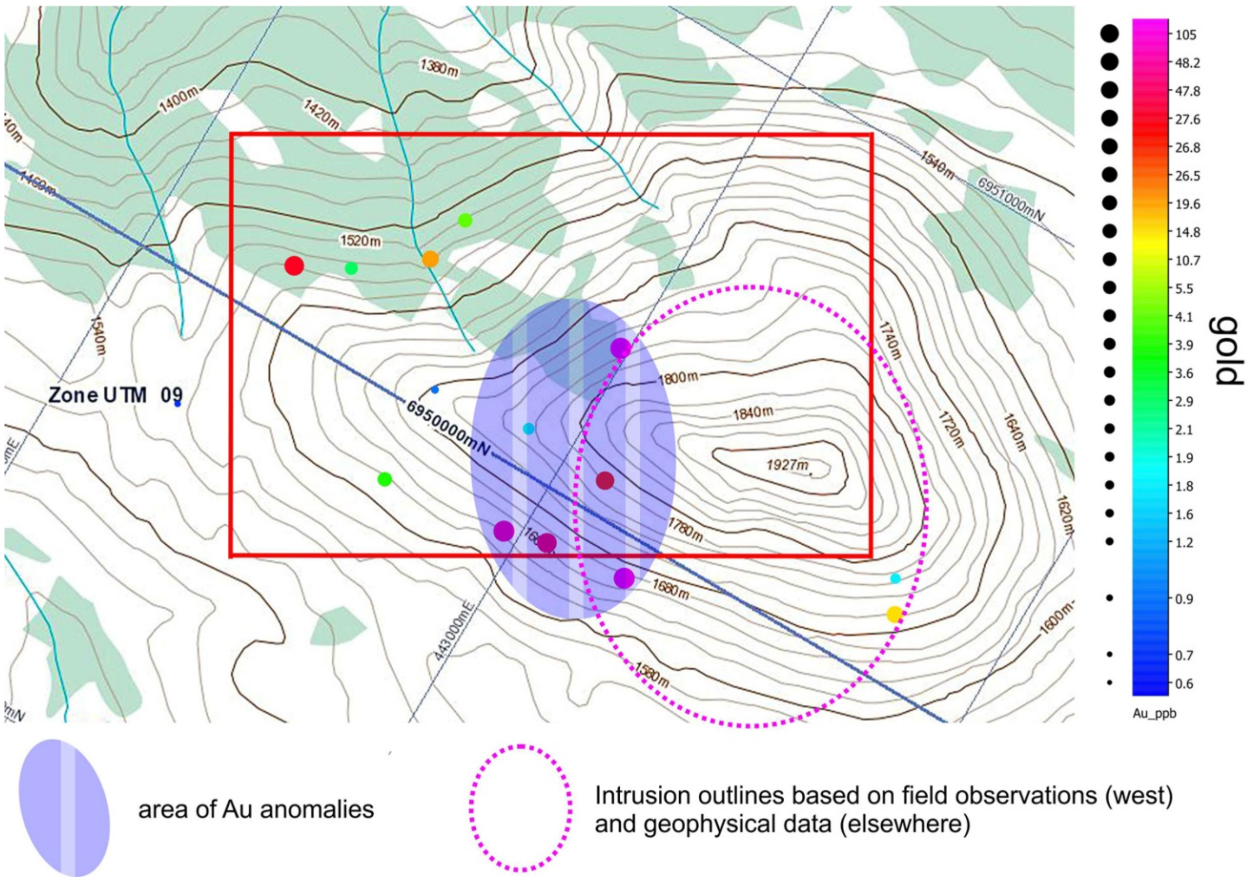

Figure 11; Map showing Au analyses distribution from 2016 field work on the Samp claims; blue circle area indicates highest concentrations of samples with anomalous gold concentrations, corresponding to the south-western contact of the monzo granite intrusion.

Preliminary results from the evaluation of the geochemical data indicate the following distribution of economic and path-finder elements (Figs. 12-14): 1. Altered granite (greisen) – Au-Ag-As-Bi-Sb-W-Sn; 2. Quartz veins (in shale and granite): Pb-Zn-Sb-Ag(-As); 3. Shale (altered): minor Au-As-Cu-Zn. These element-rock associations strongly suggest an intrusion-related gold mineralization system surrounding the monzo granite intrusion.

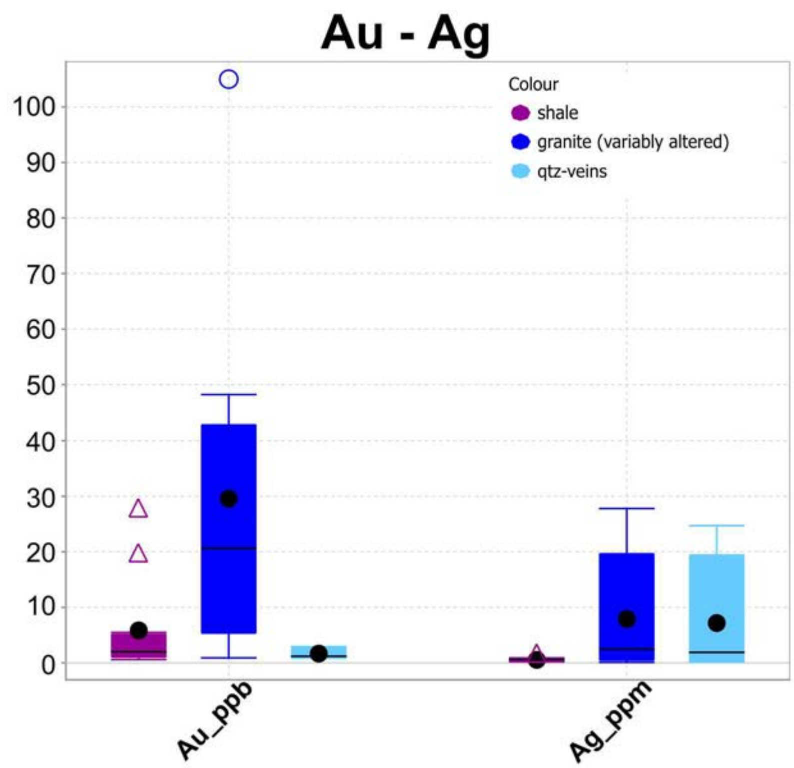

Figure 12: Turkey Box plots showing the distribution of Au [ppb] and Ag [ppm] in sampled rock types; shale includes 12 samples, granite includes 8 samples, qtz-veins includes 4 samples.

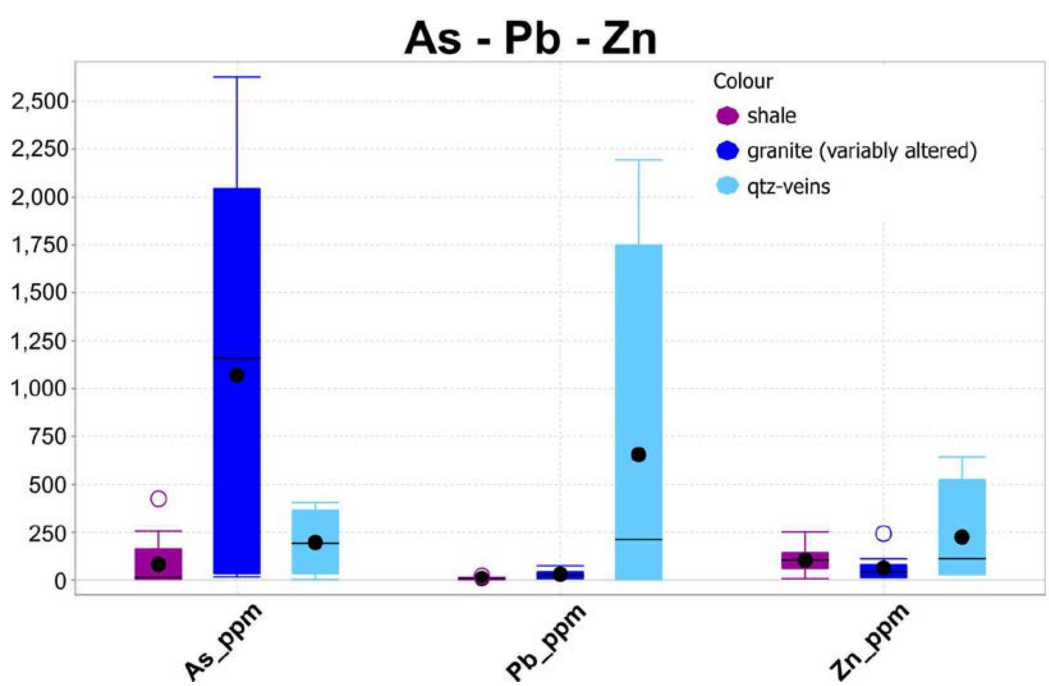

Figure 13: Turkey Box plots showing the distribution of As, Pb, and Zn [all in ppm] in sampled rock types; see caption for Figure 12 for number of samples.

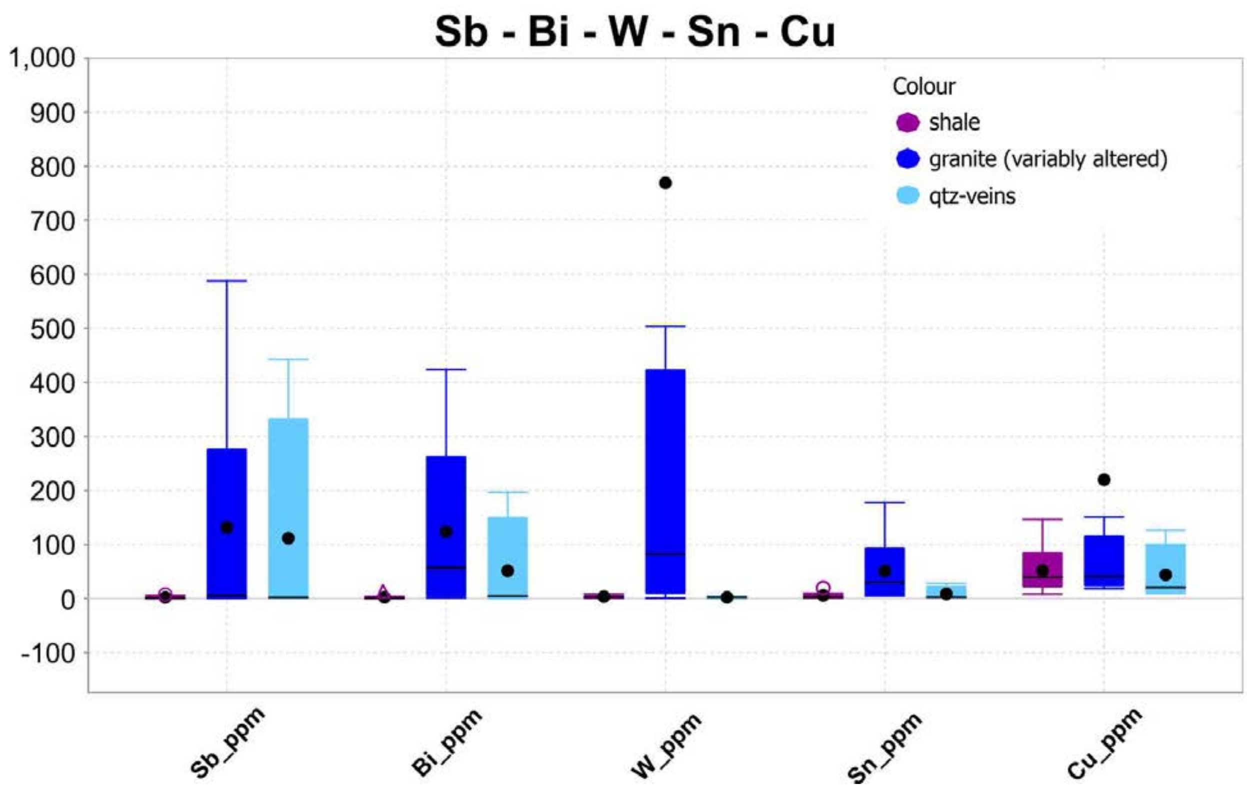

Figure 14: Turkey Box plots showing the distribution of Sb, Bi, W, Sn, and Cu [all in ppm] in sampled rock types; see caption for Figure 12 for number of samples.

GEOPHYSICS

Regional ZTEM conductivity

Regional ZTEM geophysical high-conductivity belts are shown in Figures 15-17 (black, dashed lines in Figure 15). At least four highly conductive west-northwest trending belts can be defined across the Selwyn Basin. These belts, especially the northernmost one, appear to be related to known SEDEX and Carlin type deposits (Robert Carne, 2014, personal communication). The SAMP claims are located near the center of the central high conductivity belt.

The horseshoe shaped high around Site 4 (Fig. 17) is in part due to hornfels surrounding the pluton.

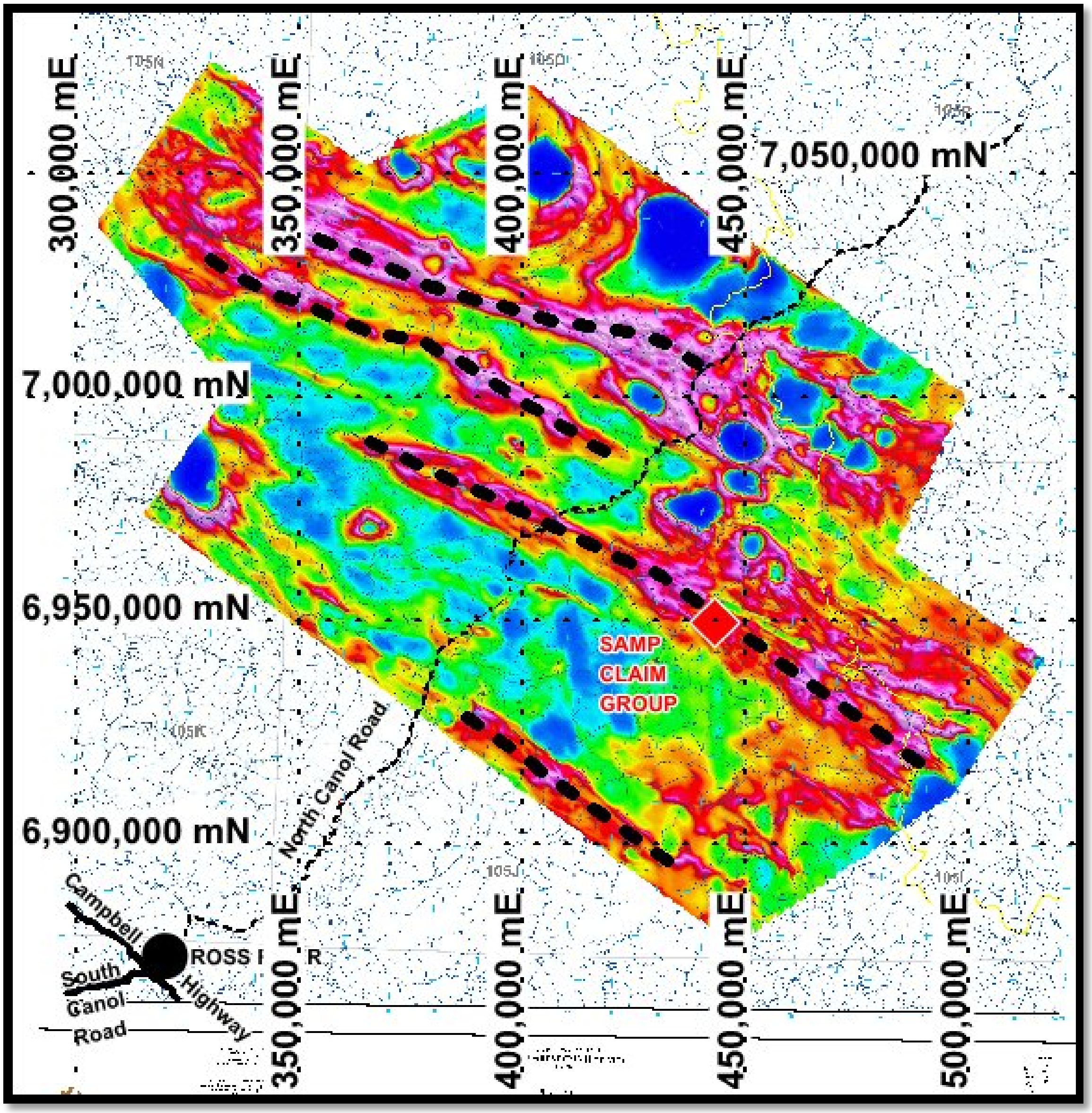

Figure 15: Regional Selwyn Basin ZTEM 30 Hz conductivity (Witherly 2013).

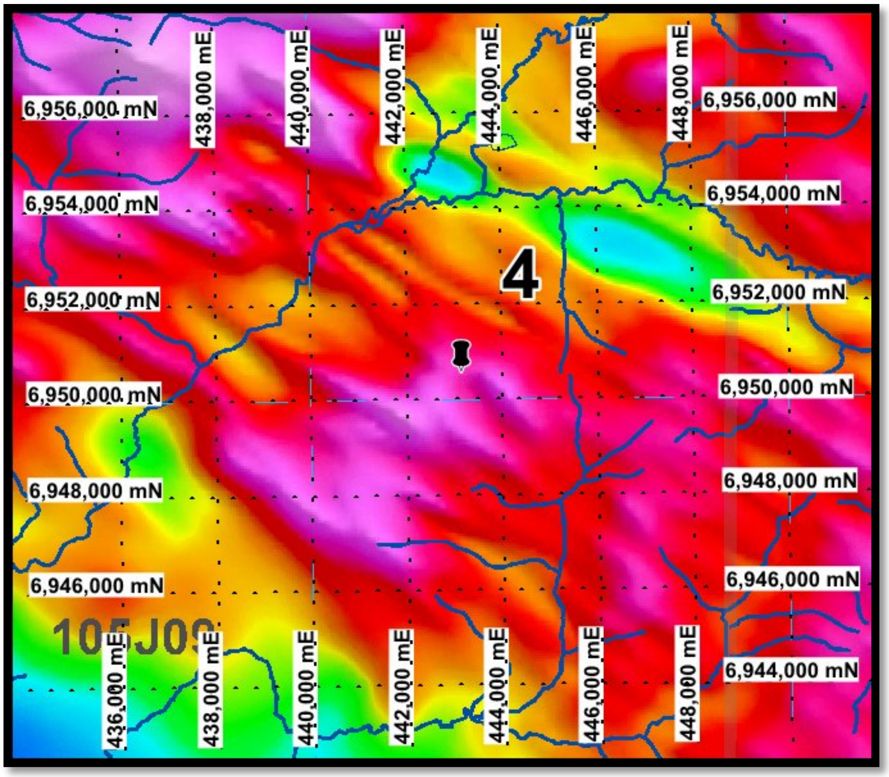

Figure 16: ZTEM 30 Hz conductivity details around the SAMP claims.

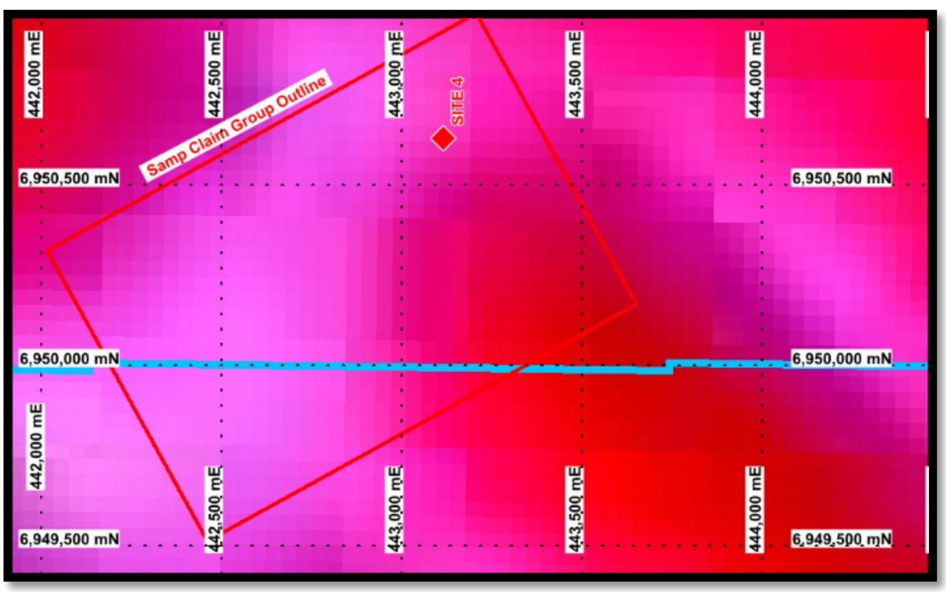

Figure 17: Detail of the 30 Hz ZTEM anomaly within the SAMP claim group. The halo around the pluton is clear.

Regional magnetics

Regional magnetic data are shown in Figures 18 and 19.

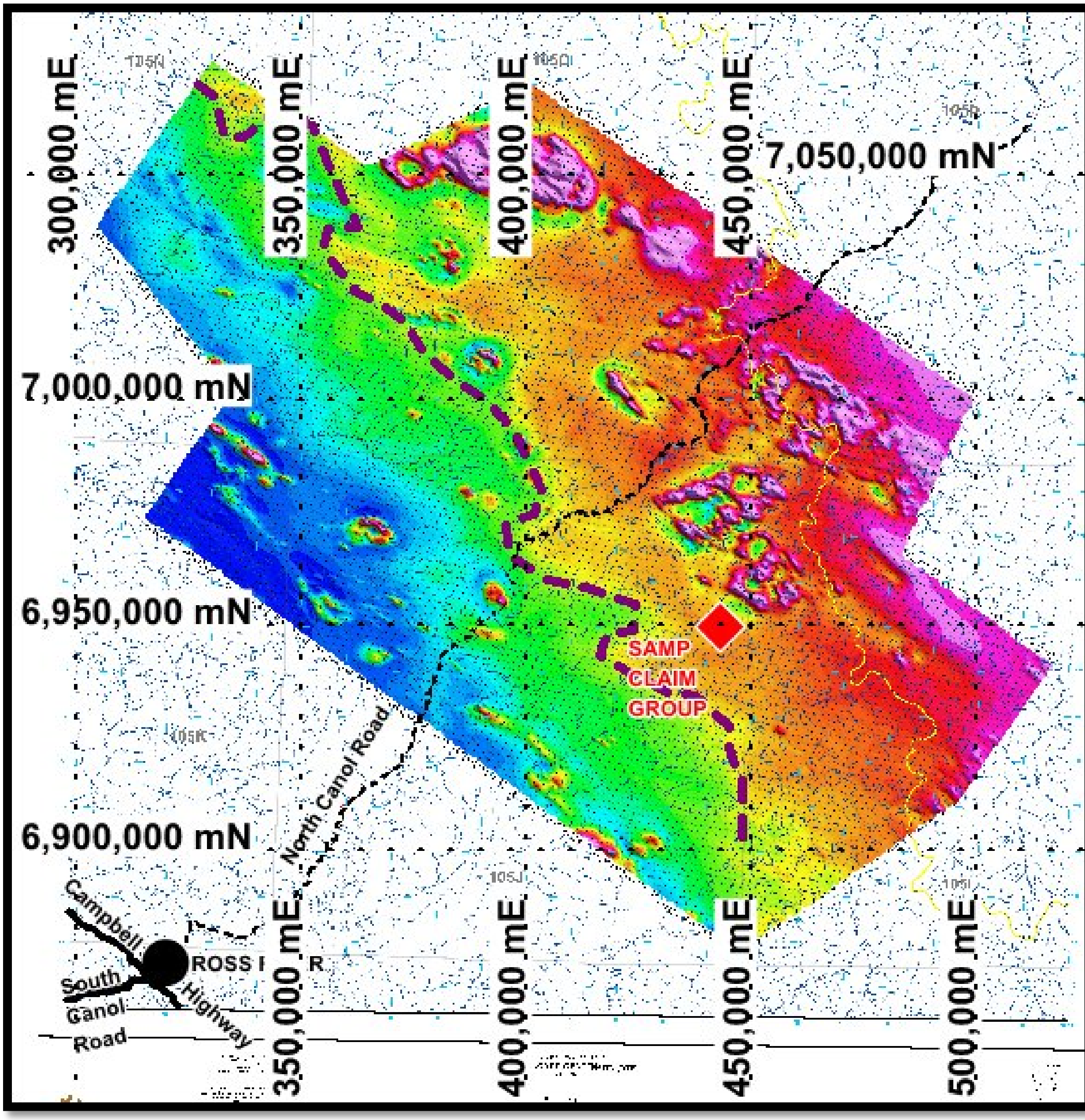

Figure 18: Regional magnetics, reduced to the pole (Witherly 2013).

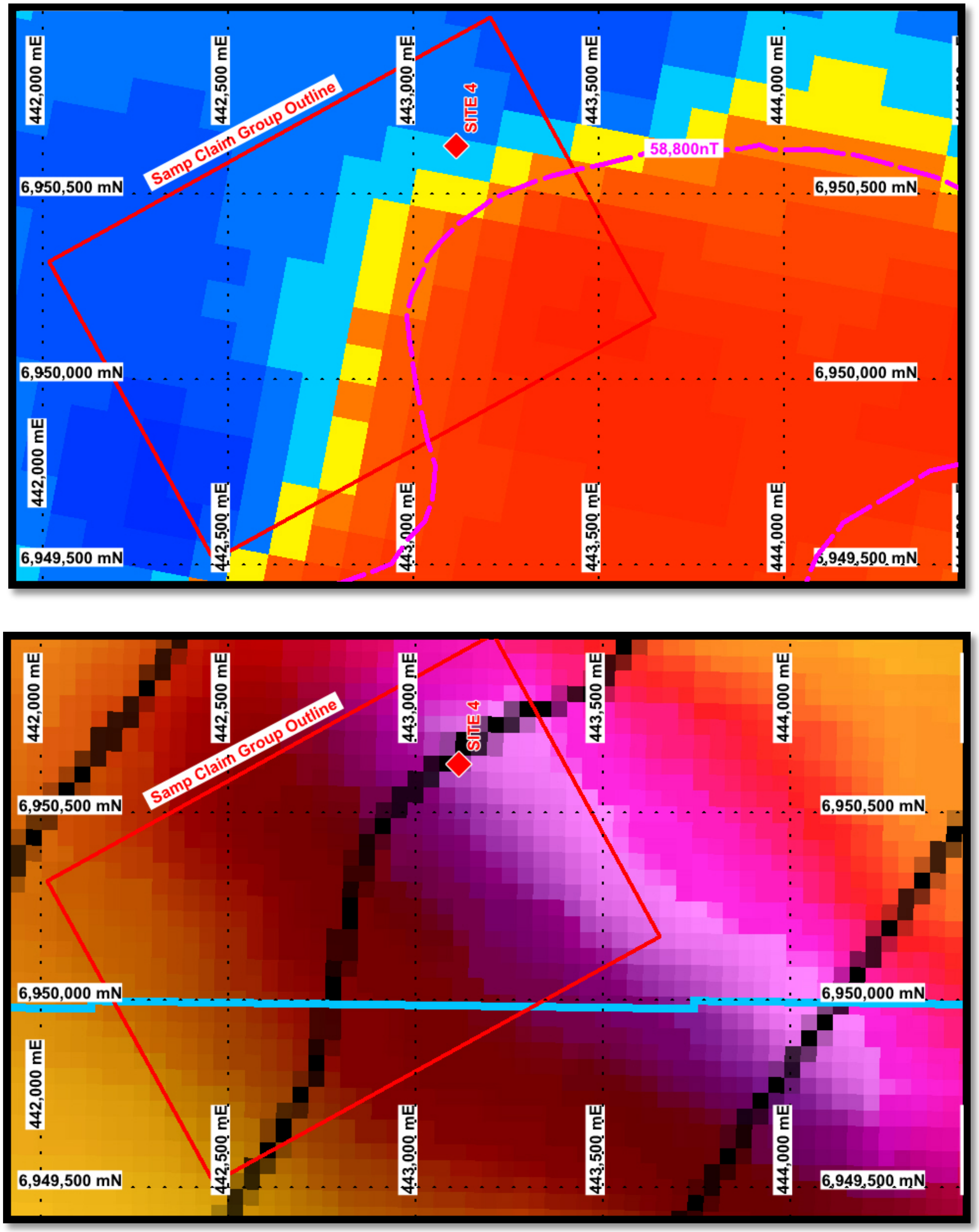

Figure 19: Regional, magnetics. Top: NRCAN (2015) total residual. Bottom: Witherly (2013) total reduced to the pole. The 58,800 nT contour is from the Godwin (1973) compilation.

WORK COMPLETED IN 2017

Logistics and travel

The field program on the Samp claims group commenced June 30th and ended July 17th 2018. It included two days of supply and equipment procurement in Whitehorse as well as meeting with Polarstar personnel followed by two days of travel to the site by truck and helicopter (July 3rd and 4th). The return trip from the field site to Whitehorse took also two days due to bad weather and delayed helicopter pick-up (July 16-17th).

Sampling program

Location

The proposed work plan included hand pitting/trenching along two grids covering the southwestern and northwestern inferred contacts of the intrusion, supplemented by additional soil sampling around the highly anomalous site 4. Following the notice of an exclusion zone of 300 m around a golden eagle nest located at N62d40’39.8 and W130d06’37.2, the proposed sample grids had to be relocated and modified. The adjusted sampling grids are presented in Figure 20.

The eagle appears to be in great spirit and was observed to hunt for siksiks, pikas and rock ptarmigans.

The northwestern grid was moved to the northwest by approximately one hundred meters which resulted in one line being outside the claim boundary; these sample points were relocated to the southwestern side of the northwest grid.

The southwestern grid was move to the southwest by approximately 350 m.

The target area is located on variably steep slopes comprised mostly of blocks, boulders and rubble that developed on top of the monzonite and shed from higher elevations. The intrusions crops out at above ca. 1840 m. The contacts to the country rocks are traceable throughout the boulder fields, especially in the northern part (e.g., NW grid) which is less steep than the southern flank.

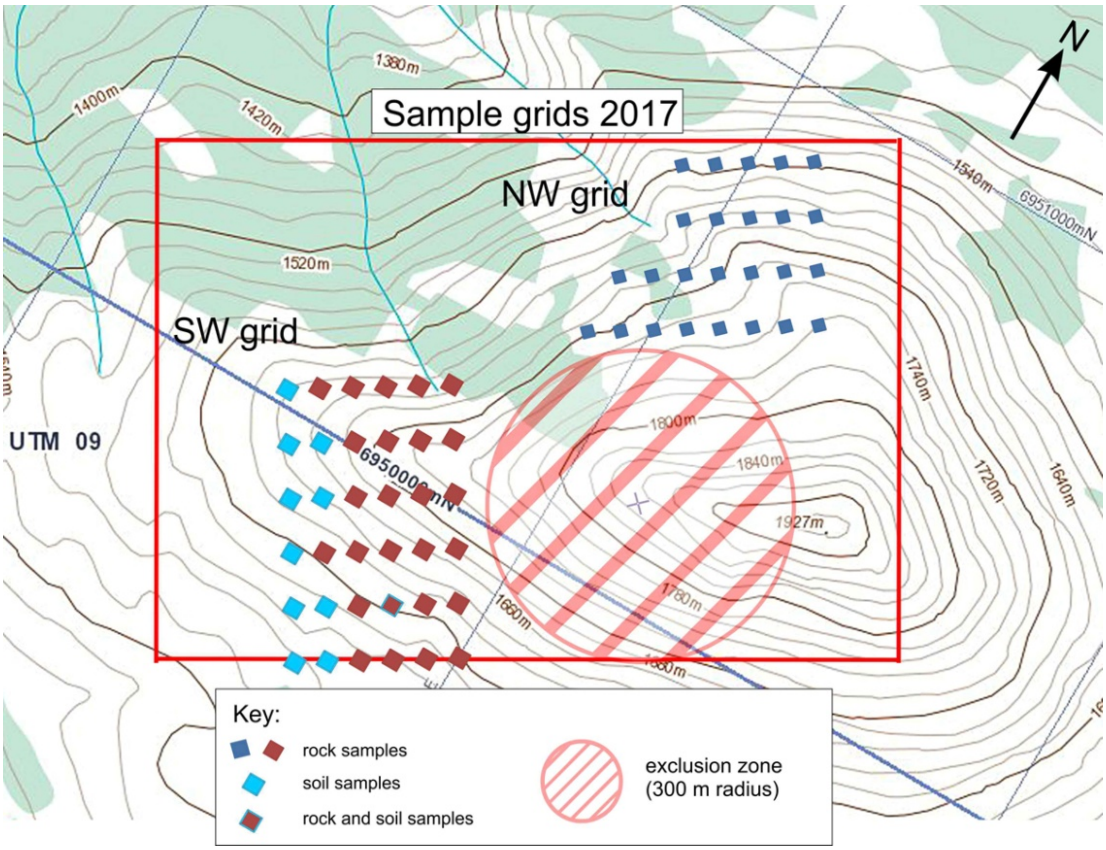

Figure 20:Map showing location of sample points for the two major grids within the Samp claim group. The exclusion zone has a 300 m radius around a Golden Eagle nest.

Sample types

Hand pitting or trenching proofed to be not feasible given the ground conditions but the samples are representative of the dominant material at each sampling point. The vast majority of the collected samples are fist-sized or larger fragments of rocks between 1 and 5 kg in total weight. Additional samples were taken throughout the work area either between grid points or outside the grids during prospecting. All sample points were documented with respect to general lithology, textures of samples and observed mineralization. In the southwestern grid, small pits were excavated where soil cover was present. In many cases, the material constituted a mixture of fragments of bedrocks and floats embedded in young soils rich in organic material.

Soil samples could only be collected in the western-most parts of the southwestern grid where no outcrop existed and sufficient soil was developed (Figure 20). They were only taken if a small pit up to 30 cm deep failed to expose the underlying rock. In these cases the lowest horizon including rubble was collected. The rubble was macroscopically identified but removed before analysis.

The total number of samples collected is: 27 rock samples on the northwestern grid, 28 rock samples and 12 soils samples on the southwestern grid, and an additional 27 rock samples between the grid sample points, across the Samp claim group and along the claim boundaries.

Sample descriptions

Appendix D contains a table with lithological descriptions of individual sample points as well as comments about the collected samples. Fig. 21 shows the rock types observed at each sample points.

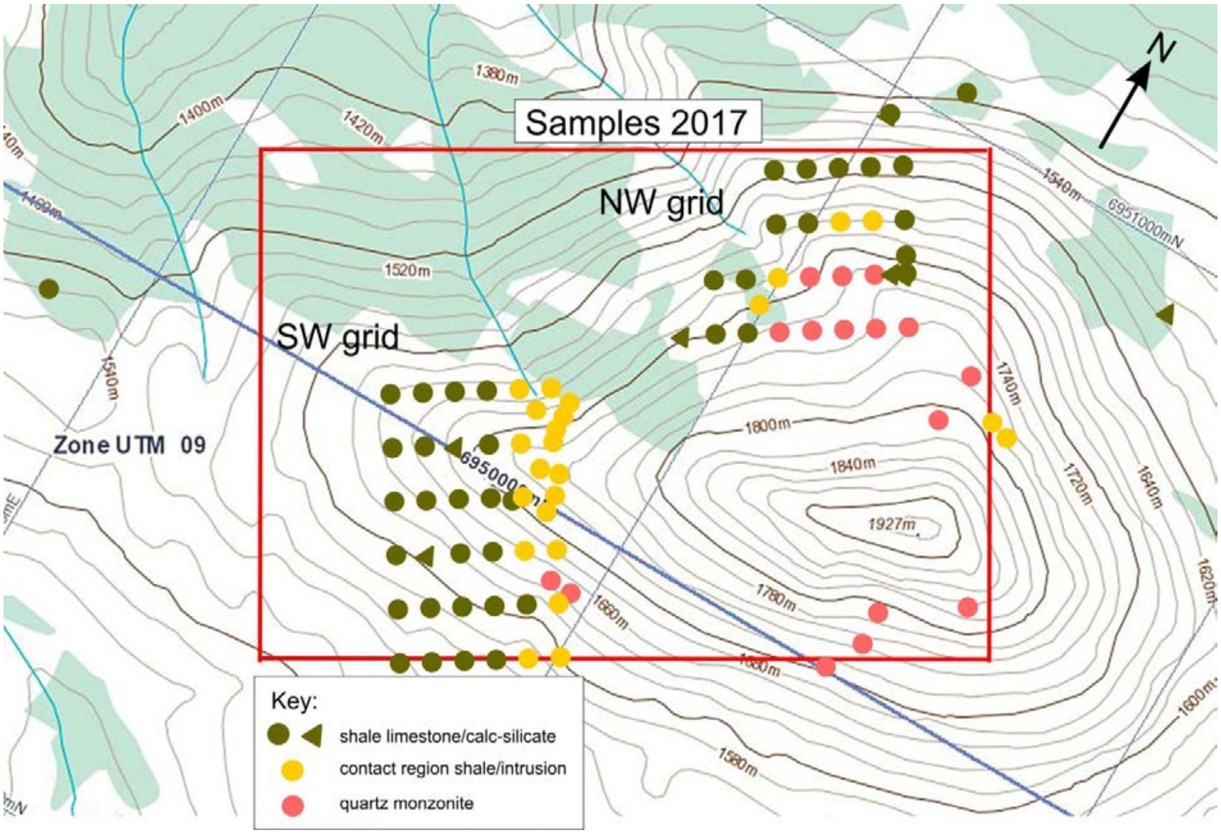

Figure 21: Map showing the encountered main lithology at each sample point. The actual sample might belong to an adjacent or subordinate rock type not depicted in the map.

GEOLOGY

The area is underlain by fine-grained sedimentary rocks that are intruded by a small monzonite stock. In this section, a brief account of observation related to the geology of the two major rock types is presented.

Sedimentary rocks

The sedimentary rocks are comprised predominantly of various shales and mudstones with minor limestone and associated calc-silicate rocks. The shales and mudstone range in color from black through grey to reddish-brown (rusty) and show textural variability with respect to bedding and composition. They can be either finely laminated or show cm-scale bedding of silt and sandy layers or be completely massive without any bedding or lamination.

The limestone beds are typically less than 2 m thick except for one location (S17-05) where this unit was more than 5 m in thickness. It has a tan-brown to grey color and a laminated texture due to mm-thick, undulatory and discontinuous tightly-spaced silica-rich layers. Calc-silicate rocks consisting of fine-grained actinolite, wollastonite, and calcite/dolomite are frequently associated with limestone. Both calcite-rich units have a relatively high content of Fe-sulfides which are finely disseminated throughout the rock. The limestone/calc-silicate beds are discontinuous and appear to be bounded by steep, vertical faults which are otherwise not obvious within the shale units.

The sedimentary rocks are variably altered and transected by quartz veins. The quartz veins can consist of either fine-grained, granular quartz or well crystallized quartz with euhedral crystals around openings or cavities. The granular quartz veins are generally thin (<2 cm) and occur in relatively high density forming a stock work transitional to breccias (e.g., location S17GNW-26 or S17GNW-02). These are mostly observed in massive black shale. The coarser-grained (>2 cm) crystalline quartz veins are typically at an high-angle (almost perpendicular) to the bedding in shales and they often contain trace amounts of a pale-yellow phase, minor muscovite/sericite, and minor sulfides and black oxides. In one instance (S17-05), an approximately 15 – 20 cm thick vein was observed cutting though a shale – limestone unit. The vein was strongly altered/oxidized, contained plenty of cm-sized cavities and abundant sulfides. The same vein-type occurs also within the adjacent limestone, where it fills en-echelon gash structures.

The general bedding strike in the area is around 300° with relatively steep dipping of 62-78° to the SW. Towards to northern contact with the monzonite the strike changes to 270°. Folding is only observed at small scale within the sedimentary units and large-scale fold structures were not observed. Similarly, faults are likely present but not easily detected within the heterogeneous shale units. At outcrop scale (5-10 m), block faults are only observed at location with lithologically contrasting units such as limestone and shale, but they cannot be traced beyond the outcrop.

Igneous rocks

The monzonite has a predominantly coarse-grained to porphyritic texture with phenocrysts of quartz (10-15%) and feldspar (15-20%) set in a fine-grained matrix of both phases. Biotite can be present in up to 15% (<5 mm) as well as garnet. Muscovite is typically associated with sericitization while opaque phases include sulfide (mostly pyrite) and minor tourmaline. Other observed textural varieties include quartz-feldspar aplite, leucogranite and holocrystalline coarse-grained quartz monzonite.

The contact to the host rocks (shale and limestone) is for the biggest part covered by debris shedding from higher elevations. However, it can be approximately traced by the first occurrence of altered shale or limestone/calc-silicate rocks within monzonite debris (northern and western parts of Samp claims). The contact is well exposed only in the steep cliffs in the northernmost sector of the Samp claims. On claim-block scale, the contact is somewhat undulatory and irregular with apophyses (northwestern grid) and smaller sills extending from the monzonite into the shale (best visible in northern sector of Samp claims). The host rocks at the contact show typical contact metamorphic features like hornfels, silicification, and oxidation. In particular, the limestone is converted into a calc-silicate rock composed chiefly of fine-grained actinolite, wollastonite and calcite. The marginal facies of the monzonite is characterized by abundant xenoliths of the surrounding lithologies that can reach up to several decimeters in diameter. Evidence for large-scale greisenization or intense sericitization within the intrusion was not observed along the contacts, although smaller scale features are frequently observed (see further below).

The monzonite stock is hosting a range of quartz veins ranging from oriented sets and sheets of cm-sized milky-white quartz veins to randomly oriented individual veins of variable composition and size (up to 30 cm).

The oriented quartz veins occur in the central portions of the intrusion starting ca. 50 – 100 m south of the NW-grid and extending across the peak. The monzonite containing this type of quartz veins weathers into large (meter size) angular blocks that fracture and break apart along the quartz veins. The steep cliffs forming the mountain peak within the Samp claim group are composed of this material. These veins induce a weak to moderate sericitization of the monzonite and result in the break-down of Fe-sulfides and biotite. Some of these veins contain a central layer of fine-grained tourmaline and potentially small amounts of scheelite.

The highest degree of alteration is associated with individual quartz veins that cut across the monzonite at random orientations. A measurement of the vein orientation was not possible because they were mostly observed in displaced boulders or as liberated floats within monzonite debris. These quartz veins are typically medium- to coarse grained and show syntaxial growth textures of euhedral quartz crystals. They have mm- to cm-sized openings and cavities and contain small amounts of micas, minor altered feldspars, Fe-sulfides and some fine-grained, pale-yellow phase that could not be confidently identified. Most of these veins also carry a slivery-bluish phase (bismuthinite - stibnite?) that forms platy or acicular crystals from few millimeters up to 3 cm in size. This phase is predominantly concentrated at the margins of the quartz veins. A typical feature of these veins is the extensive sericitization observed around them. The alteration results in a rusty, highly oxidized and porous rock composed chiefly of quartz and muscovite while the feldspars and Fe-sulfides are completely altered. This ‘greisen rock’ can contain large amounts of an brownish-green to silvery-grey sulfide (potentially arsenopyrite or tetrahedrite) as well as minor green Cu-carbonates.

This strongly altered ‘greisen rock’ selvage around the quartz veins can be up to 20 cm thick and the quartz veins easily break away from it. At some locations the quartz veins are absent or present only in smaller amounts and the impression emerges that a greisen zone is developed within the monzonite. However, field observations do not support such a conclusion. These strongly mineralized greisen rocks occur only locally and do not form a large continuous zone within the monzonite or at its margins. They are clearly related to the occurrence of the quartz veins which do not appear to be strongly concentrated in one particular zone, although they are typically found near the margins of the intrusion.

GEOCHEMISTRY

84 rock samples and 12 soil samples were submitted to Bureau Veritas Minerals (former ACME analytical labs) for whole rock geochemical analysis. All 84 rock samples were analyzed by the analytical package GENX10 that is designed for a suite of elements common in rocks associated with hydrothermal systems: Au, Ag, As, Bi, Cu, Pb, Hg, Mo, Sb, and Zn. All elements except for Au are analyzed by aqua regia digest with ICP finish. Au content is determined by Fire Assay with atomic absorption finish on 30 g subsample. In addition, a suite of 19 rock samples was selected further for trace element analysis by ICP-MS (with Lithium Borate fusion) that included the analysis for tungsten. For the 12 soil samples, the analytical package AQ201 was selected (aqua regia digest of 15g followed by ICP-ES/MS finish).

All analytical data is presented in Appendix E. Figs. 22-31 show the distribution of selected elements of all rock samples and sample types within the Samp claim group. Highlights for each relevant element of groups of elements are discussed below and presented in tab. 3.

Table 3: Assay results for selected 2017 samples and elements; slightly anomalous samples are green and strongly anomalous samples are red.

	Method	*WGHT*	*FA430*	*AQ200*	*AQ200*	*AQ200*	*AQ200*	*AQ200*	*AQ200*	*AQ200*	*AQ200*	*LF100*	*LF100*	*LF100*	*LF100*	*LF100*
Sample	*UNIT*	*KG*	*PPM*	*PPM*	*PPM*	*PPM*	*PPM*	*PPM*	*PPM*	*PPM*	*PPM*	*PPM*	*PPM*	*PPM*	*PPM*	*PPM*
	Analyte	**Wgt**	**Au**	**Ag**	**As**	**Sb**	**Bi**	**Mo**	**Cu**	**Pb**	**Zn**	**W**	**Ba**	**Cs**	**Rb**	**Sn**
DJ17-02	Rock	0.75	0.01	>100.0	2305	85	1811	3	>10000	780	340	N.A.	N.A.	N.A.	N.A.	N.A.
DJ17-05-A	Rock	0.64	0.475	3.1	284	40	>2000	14	108	139	17	N.A.	N.A.	N.A.	N.A.	N.A.
DJ17-05-B	Rock	1	0.065	5.6	2768	18	12	8	284	24	49	3968.2	930	41.5	675.7	92
DJ17-06	Rock	1.23	0.031	40.4	1584	1918	21	2	1971	15	166	N.A.	N.A.	N.A.	N.A.	N.A.
S17-05_1	Rock	1.48	<0.005	2.1	<5	<2	<2	<1	282	<2	>10000	N.A.	N.A.	N.A.	N.A.	N.A.
S17-05_2	Rock	2.05	<0.005	4.6	<5	<2	3	<1	1342	<2	1097	N.A.	N.A.	N.A.	N.A.	N.A.
S17-10	Rock	0.76	0.247	3.7	42	21	>2000	33	68	93	16	N.A.	N.A.	N.A.	N.A.	N.A.
S17-14	Rock	2.9	0.012	>100.0	1491	>2000	215	<1	>10000	270	3224	5593.1	72	1.3	9	<1
S17GNW-05	Rock	2.21	0.088	48.7	8562	86	1931	28	146	965	1877	1682	1149	14.8	271.1	113
S17GNW-06-1	Rock	1.4	0.138	1.2	27	<2	68	2	1391	<2	53	N.A.	N.A.	N.A.	N.A.	N.A.
S17GSW-12	Rock	0.76	0.018	5.2	363	91	287	319	125	44	32	>10000.0	530	42.5	542.4	211
S17GSW-17	Rock	0.55	0.217	3.8	109	56	>2000	33	44	111	15	3056.3	291	8.2	137.8	12
S17GSW-21	Rock	0.88	0.029	>100.0	1465	>2000	211	2	2684	433	365	1289.7	1239	34.2	484.9	72

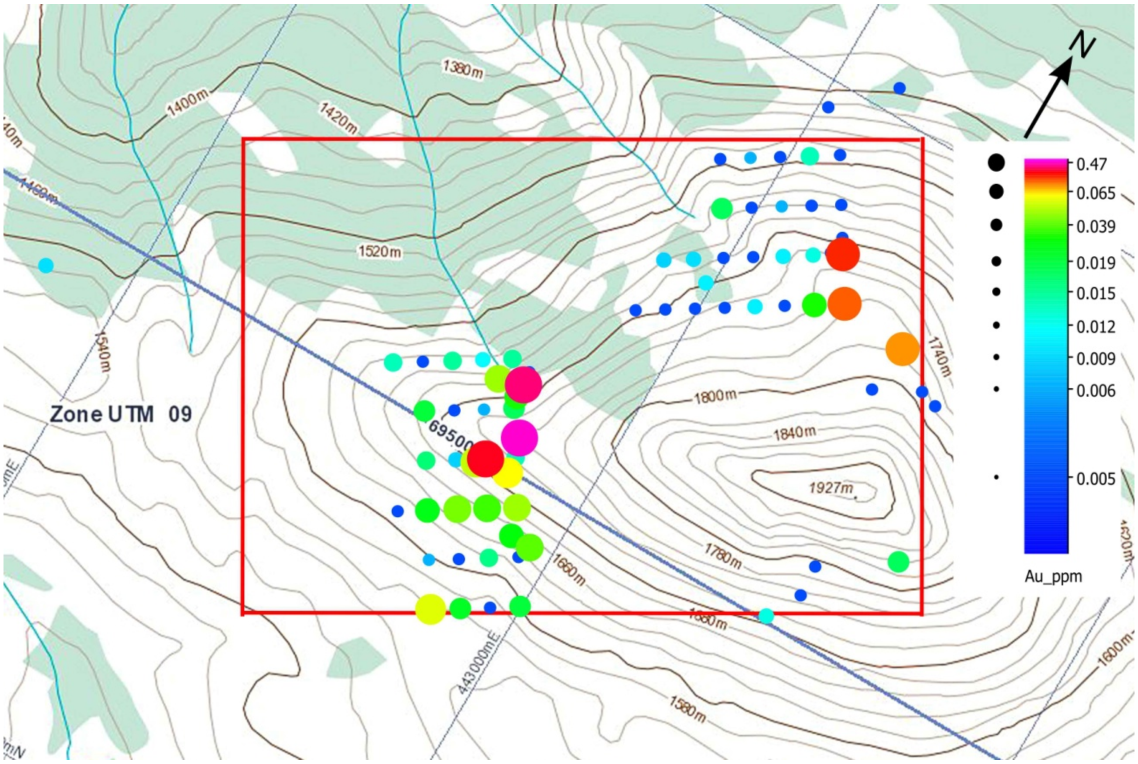

Figure 22: Map showing Au analyses distribution from 2017 field work.

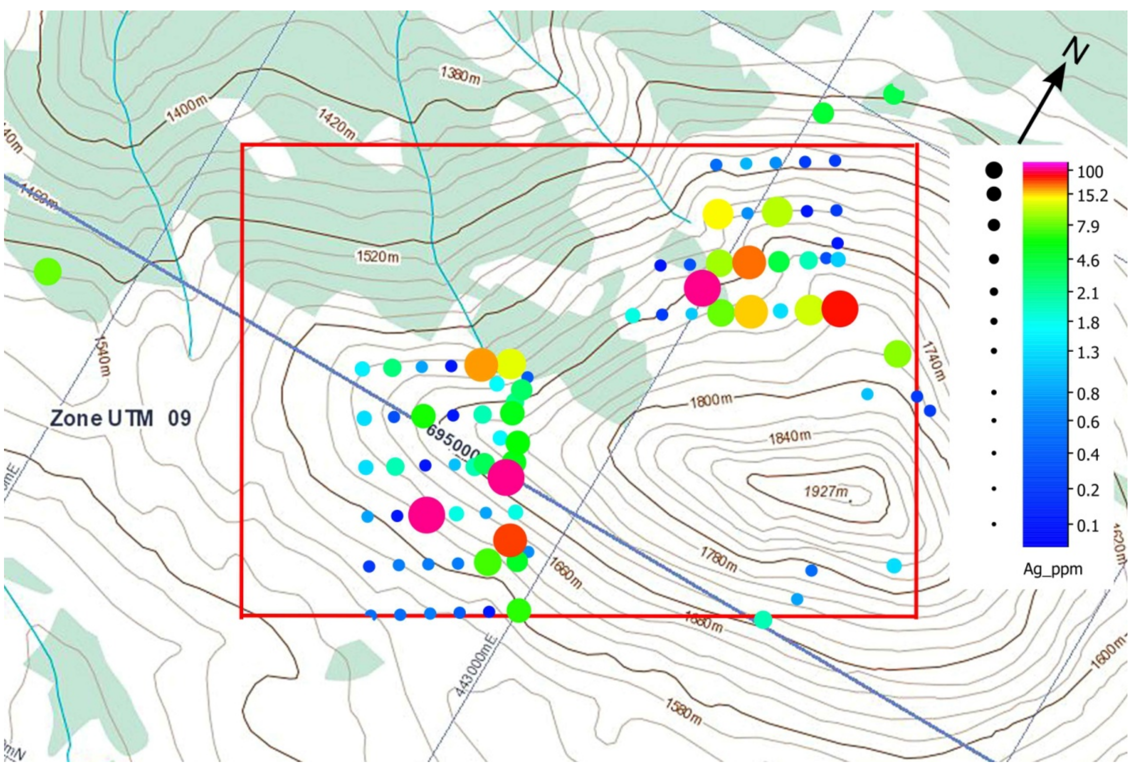

Figure 23: Map showing Ag analyses distribution from 2017 field work.

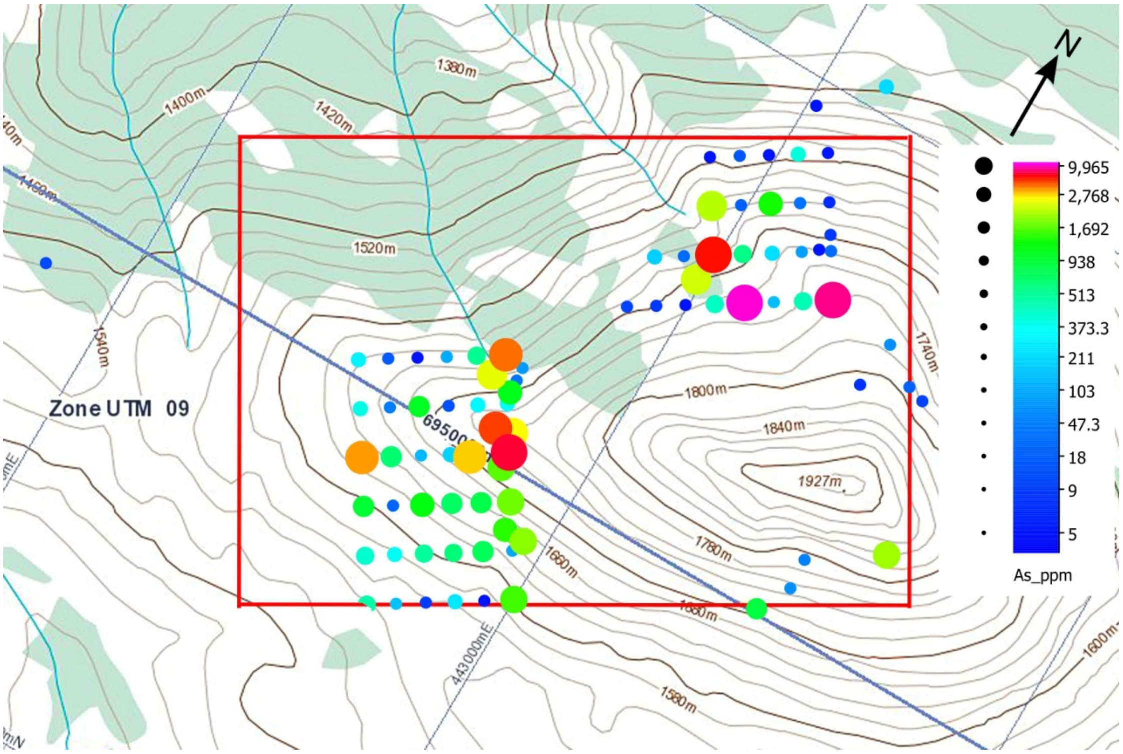

Figure 24: Map showing As analyses distribution from 2017 field work.

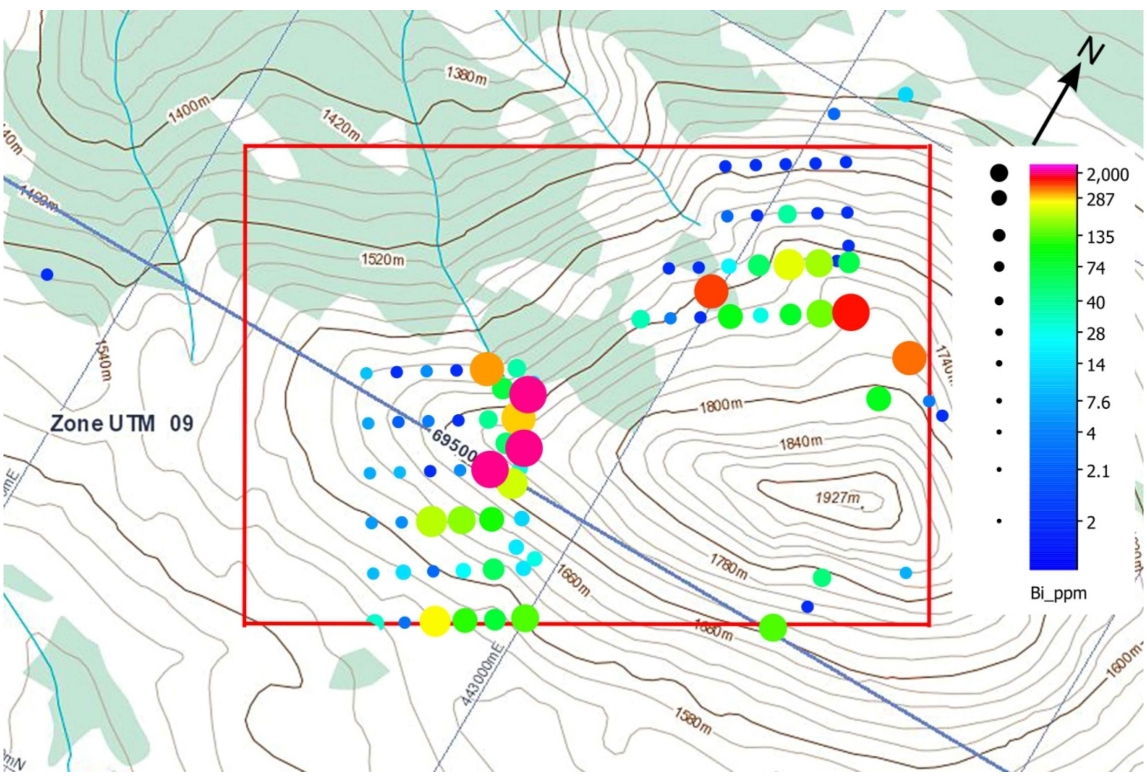

Figure 25: Map showing Bi analyses distribution from 2017 field work.

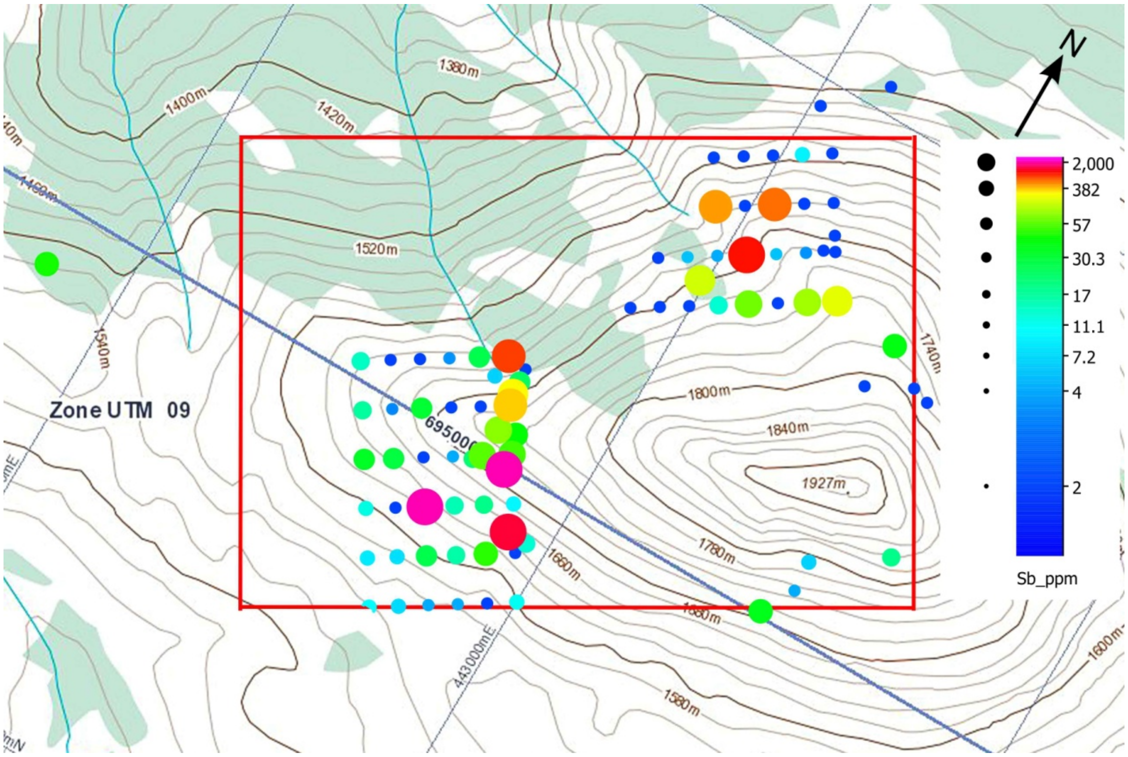

Figure 26: Map showing Sb analyses distribution from 2017 field work.

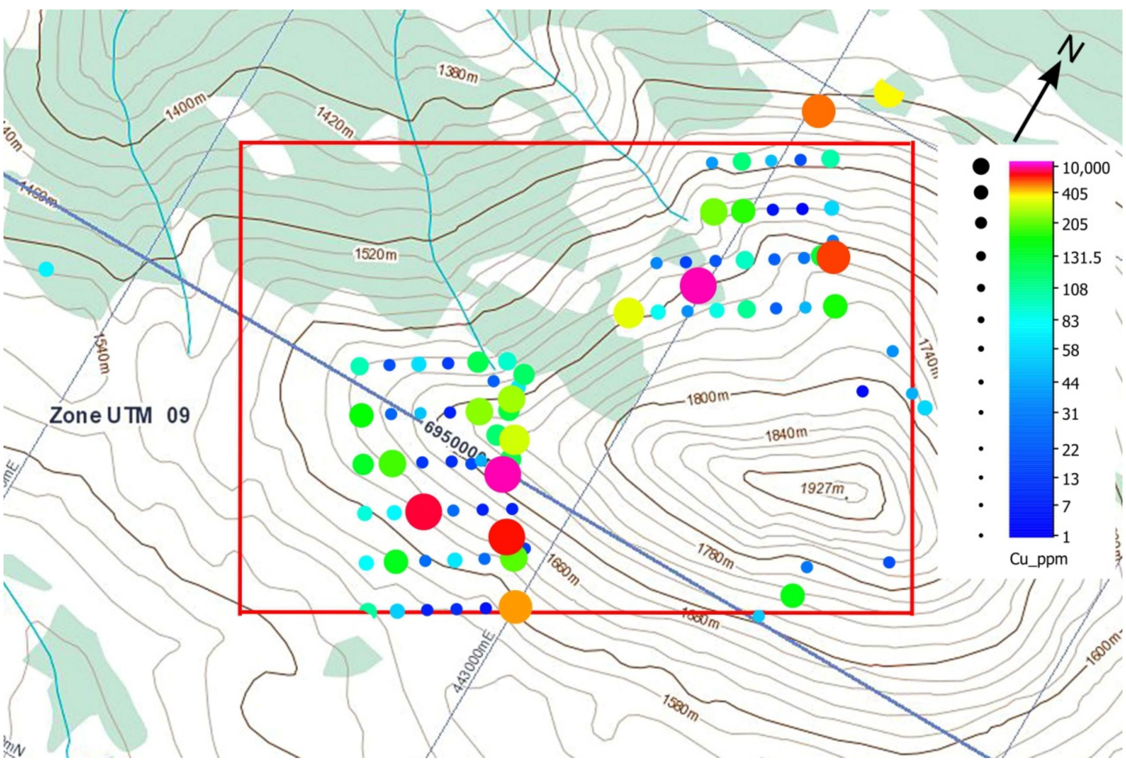

Figure 27: Map showing Cu analyses distribution from 2017 field work.

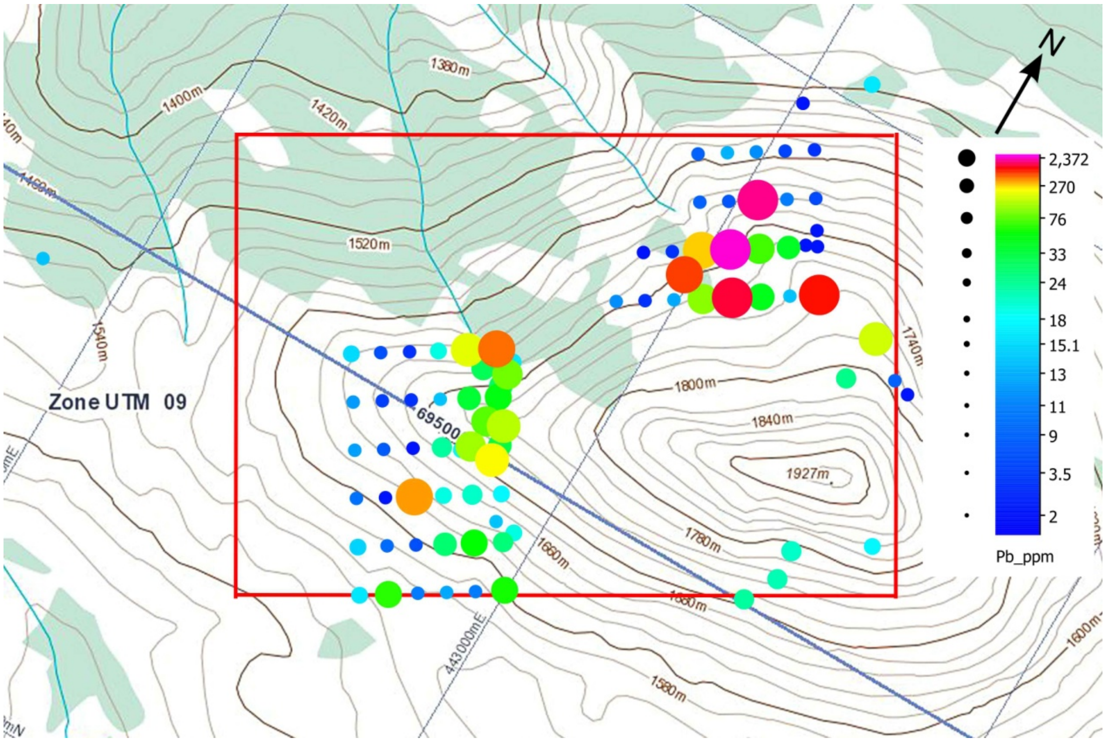

Figure 28: Map showing Pb analyses distribution from 2017 field work.

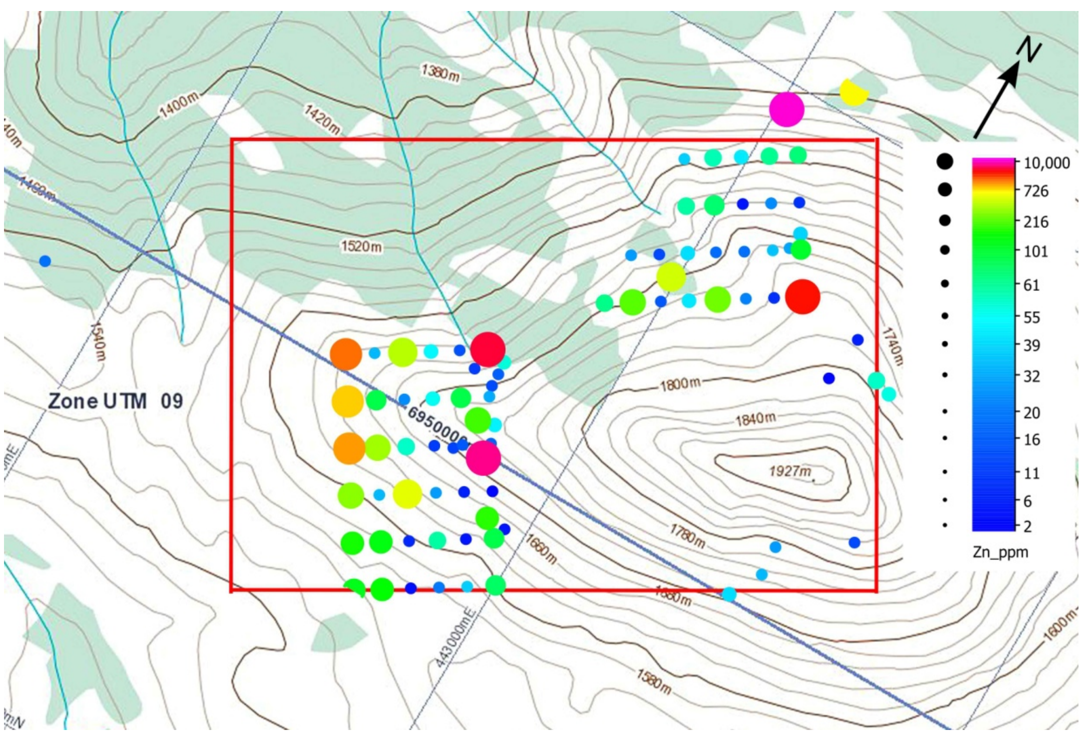

Figure 29: Map showing Zn analyses distribution from 2017 field work.

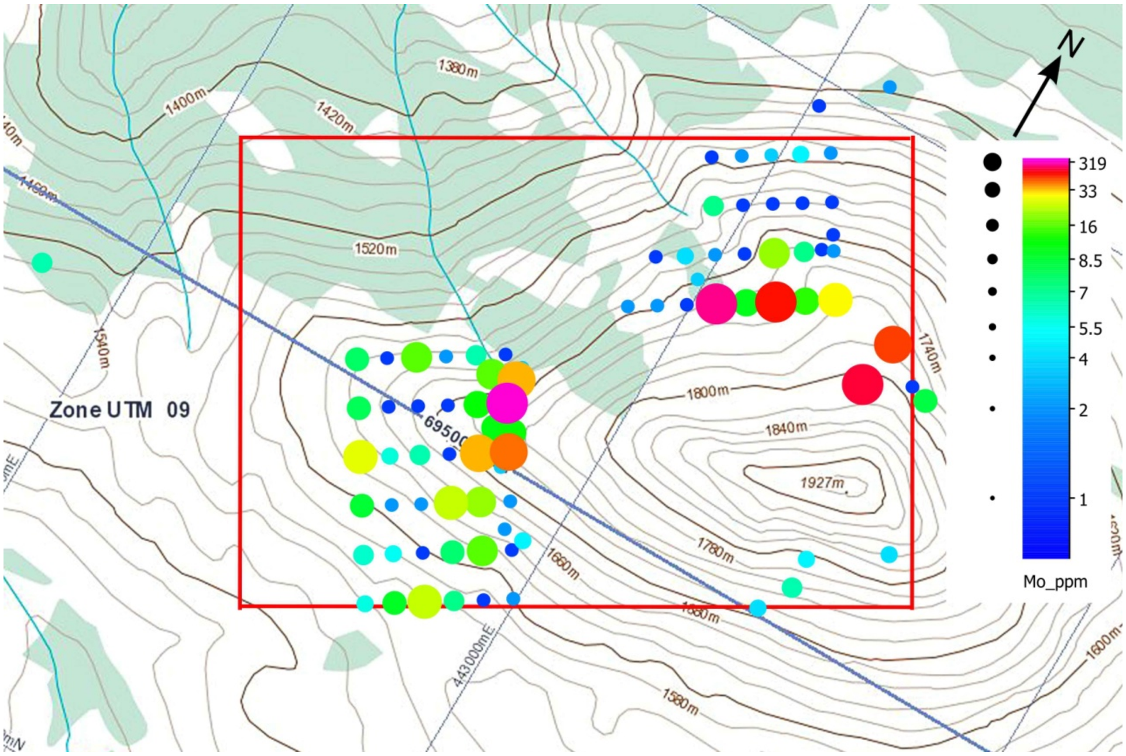

Figure 30: Map showing Mo analyses distribution from 2017 field work.

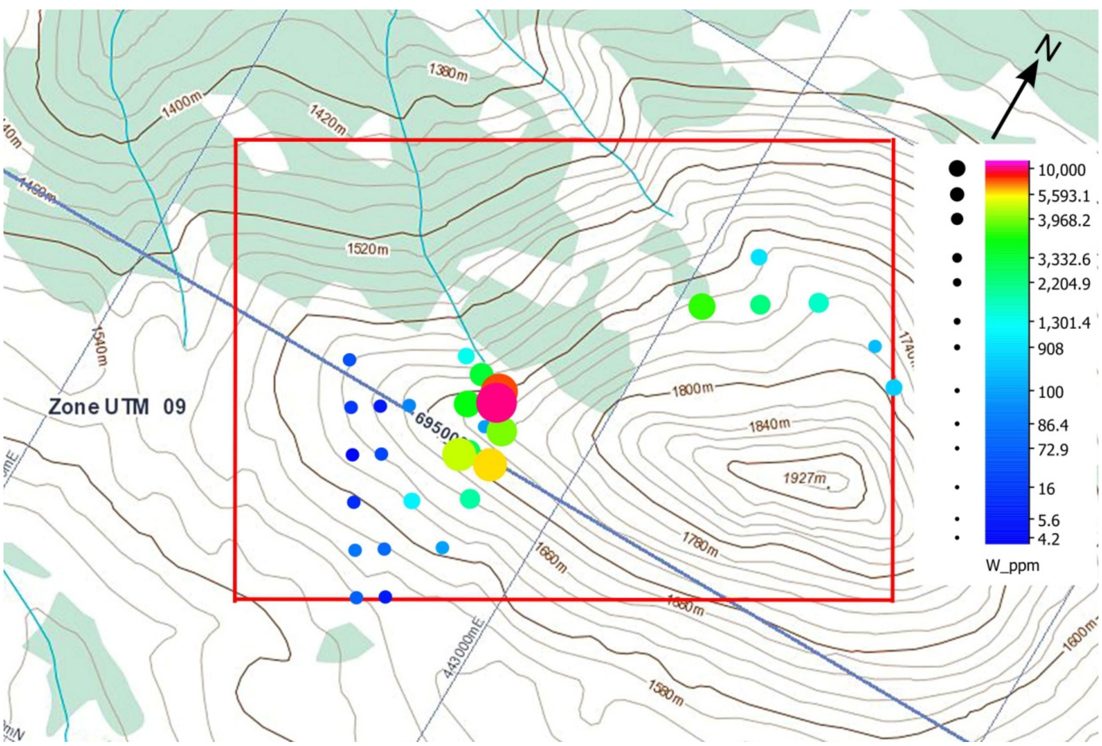

Figure 31: Map showing W analyses distribution from 2017 field work.

Gold (Au)

Gold correlates strongly with Bi in samples where it occurs in concentrations greater than 0.2 ppm. Other elements such as As, Sb or Pb are relatively low. The samples are either coarse-grained, vuggy quartz veins with acicular silvery minerals (bismuthinite?) at their margins (e.g., DJ17-05A) or strongly sericitized monzonite from the margins of such quartz veins (e.g., S17-10 and S17GSW-17).

Silver (Ag)

Highly anomalous silver contents (>100 ppm) occur in samples with very high copper contents (>1 wt.%) and elevated Pb, Bi, Sb and As values. The sample (DJ17-02) is a coarse-grained quartz vein with cavities and euhedral quartz crystals and contains abundant interstitial sulfides (Photo DSC09909). Such quartz veins can also contain elevated Zn and W in addition to Ag and Cu (sample S17-14).

Zinc (Zn)

High zinc concentrations of greater than 10000 ppm (>1%) were assayed in sample S17-05_1 which was collected from sigmoidal or enchelon-type quartz veins observed in an impure limestone. These quartz veins contain high amounts of sulfides including pyrite and sphalerite. In other collected samples the Zn contents do not exceed ca. 3200 ppm and are mostly below 500 ppm. The lower concentrations could be hosted by tennantite or other Cu-As-sulfides.

Copper (Cu)

The copper in samples with Cu concentrations greater than 10000 ppm Cu is hosted by discrete copper phases (Cu carbonates or sulfosalts?) but at lower concentrations it correlates with antimony suggesting the presence of tetrahedrite.

Tungsten (W)

Tungsten occurs in the form of scheelite which was confirmed as small specks (<5 mm) by ultra-violet light examination in a limited amount of samples. It is found in quartz veins (S17-14) and the highly altered selvage around the quartz veins (S17-12, S17GSW-12, and DJ17-05-B).

CONCLUSIONS

Most of the mineralization observed at the Samp claim group is associated with a variety of quartz veins and the alteration they induced in the hosting quartz monzonite. The mineralized quartz veins are typically coarse-grained with euhedral quartz crystals and minor muscovite and altered feldspar. They have mm- to cm-sized cavities and often contain abundant sulfides (partly weathered out and oxidized). The sulfides include pyrite, arsenopyrite, and minor bismuthinite/stibnite and tetrahedrite. Bismuthinite is found as bluish to silvery metallic needles or platy crystals typically 2-5 mm in size (max. 1.5 cm) that are concentrated near the margin of the quartz veins. Arsenopyrite and tetrahedrite tend to form greenish-brown, rounded blebs and pockets up to 3-4 cm in diameter. These sulfides are also found within the alteration selvage around the veins. The alteration is characterized by extensive sericitization and oxidation which resulted in the breakdown of most feldspars and biotite and the growth of sericite and muscovite. The resulting rock has a rusty-yellow colour and consists predominantly of quartz and feldspar with variable amounts of sulfides.

The density of these quartz veins is relatively low and they appear to occur closer to the margin of the intrusion. The associated alteration zones around the veins are relatively narrow (<15-20 cm max) and discontinuous. However, systematic sampling of potential alteration zones within the intrusion was not completed due to the exclusion zone.

At distance to the intrusion, within the country rocks, mineralization was rarely observed. Sphalerite-bearing veins were found in an impure limestone which is, however, discontinuous and bounded by faults. The various shale units contain a variety of quartz vein but they were generally not mineralized.

In summary, the observation made at the Samp claim indicate that highly anomalous Au, Ag, Cu, and W values are related to quartz veins and associated alterations halos. These structures can be tentatively interpreted as hydrothermal low temperature deposits with polymetallic mineralization. The veins could be former conduits that once connected with a mineralized greisen-zone at the apex (highest point) of the intrusion, but no continuous greisen rock was observed around the margins of the intrusion. It appears that the present level of erosion is too low for such a zone to be preserved. The contacts of the monzonite to the surrounding shales can be traced (although intermittently and often under cover by debris from higher elevations) and the mineralization is limited to the northern and western contact regions.

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APPENDIX A

The sites are plotted in Figure 8 (identified by the number in the `Map` column). The Groat samples are accurately located by GPS. Godwin and Carson sample locations are approximate.

APPENDIX B

Geochemical analyses from the 2012 sampling campaign (Fig. 9). All analyses were by Acme Labs. The gold Gpt analysis was on a 30 gram sample by fire assay with gravimetric finish. All other analyses were on 0.25 gram sample, 4-acid digestion and ultratrace ICP-MS.

APPENDIX C

Geochemical analyses from the 2016 sampling campaign; sites are plotted in Figure 10. All analyses were performed by Acme Labs using the 'Four acid digestion Ag', 'Fire Assay with ICP finish', and 'Total whole Rock + C & S' analytical packages. Samples returning Au >10 ppm by previous analytical methods are automatically analyzed by gravimetric method on a 30 g sample.

APPENDIX D

Sample locations, geological-mineralogical observations, and sample types for samples collected in 2017.

APPENDIX E

Geochemical analyses from the 2017 sampling campaign; sites are plotted in Figure 21. All rock samples were analyzed by the analytical package GENX10 that is designed for a suite of elements common in rocks associated with hydrothermal systems: Au, Ag, As, Bi, Cu, Pb, Hg, Mo, Sb, and Zn. All elements except for Au are analyzed by aqua regia digest with ICP finish. Au content is determined by Fire Assay with atomic absorption finish on 30 g subsample. In addition, a suite of 19 rock samples was selected further for trace element analysis by ICP-MS (with Lithium Borate fusion) that included the analysis for tungsten. For the 12 soil samples, the analytical package AQ201 was selected (aqua regia digest of 15g followed by ICP-ES/MS finish).