Open File 2006-11

Report on the Detailed Mineral Assessment of the Proposed Wellesley Lake Special Management Area, Yukon

R. Stroshein and R. Hulstein

YUKON GEOLOGICAL SURVEY

Yukon Energy, Mines and Resources

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Preface

This report summarizes the results of geological field work and a detailed and the mineral assessment of a region of western Yukon that includes the proposed Wellesley Lake Special Management Area. This mineral assessment was done in 2002 by the Department of Energy, Mines and Resources of the Government of Yukon (YTG).

The purpose of this mineral resource assessment was to determine the mineral potential of the region and thereby assist with proposed land planning in the area. The Yukon Geological Survey is pleased to release the results in this report.

The information is being released as originally prepared and may not conform to current Yukon Geological Survey publication standards. Please note that the report does not include information from any studies that may have been carried out in the areas since the mineral assessment was conducted. Special Management Area names and boundaries may have changed since the study was completed. This report was not previously released to the public due to the confidential nature of the Land Claim negotiation processes.

Report on the

Detailed Mineral Assessment

of the

Proposed Wellesley Lake Special Management Area

Confidential

March 10, 2003

Internal Report
Robert W. Stroshein
Roger W. Hulstein
YTG, Energy Mines and Resources
Mineral Planning and Development

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Executive Summary

The Yukon and Canadian Governments and White River First Nation agreed to create a 530.30 km^2 Special Management Area designated as a Habitat Protection Area that cover Wellesley Lake and the surrounding wetlands. It is currently proposed that Selkirk First Nation will add this SMA to their Final Agreement. The Habitat Protection Area designation does not require the withdrawal of the area from mineral staking and withdrawal has not been requested in the Memorandum of Understanding signed between the Governments of Canada and Yukon and the First Nations.

The purpose of this report is to present the results of the detailed mineral assessment of an approximately 1094 km^2 area that encompassed the proposed Special Management Area. This enlarged area was included to provide some relative context for the assessment.

The proposed area has no known mineral occurrences and although it was not the focus of the 2002 fieldwork, work conducted during 2002 did not identify any new mineral resources. The detailed mineral assessment is based on the mineral potential of the geology as identified by a panel of industry experts.

The detailed mineral assessment map indicates that a belt of rocks crossing the northwestern portion of the proposed Special Management Area has the highest relative mineral potential. This area is underlain by Windy McKinley Terrane (WMT). The WMT is composed of an oceanic assemblage of ultramafic rocks, greenstone, chert, carbonate, and metamorphosed equivalents. The WMT was determined to have the highest relative mineral potential by the assessment panel conducting the detailed mineral assessment of the Wellesley study area.

The assessment panel determined that the WMT has potential for hosting volcanic massive sulfide volcanogenic type, gabbroic nickel-copper and gold-quartz vein deposits. The Carmacks volcanic rocks in the southern portion of the proposed Special Management Area have potential for epithermal type deposits.

Field work in 2002 located an area with anomalous gold, arsenic and antimony values in soil and stream sediment samples in the WMT just outside the proposed SMA boundary. Two soil samples collected from within the proposed SMA, from an area underlain by Carmacks Group basalts, yielded weakly anomalous gold values. Further evaluation work is recommended for the higher elevations where there is potential for rock formations to outcrop.

Introduction

Land Status

The proposed Wellesley Lake Special Management Area (SMA) has been identified as a Habitat Protection Area (HPA) in the Memorandum of Understanding (MOU) with the White River First Nation (WRFN). The MOU was signed on March 31, 2002 and the Proposed SMA is included as part of Chapter 10 of the draft Final Agreement (FA). The HPA designation in the MOU does not require interim protection and therefore the future land use planning will be the purview of the SMA steering committee. A Portion of the proposed Wellesley Lake SMA is an overlapping area with the Selkirk First Nation (SFN) (Figure 1). In the November 2002 version of the proposed Schedule C of WRFN FA a provision is made to add this proposed SMA to the SFN FA.

The proposed SMA is located within the Klondike Plateau ecoregion.

Work carried out by EMR, YTG.

During the summer of 2002, the mineral assessment team composed of geologists: Roger Hulstein, Farrell Andersen, Jo-Anne vanRanden and Robert Stroshein spent two days working in the proposed Wellesley Lake SMA. A one-day helicopter supported fly in visit on June 14 followed by a visit in late summer on August 30. Work included 1:50,000 scale geological mapping, prospecting and collection of rock, soil and silt sediment samples for geochemical analysis. All samples were analyzed for gold plus a suite of 34 elements. The details of the laboratory procedures are included in Appendix A and geochemical results are shown in Appendix B.

Preliminary evaluation of regional geological and geochemical data indicated the Windy Assemblage had the highest response in multi-elements (Regional Geochemical Survey) for potential economic metals. The Carmacks Group volcanics along the south and east side of the proposed SMA have modest potential for hosting epithermal type gold mineralization.

Traverses were carried out to locate and examine the Cretaceous Carmacks Suite basalts previously mapped on the south side of Wellesley Lake as these had been identified as being of potential economic interest. A number of small creeks draining the ridges surrounding Wellesley Lake were silt sediment sampled to fill in areas not included in the original reconnaissance stream sediment survey.

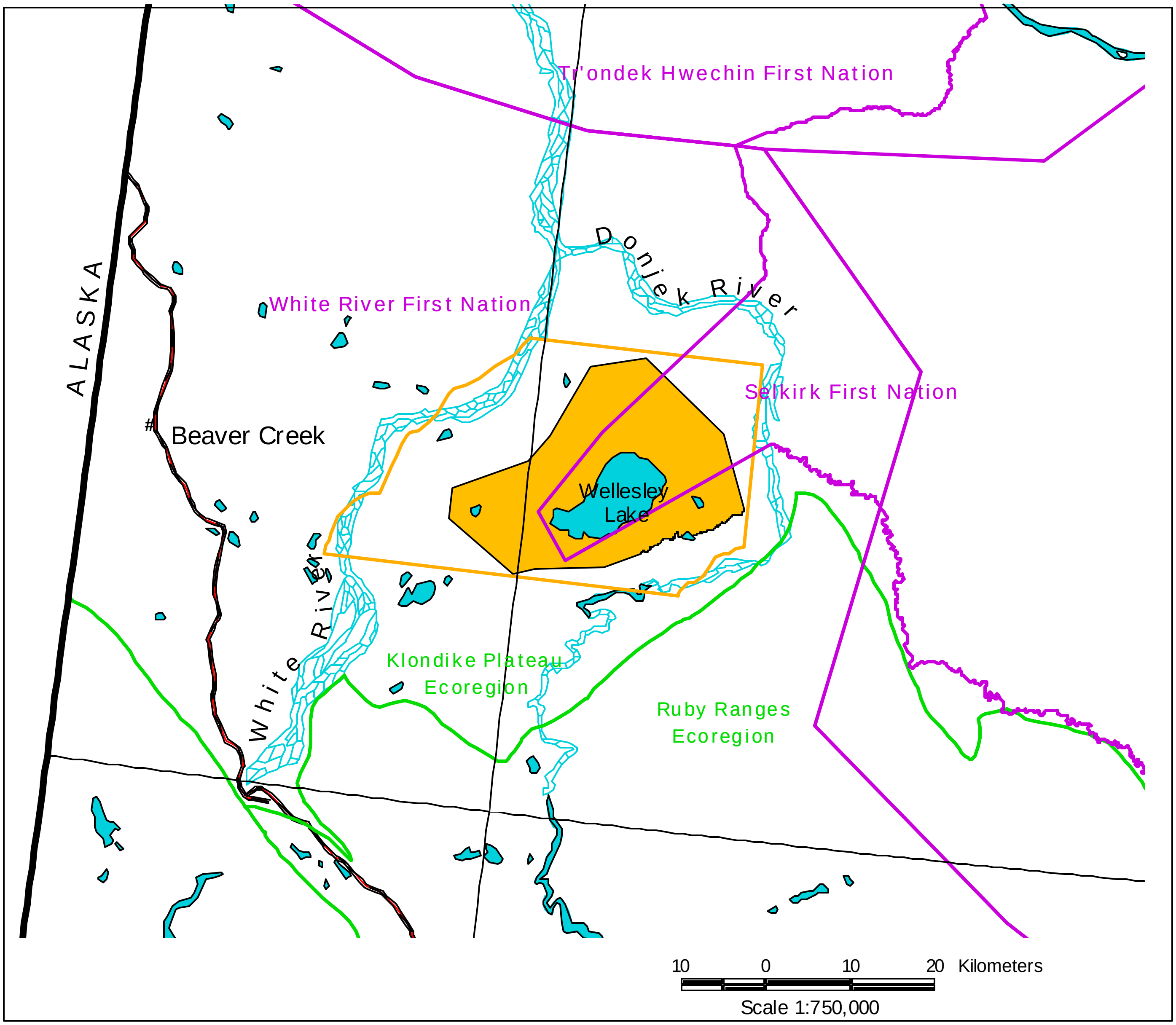
Location, access and physiography

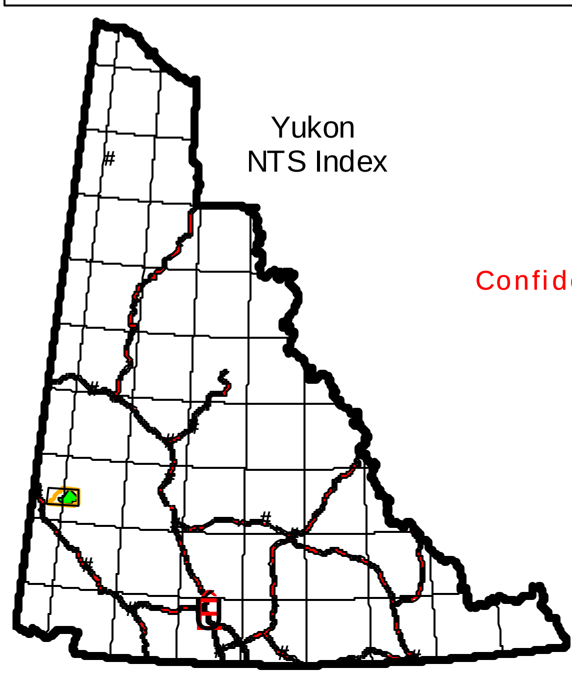
The proposed Wellesley Lake Special Management Area is located in SW Yukon around the 70.3 km^2 Wellesley Lake, overlapping NTS map sheets 115 J/10 and K/8. The proposed SMA encompasses an area of 530.3 square kilometers centered approximately 55 kilometers east of the settlement of Beaver Creek.

Access to the area is by helicopter or float/ski plane.

The proposed SMA covers the extensive wetlands around and enclosing Wellesley Lake that abound with wildlife. The area encompasses the higher ridges north and south of the lake. The region is well vegetated with spruce, alder and dwarf birch.

The area was glaciated during the last glacial period, the McConnel, with the margin of the glacial event being located close to the northern boundary of the 2002 study area. Although the surrounding ridge tops were noted to be free of glacial deposits, the Wellesley Lake valley is filled with unconsolidated glacial, glaciofluvial and likely glaciolacustrine deposits of fluviatile silt, sand, gravel and local volcanic ash.





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Wellesley Lake
Proposed Special Management Area

Location Map

Figure 1

Exploration History

No exploration work had been reported and there are no reported Yukon Minfile (2001) occurrences in the 2002 detailed mineral assessment study area. The regional mineral assessment panel evaluated the detailed study area in 2001 and concluded that the area lies within relative high to moderate regional mineral potential (Figure 2).

Geology

Regional Setting

The majority of the proposed Wellesley Lake SMA is located within the Windy McKinley Terrane (WMT) of Western Yukon (Gordey and Makepeace, 2001) (Figure 3). The WMT is defined as an assemblage of early Paleozoic – Cretaceous mélange and gabbro with oceanic affinity (Monger, 1991). Canil and Johnston (2003) make a case for the possibility that these rocks, assigned to the WMT, may be Permian rocks thrust over Yukon–Tannana Terrane, as originally interpreted by Tempelman–Kluit (1976). The south side of the proposed SMA encompasses Upper Cretaceous Carmacks Group composed mafic and lesser felsic volcanics. The Carmacks Group is a post terrane amalgamation/accretion unit. To the north of the proposed SMA lie units of the Yukon–Tanana, Klondike sub-terrane composed of metamorphosed upper Paleozoic arc(?) volcanic (=Klondike Schist assemblage) and plutonic rocks.

Regional geological mapping was carried out by Templeman-Kluit (1974) at a scale of 1: 250,000. The geology is reported in GSC Paper 73-41 entitled "Reconnaissance Geology of Aishihik Lake, Snag and Part of the Stewart River Map-Areas, West-Central Yukon (115 H, 115 K-J and 115 N-O)".

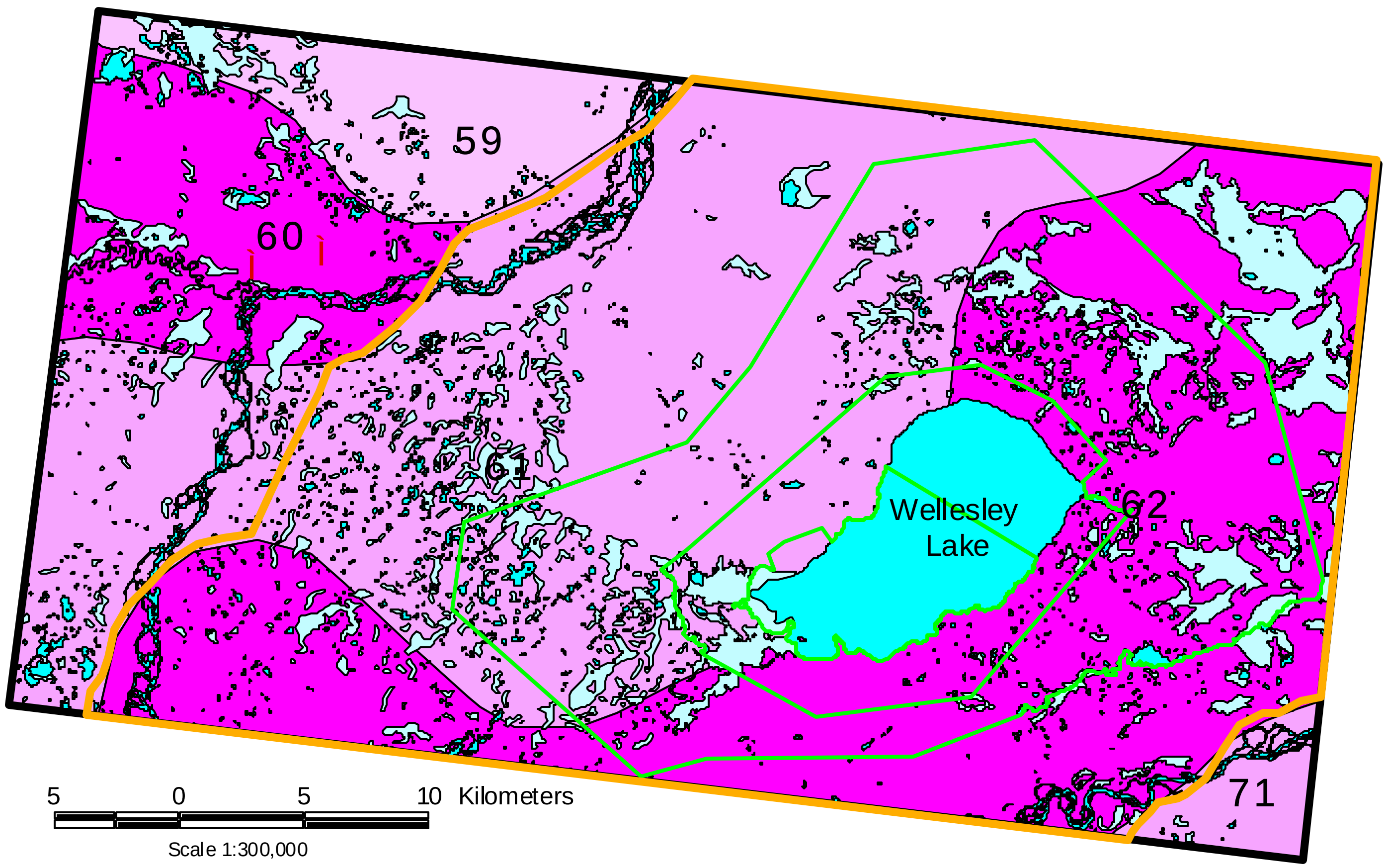
Gordey and Makepeace (2001) produced a digital compilation of the geology of the Yukon from which Figure 4: Geology of the Proposed Wellesley Lake SMA was created.

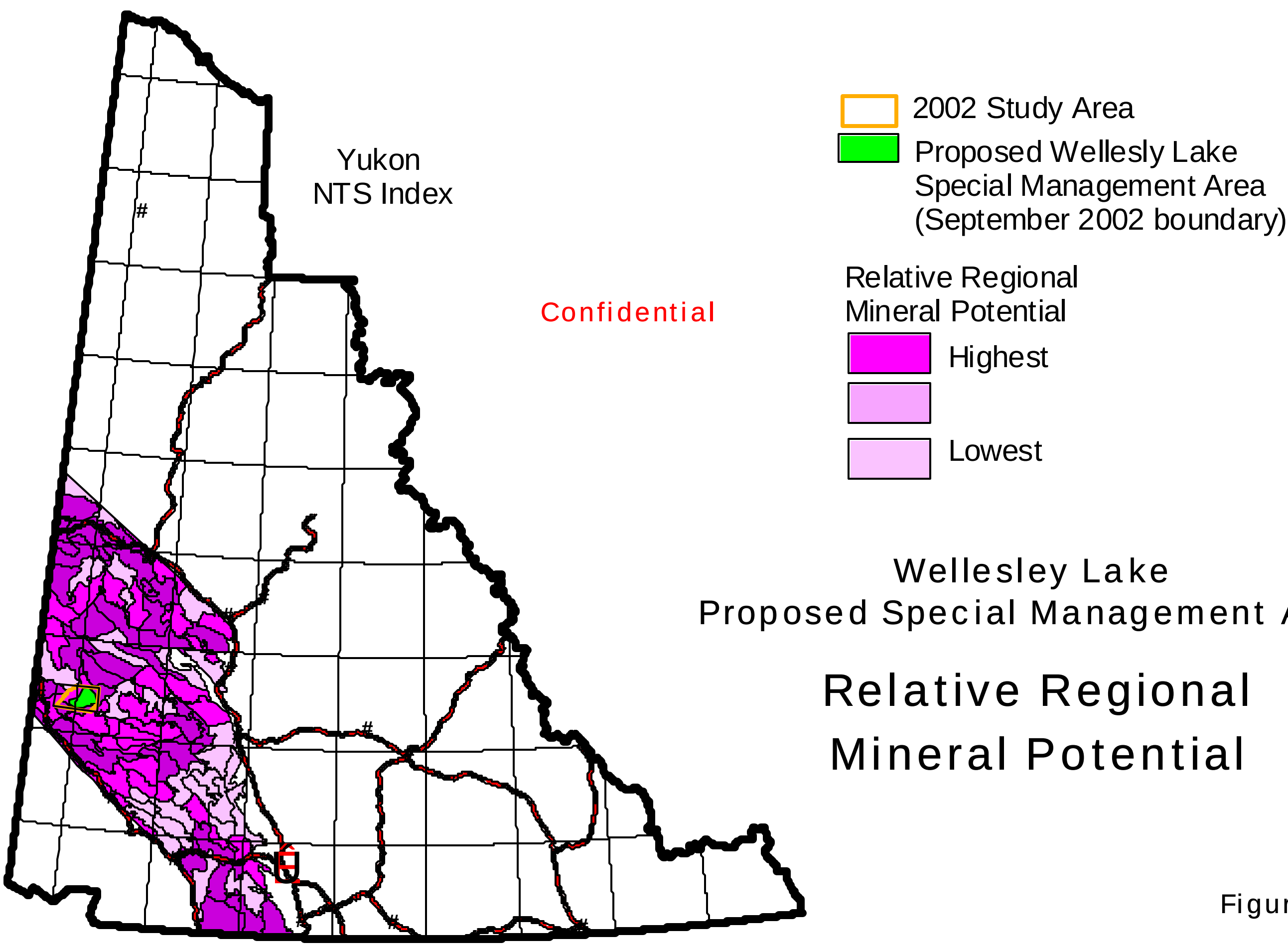
Canil and Johnston (2003) interpret the arcuate aeromagnetic high that trends through the proposed SMA as a ~100 km long ophiolite extending from Harzburgite Peak to the north of Wellesley Lake to Eikland Mountain to the west. Further, they interpret the arcuate magnetic anomaly and ophiolite as an antiform, plunging gently southeast in a klippe thrust over crystalline rocks of the underlying Yukon Tanana Terrane. The Harzburgite Peak area is underlain by harzburgite and gabbro while the Eikland peak area is underlain by gabbro, harzburgite and what Canil and Johnston (2003) interpret to be sheeted dykes and gabbro.

Geology of the proposed Wellesley Lake SMA

The geology of the proposed Wellesley Lake SMA and study area is similar to the description above of the regional setting. On the north side of Wellesley Lake exposures of Windy Assemblage rocks out crop on the ridges. This oceanic assemblage consists of sheared and foliated greenstone and related volcanic rocks including minor cherty tuff (Gordey and Makepeace, 2001). Basic volcanic and related rocks of the Carmacks Suite are found to the northeast, east and south of Wellesley Lake.

On the north side of the lake the greenstone is composed of dark green, massive to thick bedded, metamorphosed basalt that is locally well veined with quartz-epidote stringers. Rare light grey rhyolite or strongly bleached and silicified andesite beds were observed in outcrop.





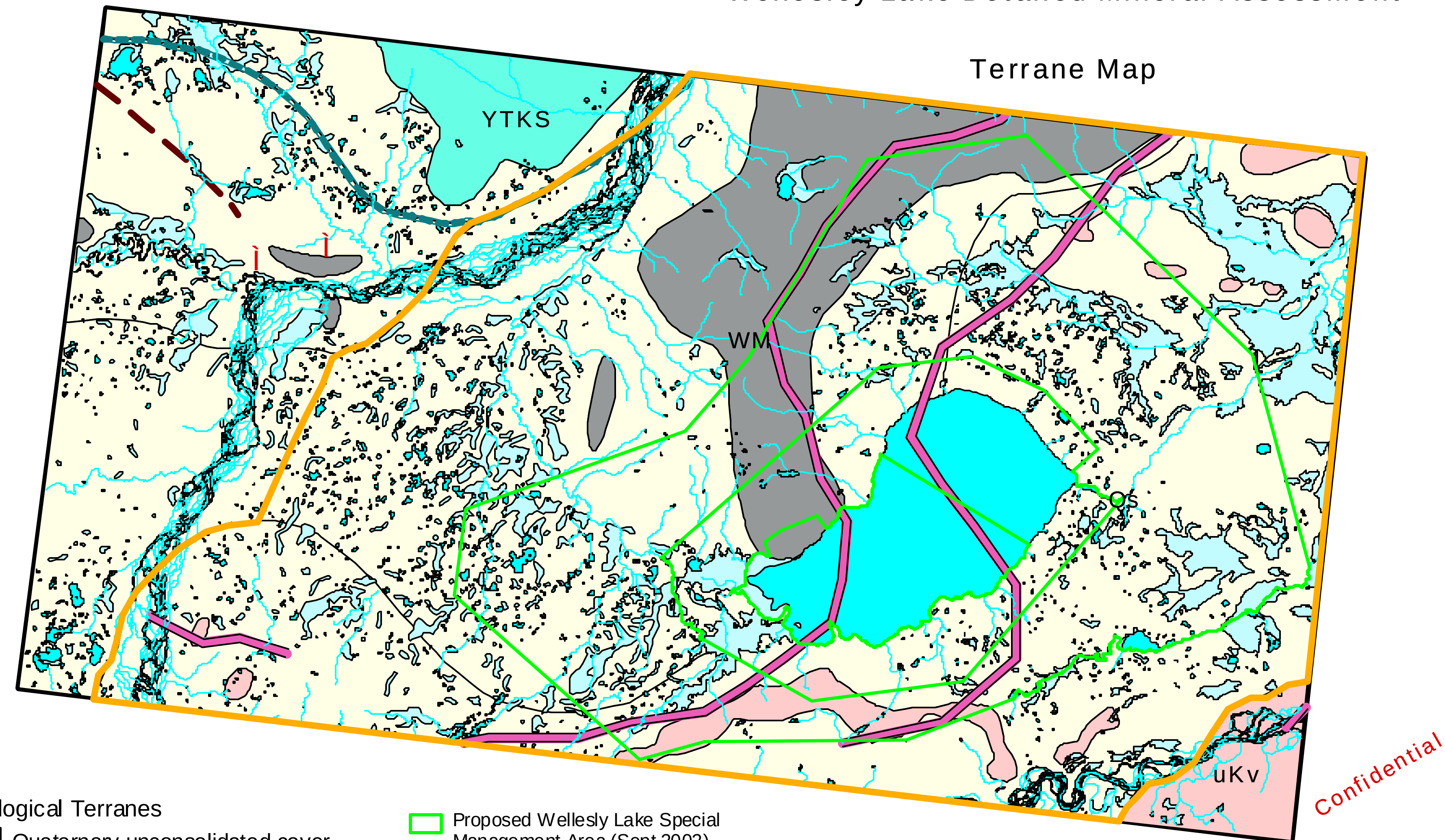
Wellesley Lake
Proposed Special Management Area

Relative Regional
Mineral Potential

Figure 2

Wellesley Lake Detailed Mineral Assessment

Terrane Map



Geological Terranes

- Qs Quaternary unconsolidated cover
- WM Windy McKinley
- YTKS Yukon-Tanana; Klondike sub-terrane
- uKv Carmacks Group volcanics

- Proposed Wellesly Lake Special Management Area (Sept 2002)
- Yukon Minfile Occurrence
- Fault, extrapolated, movement undefined
- Fault, extrapolated, thrust, upright
- Aeromagnetic Trends
- Wetlands
- Lakes
- 2002 Study Area

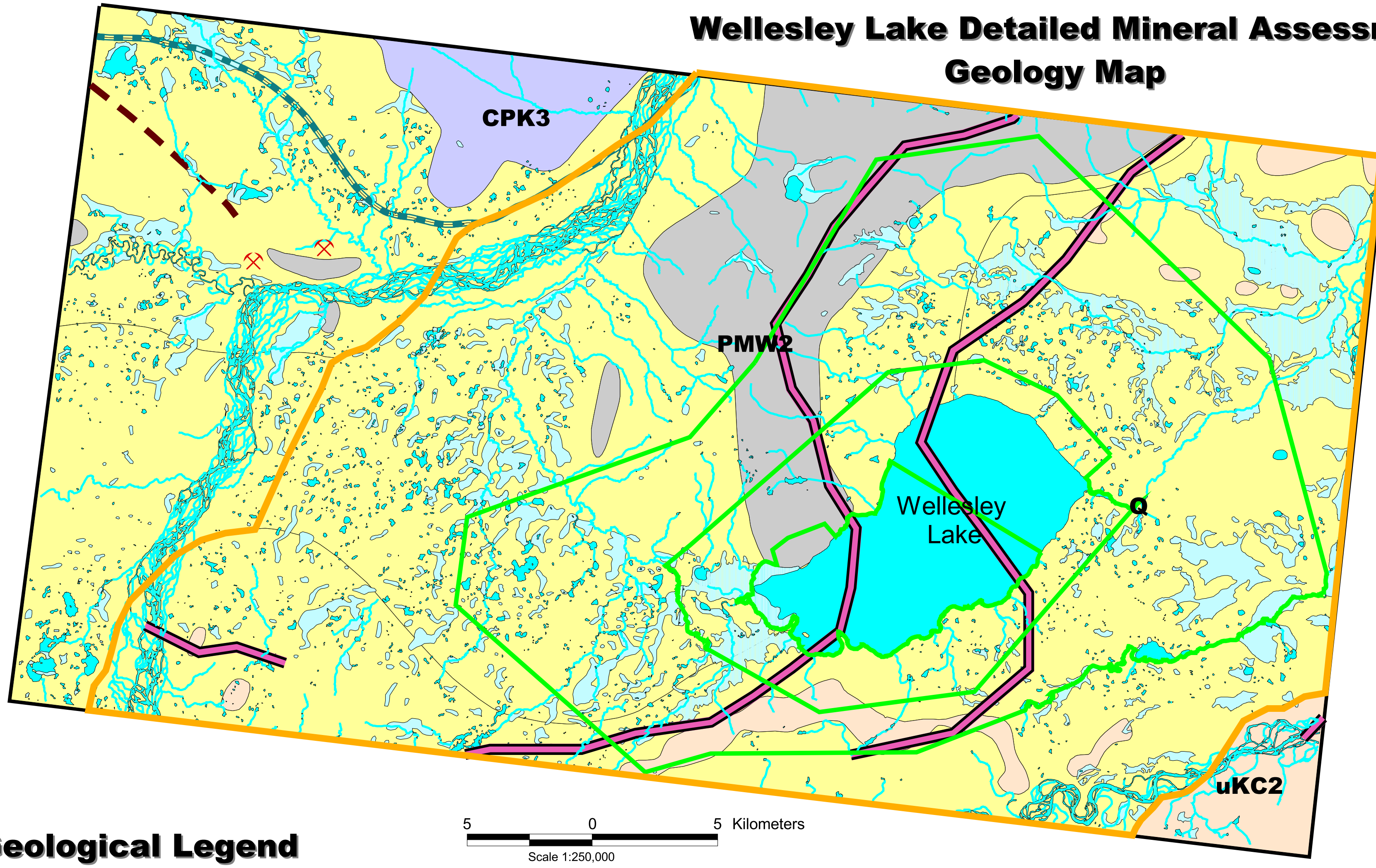
5 0 5 10 Kilometers

Scale 1:250,000

Arcview GIS Version 3.2a - RWH - March 2003

Figure: 3

Wellesley Lake Detailed Mineral Assessment
Geology Map



Geological Legend

Q	Quaternary unconsolidated glacial, glaciofluvial and glaciolacustrine deposits
uKC2	Upper Cretaceous - Carmacks Group a volcanic succession dominated by basic volcanic strata including felsic volcanic rocks at the base of succession and locally basal clastic strata
PMW2	Devonian and Cretaceous Windy Assemblage - oceanic assemblage of ultramafic rocks, greenstone, chert, carbonate, and metamorphosed equivalents
CPK3	Carboniferous and Permian Klondike Schist- poorly understood assemblage of metamorphosed pelitic/volcanic rocks; silvery grey muscovite chlorite quartz phyllite

- Proposed Wellesly Lake Special Management Area (Sept 2002)
- Yukon Minfile Occurrence
- Fault, extrapolated, movement undefined
- Fault, extrapolated, thrust, upright
- Aeromagnetic Trends
- Wetlands
- Lakes
- 2002 Study Area

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Figure: 4

Arcview GIS Version 3.2a - RWH - March 2003

Metamorphosed sedimentary rocks including grey medium bedded, moderately well foliated quartz-sericite schist apparently underlay the basalt sequence. At the north end of the ridge dark grey and maroon, thinly laminated chert outcrops appear to be at the base the exposed sequence.

On the south side of Wellesley Lake an east-west trending ridge is underlain by Upper Cretaceous Carmacks volcanics. This is described by Gordey and Makepeace (2001) as consisting of a volcanic succession dominated by basic volcanic strata including felsic volcanic rocks at the base of the succession and locally basal clastic strata. A traverse along this ridge in 2002 encountered rock types consist with the above description including greater than 10 m high cliff exposures of a brown weathering lithic-basalt (olivine bearng basalt) conglomerate, with clasts up to 25 cm in diameter, and containing well rounded red jasper or chert pebbles. Other exposures consisted of fine grained dark green basalt, maroon weathering feldspar-hornblende phyric andestite-basalt(?) and, at the base of the ridge on the traverse, a green feldspar phyric andesite-basalt(?).

A short traverse on the northeast side of Wellesley Lake also encountered brown weathering medium grained amygdaloidal olivine phyric medium brown-green fine grained Carmacks basalt. The basalts were generally massive to thick bedded with thinly banded to platy sections, representing possible volcanic flows.

In the course of a reconnaissance soil sample line on a ridge just outside the northwest side of the proposed SMA, two samples contained chips of weathered brown intrusive. No other details regarding this previously unmapped intrusive are available.

The 2002 field examination confirmed that, indeed the Wellesley Lake area consists largely of wetlands and as such has a paucity of rock exposure and areas not covered by water, bogs or organic material.

Structural Geology

Observed within the Carmacks lithic-basalt conglomerate unit, south of Wellesley Lake, was a possible bedding structure that dipped gently to the north. The andesite-basalt(?) observed at the base of the ridge was cut by joints, spaced 1-2 m apart, trending $270^0/70^0$N.

The Carmacks basalts outcropping to the northeast of Wellesley Lake trends northeast and dips gently to the northwest.

The metamorphosed sedimentary rock sequence exposed north of Wellesley Lake strikes north-north-westerly and dips moderately to steeply east.

Mineralization and Metallogeny

No mineralized occurrences are known in the area studied in 2002.

The geological setting of the proposed SMA is permissive for various types of deposits. The regional mineral assessment panel evaluated the potential for gabbroic Ni-Cu, plutonic related gold, gold-quartz vein, epithermal low sulphur gold and volcanic massive sulfide (VMS) Kuroko type deposits in the rocks within the proposed SMA, study area and surrounding rocks. The results of the evaluation indicated that the area lies within relative high to moderate regional mineral potential (Figure 2).

The ultramafic rocks of the Windy Assemblage are mappable using the aero-magnetic survey plot to extrapolate rock formations in outcrop through the low-lying wetlands and vegetative covered hills. The RGS results indicate that the ridge of Windy Assemblage rocks north of Wellesly Lake is prospective and warrants field examination. The potential for nickel-copper mineralization within the ultramafic rocks is an important deposit type to be considered. Exploration of Windy Assemblage rock in Yukon has been limited to staking and surface examination of aero-magnetic anomalies.

Carmacks group volcanics along the south and east sides of the proposed SMA and study area have modest potential for hosting epithermal type gold mineralization.. The presence of a detectable gold-in-sediment sample in the area may be indicative of greater potential and warrants further evaluation. The Carmacks magmatic event is significant also as Carmacks age (circa 70 Ma) host the Casino and Adanac porphyry deposits.

The greenstone and metamorphosed rocks north of Wellesly Lake have potential to host gold-quartz veins. The VMS potential is related to the greenstone (metamorphosed mafic volcanic rocks) of the Windy Assemblage or the possibility of Klondike Schist rocks underlying the low lands on the western side of the proposed SMA and study area.

Geochemistry

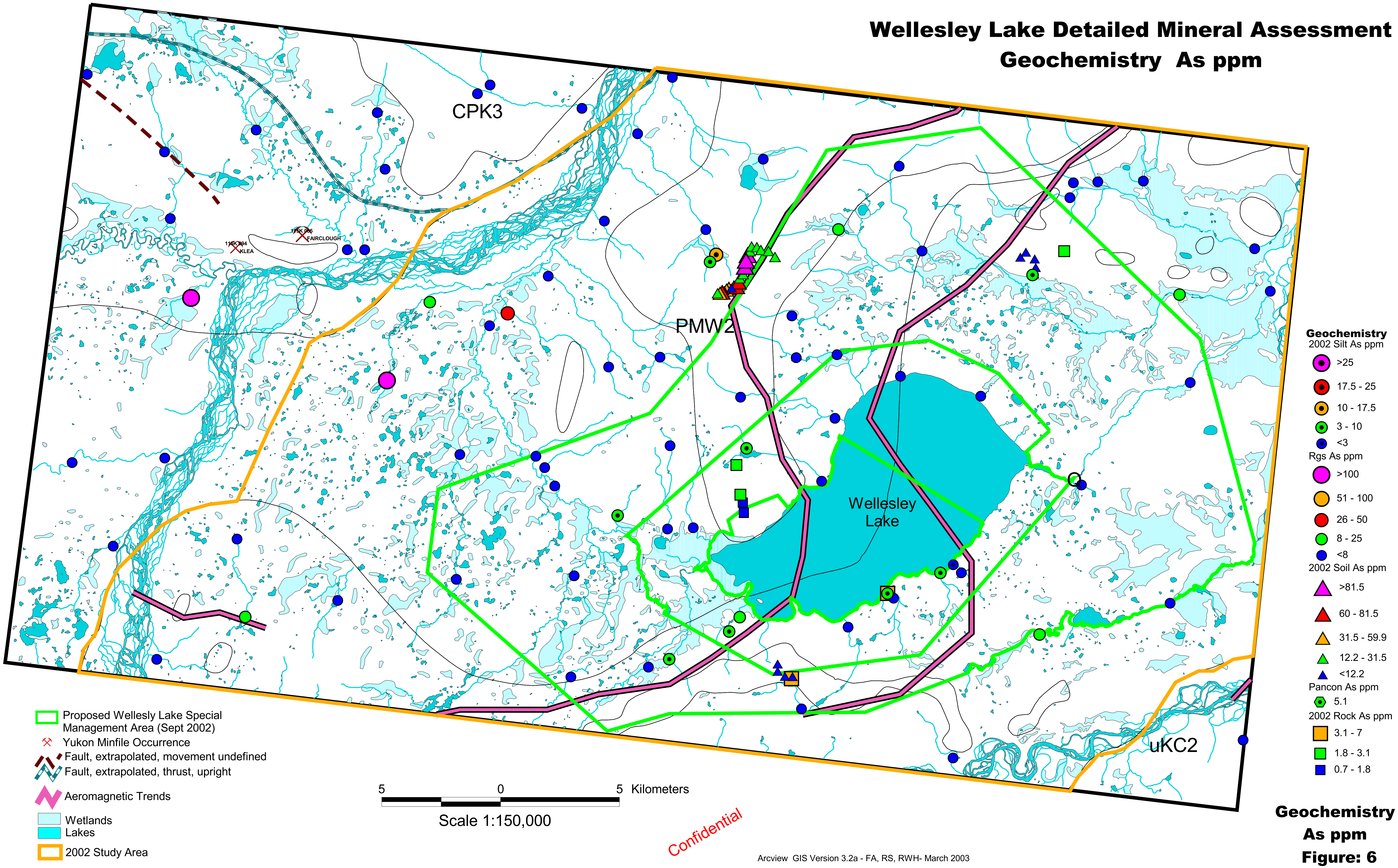
A total of 71 Regional Reconnaissance Stream Geochemical survey (RGS) stream sediment samples, collected by the GSC in and around the Wellesley Lake area, were windowed out and processed. Fifty-five of the above RGS samples lie within the study area used by the detailed mineral assessment panel (Figure 5 and 6).

A total of eight rock, 32 soil and 10 stream sediment silt samples were collected by EMR Mineral Assessments in the course of 2002 fieldwork. The samples were submitted to Northern Analytical Laboratories Ltd. of Whitehorse where they were prepared and the pulp samples were shipped to Acme Analytical Laboratories in Vancouver for analysis. The samples were analyzed by Inductively Coupled Plasma – Mass Spectrometry (ICP-MS) following an Aqua Regia digestion. Laboratory procedures are described in Appendix A. Sample descriptions and analytical results for rock, soil and stream sediment silt samples collected in 2002 are presented in Appendix B.

The GSC regional stream sediment geochemistry and the stream sediment, soil and rock samples collected by EMR in 2002 were subjected to statistical analysis using MS Excel and ESRI ArcView 3.2a where populations permitted. The samples were separated into populations of RGS stream sediment samples, 2002 stream sediment, 2002 soil and 2002 rock samples.. Each population was assessed individually. Where the variation for sample results was sufficiently variable, the populations were divided into five categories that identified background, slightly above background, weakly anomalous, moderately anomalous and anomalous sample results for the elements of interest. Due to the small sample groups anomalous thresholds were adjusted visually, either in Arcview 3.2a or from histogram plots.

Quality control to ensure the integrity of the 2002 geochemical data was done all for all samples, from all projects, submitted by mineral assessments in 2002 as one data set for all the 215 rock samples and one set for the 667 stream sediment and soil samples. Data pertaining to the proposed Wellesley Lake SMA is included within these sample sets. Quality control analysis of the data showed that the 2002 analytical results are reliable. Analytical procedures and geochemical statistics for quality control are described by Appendix A and quality control is fully described by Hulstein *et al.* (2003).

Wellesley Lake Detailed Mineral Assessment
Geochemistry As ppm



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Arcview GIS Version 3.2a - FA, RS, RWH- March 2003

Geochemistry
As ppm
Figure: 6

Regional Reconnaissance Stream Geochemical Survey (RGS)

The proposed SMA contains the 72.3 square kilometer Wellesley Lake and a major portion of the surrounding wetlands. The area was covered by the most recent glacial episode although on the north side on the study area glacial coverage may have been only partial. The low-lying areas are prime wetland habitat and the stream sediment quality for sampling is very poor. Streambeds are composed of organic muck with only rare silt sediment accumulations. Locally at higher elevations the stream sediments are of good quality but drain only small basins. The loss on ignition sample results generally show high levels of organics in the samples from which it can be deduced that the sample quality was often poor.

The Regional Reconnaissance Stream Geochemical survey (RGS) results for the area were released in the Geological Survey of Canada Open File 1363 (Geological Survey of Canada, 1986). There are 55 samples collected from the study area and of these 30 samples are from the proposed Wellesley Lake SMA. The following discussion on the RGS results is restricted to the 30 sample group.

Base Metals

Two samples with relatively high zinc values occur on streams draining the proposed SMA. One sample yielded an analysis of 392 ppm from a stream drainage on the northeast side of the proposed SMA. The underlying geology is not known and appears to be outside the area of the interpreted Windy Assemblage. The nearest outcrops are of Carmacks Group volcanics. The second sample yielded an analysis of 216-ppm zinc within the proposed study area on the northwest side. The stream drains an area underlain by Windy Assemblage of oceanic rocks.

An additional sample yielded an analysis of 261-ppm zinc north of the proposed SMA but draining an area underlain by the Windy Assemblage on the stratigraphic trend immediately north of the proposed SMA study area. Three samples with moderately anomalous results are on streams in the northern portion of the proposed SMA and study area also draining Windy Assemblage rocks. The results ranged from 82 – 86 ppm zinc.

Four samples draining Carmacks Group volcanics on the south side of the proposed study area are moderately anomalous ranging from 77 – 89 ppm zinc. The steams likely drain areas outside of the proposed SMA study area. The remainder of the sample results yielded analytical values ranging from 32 – 70 ppm zinc.

Lead analyses results of the stream sediments in the area are 10 ppm or less with one sample yielding an analysis of 14 ppm lead just north of the west end of Wellesley Lake. Rocks of the Windy Assemblage probably underlie this drainage area.

The results of copper analysis for the stream sediments in the proposed SMA are grouped in two categories. Low levels range from 11 – 24 ppm copper and moderate values range from 36 – 60 ppm copper. The moderate level samples tend to cluster around the western end of Wellesley Lake. Rocks of the Windy Assemblage and the Klondike Schist Assemblage underlie the area.

Nickel values are generally low in the proposed SMA and study area ranging from 7 – 30 ppm. Two moderately anomalous values (31 and 34 ppm) occur on streams draining the ultramafic package of rocks of the Windy Assemblage at the north end of Wellesly Lake. Anomalous samples greater than 50-ppm nickel occur on streams draining the ultramafic rocks in an outcrop area five kilometers north of the proposed SMA and study area.

Precious Metals

Two samples in the proposed SMA area yielded gold values above the detection limit. One sample (13 ppb) at the mouth of a creek on the south shore of Wellesley Lake drains an area underlain by Carmacks Group volcanics. The second sample (9 ppb) in the western portion of the proposed SMA and study area is located on a stream draining an area underlain by Windy Assemblage rocks or Klondike Schist.

There are no significant silver in stream sediment samples on creeks draining areas within the proposed SMA and study area.

Other Metals

At least three samples from creeks draining areas within the proposed SMA and study area have moderately "interesting" tin values (6 – 8 ppm). These are from creeks draining into the north end of Wellesley Lake in areas underlain by Windy Assemblage Rocks. The amorphous aero-magentic response in the area possibly indicates the presence of Nisling Range Alaskite stocks.

There are a number of moderate to high anomalous assay results for mercury from streams within the proposed SMA and study area. The values for the moderate range are within 55 – 100 ppb and for the high range are 105 – 155 ppb. The high range values are from streams draining the inferred trend of the Windy Assemblage rocks through the center of the proposed SMA and study area.

Two samples in the high analytical range for cobalt are located on streams draining Windy Assemblage rocks northwest of Wellesley Lake.

Two samples of moderate range (4 – 8 ppm) for molybdenum are also located northwest of Wellesley Lake in streams draining rocks of the Windy Assemblage.

Tungsten results from streams within the proposed SMA and study area are at or below detection limits.

Barium values throughout the area are generally in the low range (100 – 680 ppm) with two samples of greater than 800-ppm. The two samples are from streams draining the Windy Assemblage rocks northwest of Wellesley Lake.

There are five samples within or along the edge of the proposed SMA and study area that yielded manganese values of greater than 2100-ppm. The highest value (14,400-ppm) is on a stream draining Windy Assemblage rocks northwest of Wellesley Lake.

The analytical results for iron from the RGS samples are generally in the low range (0 – 3.0 %) with several samples greater than 3.0 % from creeks draining Windy Assemblage rocks trending through the center of the proposed SMA and study area.

The RGS sample results for uranium are generally in the low range of 0.3 – 2.6 ppm with one sample on the north shore of Wellesley Lake yielded a result of 3.2-ppm.

There are 5 – 6 samples with elevated results (325 – 390 ppm) for florine from streams draining Windy Assemblage rocks trending through the central portion of the proposed SMA and study area.

Indicator Elements

The antimony results from the RGS samples indicate three moderately high values (1.0 – 1.8 ppm) in the center of the proposed SMA core area surrounding Wellesly Lake. The streams appear to drain Windy Assemblage rocks.

Arsenic values from RGS sample within the proposed SMA and study area are all in the low range (detection – 10-ppm). Two samples on the eastern side of the proposed SMA and study area are on streams draining from the study area yielded results of 14 and 15-ppm in areas underlain by Carmacks Group volcanic rocks.

The cadmium results from the RGS samples are generally in the low range (0.11 – 0.3 ppm). Three samples (0.4 – 0.6 ppm) are located on streams draining Carmacks Group volcanics on the east and south sides of Wellesly Lake.

Ph values are in the above neutral range in the low lands around Wellesly Lake and tend to be below the neutral level in the higher elevations.

The loss on ignition values, as previously noted, is generally in the high range throughout the proposed SMA and study area (up to 98%).

2002 Rock Geochemistry

Eight rock samples were collected in 2002 from the proposed Wellesley Lake SMA area. The samples consisted of quartz-epidote veining, siliceous rocks and one piece of mineralizing float float containing up to 1% disseminated pyrite and trace disseminated chalcopyrite. Analytical results for elements of economic interest were low for all samples.

2002 Soil Geochemistry

Soils are generally poorly developed. The vegetative layer composed of relatively thick humus deposits cover the soils in the low-lying areas. Loess and frozen soils inhibit sampling at higher elevations especially early in the summer season. Local well developed soil horizons were encountered on the ridge reconnaissance soil sample line north of Wellesley Lake. South of Wellesley Lake soils were poorly developed and consisted largely of till material on the ridge underlain by Carmacks Group volcanics.

Of the 32 soil samples collected within the proposed Wellesley Lake SMA study area, 23 were collected on a ridge just outside the NW boundary of the proposed SMA. Two of these sample sites yielded significant gold values, 33 ppb and 56.7 ppb, from a weathered brown chert and brown weathered intrusive respectively. A duplicate sample pair over the intrusive yielded up to 55 ppb Au, 210 ppm As, 12.5 ppm Sb and 78 ppm Ga.

Two other reconnaissance soil samples collected north of Wellesley Lake over an area underlain by Carmacks Group volcanics yielded 12.6 and 15.4 ppb Au. Other elements of economic interest returned low values.

2002 Silt Geochemistry

A total of 10 samples were collected by EMR within the study area in 2002. Sample media was generally poor as most samples were collected below the break in slope and in wetland areas. The highest gold value, 237.5 ppb, from a good quality sample in the southwest side of Wellesley

Lake was likely of glaciofluvial origin. No other elements of interest were anomalous in this sample.

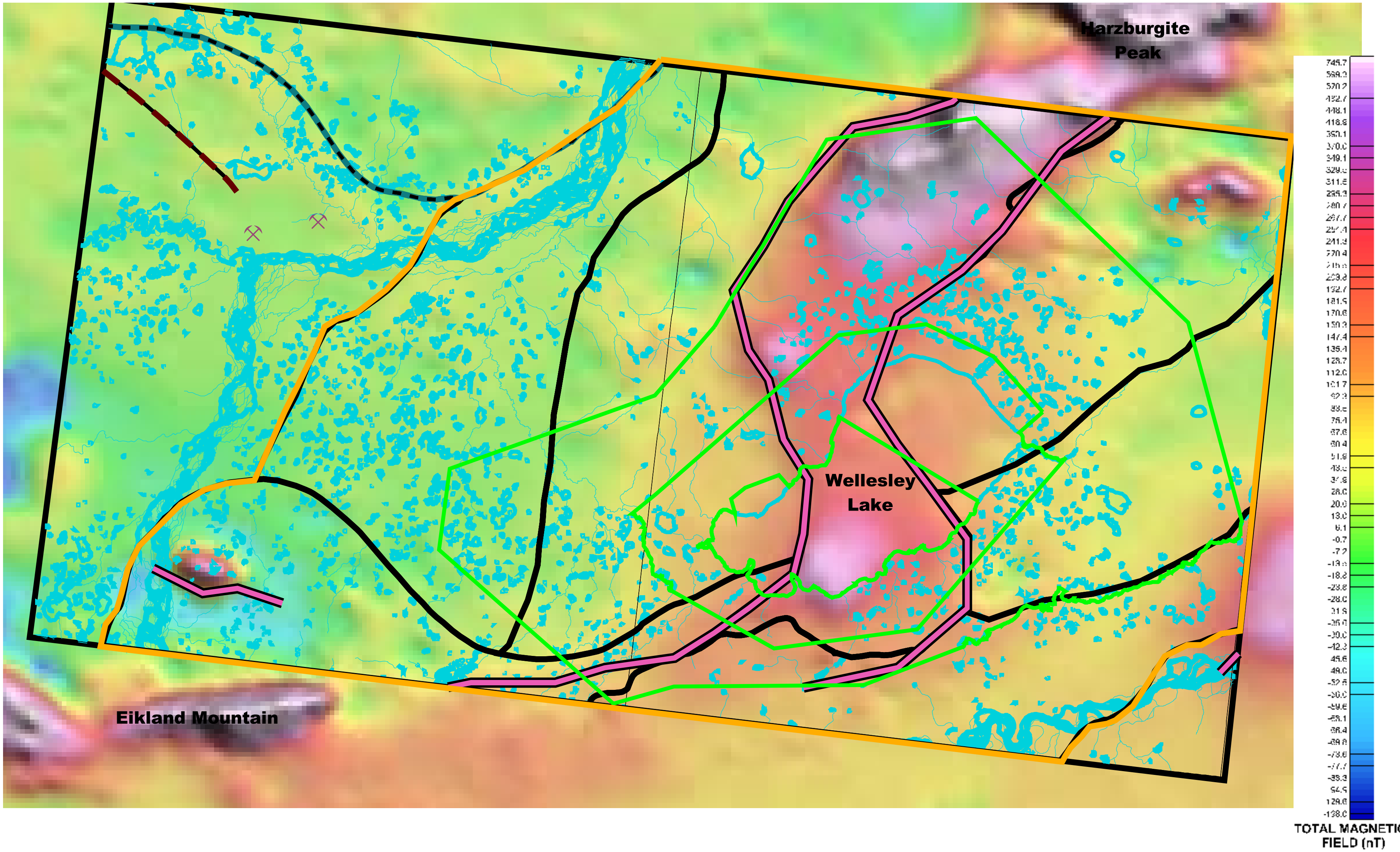
Sample 176530, collected on the northwest side of the study area, yielded 12.4 ppb Au, 1.6 ppm Sb and 14.6 ppm As (Figure 5). This is below the ridge that had the anomalous (Au, As, Sb, Ga) soil samples. Although low they are significant values considering the poor quality of the sample and well above the values from the other nine samples (except for Au in sample 176530).

Geophysics

The regional aeromagnetic survey was plotted and the results were processed to calculate and plot the residual magnetic anomaly of the total magnetic field (Figure 7). first vertical derivative. Both the aero-magnetic

Both the residual magnetic anomaly and the first vertical derivative of the total field have a high positive magnetic trend that crosses through the proposed SMA and study area . A discontinous trend of magnetic highs trends easterly from the southwest corner of the area and changes to a northerly trend and crossing Wellesley Lake carries on north, ultimately to Harzburgite Peak. The magnetic trend correlates with outcrops of the mafic and ultramafic units of the Windy Assemblage. The source of the magnetic anomaly in the Harzburgite Peak area was postulated to be magnetite produced by serpentinization of the harzburgite (Canil and Johnston, 2003).

The Carmacks basalt, underlying large parts of the area, has a subdued magnetic positive response but not as high a response as the Windy Assemblage that it abuts. Magnetic susceptibility measurements collected from out cropping Carmacks basalt northeast and south of Wellesley Lake revealed widely variable magnetic susceptibility ranging from 0.5 to 22.7 SI units, often on the scale of the outcrop.



Detailed Mineral Assessment Tract

2002 Study Area

Proposed Wellesly Lake Special Management Area (Sept 2002)

Yukon Minfile Occurrence

Fault, extrapolated, movement undefined

Fault, extrapolated, thrust, upright

Aeromagnetic Trends

5 0 5 10 Kilometers

Scale 1:250,000

GCS Aeromagnetics
Residual Magnetics

Figure 7

Mineral Assessment

Regional Mineral Potential

The study area of the proposed Wellesley Lake SMA was included the regional mineral potential assessment of Southwest Yukon that was the fourth phase of Regional Mineral Potential mapping of the Yukon Territory carried out by YTG. The proposed SMA covers two tracts, number 61 and 62 that rank in the lowest and highest categories respectively of mineral potential in the regional assessment (Figure 2). Tract 61 was assessed for gold-quartz veins, gabbroic nickel-copper, plutonic related gold and Kuroko massive sulfide deposits. Tract 62 was assessed for gold-quartz veins, gabbroic nickel-copper, plutonic related gold and low sulfidation epithermal gold deposits.

Detailed Mineral Potential Map

A detailed mineral assessment of the proposed Scottie Creek SMA took place in Whitehorse, on December 14th, 2002. The Windy Assemblage, with its attendant high positive magnetic response was separated into four tracts of approximately similar size areas. The area mapped as being underlain by the Carmacks basalt was divided into three separate tracts. Figure 8 shows the resulting mineral potential map of the proposed Wellesley Lake SMA and surrounding detailed mineral assessment study area.

Methodology

The study area was divided into seven tracts, each representing a package of rocks that constitute a domain with unique lithological, geophysical or physiographic characteristics.

Five panelists were chosen for their expertise in the geology and mineral deposits of the Yukon and the study area: Rob Carne (consultant), Gerald Bidwell (consultant), Al Doherty (consultant), Mark Baknes (consultant) and Anna Fonseca (consultant). The WellesleyLake assessment lasted one half day. After examining and discussing all the geoscientific information available for each tract the panelists decided upon a list of deposit models pertinent to the tract and filled in evaluation forms for the likelihood of new discoveries of the median tonnage for each deposit type in the tract. The forms were utilized to maintain the focus on mineral deposit models and explorability of the tract and to reduce personal biases. The forms are not used for a statistical analysis. At the end of the assessment, the panelists ranked the tracts relative to each other unanimously, from highest to lowest mineral potential.

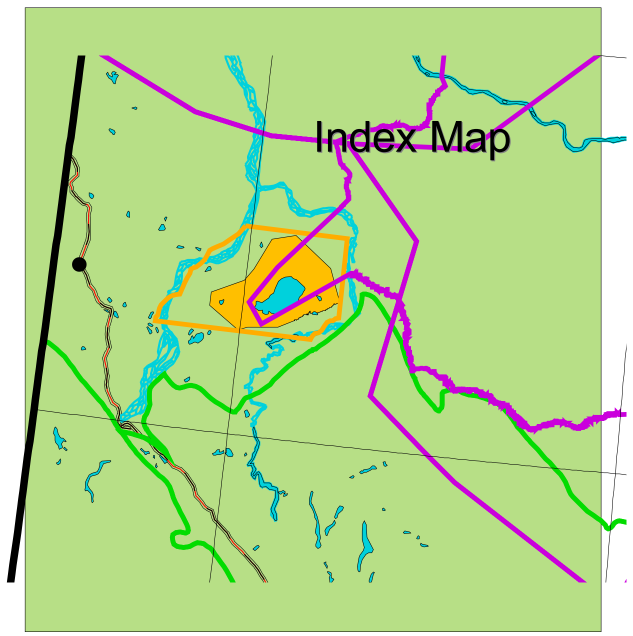
Limitations

Mineral potential maps portray the best estimation at the time of the assessment. Since the expert panel are assessing a hidden resource, it is important to realize that the geological knowledge base is in a constant state of growth, and mineral deposits may one day be found in rocks that we once thought to have lower relative potential.

Results and Conclusions

The final ranking of tracts from highest to lowest relative mineral potential is as follows: Tract # 2 (highest), 3, 1, 7, 4, 6, and 5 (lowest). Details of relative mineral potential tract ranking and deposit models used are presented in Appendix C

Proposed Wellesley Lake SMA and Study Area
Detailed Mineral Assessment



Proposed Wellesly Lake Special Management Area (Sept 2002)
Yukon Minfile Occurrence
Fault, extrapolated, movement undefined
Fault, extrapolated, thrust, upright
Aeromagnetic Trends
Wetlands
Lakes
2002 Study Area
3 Tract outline and number

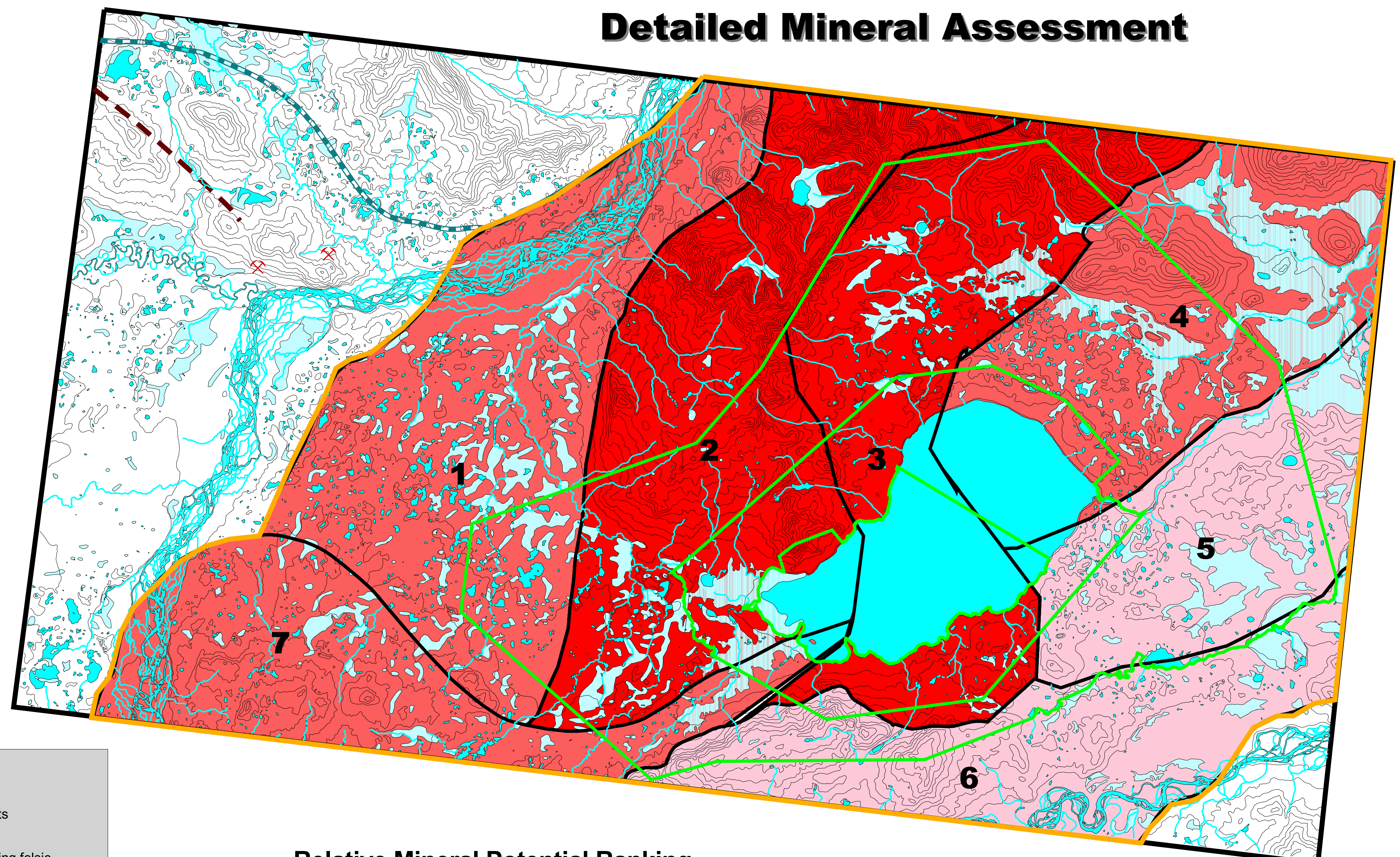
Geological Legend

Q — Quaternary
unconsolidated glacial, glaciofluvial and glaciolacustrine deposits

uKC2 — Upper Cretaceous - Carmacks Group
a volcanic succession dominated by basic volcanic strata including felsic volcanic rocks at the base of succession and locally basal clastic strata

PMW2 — Devonian and Cretaceous
Windy Assemblage - oceanic assemblage of ultramafic rocks, greenstone, chert, carbonate, and metamorphosed equivalents

CPK3 — Carboniferous and Permian
Klondike Schist- poorly understood assemblage of metamorphosed pelitic/volcanic rocks; silvery grey muscovite chlorite quartz phyllite



Relative Mineral Potential Ranking
Highest
Lowest

Kilometers
5 0 5
Scale 1:200,000

Figure 8

The Detailed Mineral Potential Map displays the relative mineral potential within the SMA and study area. The areas of highest mineral potential (tracts 2 and 3) reflect the underlying potential of the Windy Assemblage rocks to host gabbroic nickel-copper, VMS type, gold-quartz veins and in the case of tract three, minor podiform chromite deposits.

Anomalous Au, As and Sb results in soil and stream sediment geochemistry samples collected in 2002 indicate the potential for intrusive related gold deposits exists along the boundary between tracts 2 and 3. The two soil samples with weakly anomalous gold values, collected north of Wellesley Lake indicate potential for gold deposits hosted by units of the Carmacks Group.

Recommendations and Future Work

It is recommended that land use planners take into account the results of the mineral assessments of the proposed Wellesley Lake SMA and use the mineral potential maps in their planning. Ideally land use planners would avoid alienating exploration and development in the areas identified as having highest mineral potential.

The following additional research is recommended to better constrain the mineral deposit types applicable to the proposed Wellesley Lake SMA.

Additional traverses within the Windy Assemblage and Carmacks volcanic rocks to collect lithological data and geochemical soil and silt samples are recommended. Specifically tract two should be targeted at its northern end where the aero-magnetic anomaly is strongest. Tracts four and six, where mapped as being underlain by Carmacks basalts, should be assessed for their potential to host epithermal gold deposits. Work should be concentrated in the area of higher elevation where there is a better chance of out cropping rocks.

As the meaningfulness of most of the existing stream sediment geochemistry data is suspect, additional samples should be collected further up the drainages where the stream sediment reflects the bedrock source.

Acknowledgements

Amy Stuart, Panya Lipovsky, and Gary Stonghill provided technical support preparing the data for the fieldwork and assessment panel as well as base data for the study area. Rod Hill and Monique Shoniker performed the diplomatic and administrative services that allowed fieldwork to proceed. Trans North Helicopters of, based out of Haines Junction and Fireweed Helicopters based out of Dawson City, provided safe, reliable and enjoyable transportation.

I would recommend my co-workers for their companionship, perseverance and dedication to preparing the best quality work that is possible.

Thank you to the expert panel; Mark Bakness, Gerald Bidwell, Rob Carne, Al Doherty and Anna Fonseca, for sharing and applying their expertise in Yukon geology and mineral deposits with diligence and good humor.

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Appendix A

2002 Analytical Procedures and Quality Control

Energy Mines and Resources, Yukon Geology Program
2002 Mineral Assessment

Geochemical Analysis

Laboratory Procedures

Northern Analytical Laboratories Ltd., of Whitehorse, secured the 2002 contract to supply geochemical analysis to the Mineral Assessment branch of the Yukon Geology Program. Northern Analytical Laboratories Ltd. in turn subcontracted Analytical Laboratories Limited, of Vancouver, B.C. to carry out the geochemical determinations. All samples; rock, soil and steam sediment were submitted to Northern Analytical Laboratories Ltd. for sample preparation and then shipped to Acme Analytical Laboratories Limited for analysis by ICP-MS.

The attached sheets supplied by Acme Analytical Laboratories Limited and Northern Analytical Laboratories Ltd. summarizes the analytical methodology and sample preparation procedures respectively. Also shown are the elements analyzed for and their detection limits. Gold analysis was ideally done on 30gm pulps but where there was insufficient material Au analysis was done on a 15gm, 7.5gm or 5gm sample (as applicable). Analytical results were sent to the Yukon Geology Program in both digital and paper form. The digital results were merged with the digital sample location data and converted from MS Excel file to an MS Access database.

Quality Control

In addition to Acme Analytical Laboratories Limited's internal sample standards and duplicates Yukon Geology Program - Mineral Assessments inserted standards prepared by CANMET (Natural Resources Canada) and locally collected material as sample checks. The local material consisted of marble rock (used a blank) and mineralized copper-magnetite skarn used with rock sample submissions. Local material consisting of unlithified silt ('clay cliff') and tailings from the Whitehorse copper mine (milled copper-magnetite skarn rock) were inserted with the soil and stream sediment samples. Duplicates of the soil samples and occasionally the stream sediment samples were collected in the field or a sample was split later and inserted with the same number with a 'B' appended to the sample number denoting a duplicate. The result is that analysis were carried out on duplicate samples approximately every 20-25 samples. Check samples and standards inserted into the sample stream can be determined by the letters appended to the sample number as, where xxx is the sample number:

XXXa = Whitehorse 'clay cliff' check
XXXb = duplicate sample split
XXXc = Whitehorse copper mine tailings check
XXXd = marble rock, blank (collected at the Grafter occurrence)
XXXe = magnetite copper skarn rock (collected from Best Chance occurrence)
XXXf = Canmet standard STSD-3 (derived from stream sediment samples)

In addition Acme Analytical Laboratories Limited carried out their in house internal duplicate checks as; reXXX (re-assay of sample XXX) and inserted their own standard, standard DS4.

Rock Sample Quality Control Results

Marble Blanks

Results from 14 marble blanks show that values are mostly uniform and the variation could be due to the marble rock which had visible impurities (trace sulfides?) once it was crushed and homogenized (using cone on cone method). Variations are restricted to only a few (or one) element per sample. The highest gold value coincides with a high As and Pb value (sample 176535D). For almost all the samples and all elements the samples returned low ('blank') values. The variation in analytical results could be due to contamination or lack of analytical precision.

Magnetite Copper Skarn

Results from the 15 magnetite copper skarn samples show highly variable results for most elements. Following crushing, the sample was homogenized (cone on cone method) but homogeneity was not achieved. The samples do show that anomalous values were determined but precision and accuracy are very questionable due to the variably mineralized material. This results in a very high percent relative standard deviation and shown graphically by univariante scatterplots for 6 selected elements.

Acme Analytical Laboratories Limited – Duplicate Analysis

Most elements for all the splits correlated very closely (visually <10% difference).

Acme Analytical Laboratories Limited – In-house Standard DS4)

The 12 standards analyzed with the rock samples returned very consistent values, so consistent that descriptive statistics were not calculated.

Soil and Stream Sediment Quality Control Results

Over all the analytical results are acceptable although questions about the accuracy and precision of the data are raised by variations in the Canmet standards. The check samples of Whitehorse copper tailings and Whitehorse clay cliff material served their purpose and returned anomalous and low values respectively.

Canmet Standard STSD-4

Results for the Cannmet standards show an acceptable range of values. The univariate scattergrams for Au, Cu, Zn, Pb, Ni and As illustrate that it is the occasional and random (not restricted to one sample or sample batch) 'flyer' that results in the higher percent relative standard deviation values (values >10%). Results for Au analysis are disturbing as two samples returned values that could be considered anomalous at 18ppb and 29ppb. Analysis of the standard only tests the analytical techniques for accuracy and precision as the standard is received in a pulped form (<-200 mesh, -74um) it is not prepared (dried, sieved or split). The percent relative standard deviation was calculated for Au, Cu, As, Zn, Pb, Ni, and As. Values were below <10% for Z, Pb, Ni (acceptable) and <16% As and Cu (marginally acceptable) and a high 128% for Au due to the two high values mentioned above.

Whitehorse Copper Mine Tailings

A total of 20 copper mine tailing samples were inserted into the sample stream with two purposes in mind; one was to confirm that obviously anomalous samples (for Cu, Au, Ag, Bi) were being detected and secondly, to test for analytical precision and accuracy. As the samples were prepared at Northern Analytical they also test the preparation procedures. All the samples returned anomalous values for the above elements although the variation for Au exceeded the preferred 10% maximum (at 32%) for the percent relative standard deviation. Other elements where the percent relative standard deviation was calculated (Cu, Ag, As, Pb, Zn, Mo, Bi) returned a close to or less than a 10% percent relative standard deviation.

Whitehorse Clay Cliff Silt

A total of 25 clay cliff silt samples were inserted into the sample stream for two purposes; one was to ensure that material considered to have background values did indeed return background values and to test for analytical precision and accuracy. As the samples were prepared at Northern Analytical they also test the preparation procedures. All the samples exceeded the preferred 10% maximum for the percent relative standard deviation for Au (31%), Cu 11%, Pb (38%), Zn (13%), As (26%) and Ni (12%). The variations in the gold values are quite acceptable as the highest value was 4.7ppb. Most of the variation in the other samples is due to two samples that yielded inconsistent values. Variation in the 'clay cliff' material is expected and is likely responsible for the variation. Laboratory error is not suspected as other check samples and standards from the same batches did not produce similar errors.

EMR Duplicate Check Samples

A total of 29 duplicate pairs were submitted to check for reproducibility – accuracy. A visual scan reveals a close approximation. All of the seven elements (Au, Cu, As, Ni, Pb, Zn and U) display a linear trend on scatterplots. The only errant value was for gold in one stream sediment (silt) sample pair. This is not unexpected given gold's nugget effect.

Acme Analytical Laboratories Limited – In-house duplicate pairs

Acme Analytical analyzed 20 duplicate pairs. The scatter plot results are as close for Cu and Pb as for the duplicate pairs submitted by EMR. Gold values were less than 7.4ppb so significant variation for anomalous samples can't be determined. Interestingly, the Acme duplicates included 5 duplicate pairs of clay cliff material, presumably because there was abundant sample to split, but no Whitehorse copper tailing samples.

Acme Analytical Laboratories Limited – In-house Standard DS4)

The 27 standards analyzed with the stream sediment and soil samples returned very consistent values, so consistent that descriptive statistics were not calculated.

Statistical Analysis Procedures used in 2002

Following computer listing of the data, statistical parameters such as arithmetic mean, median and mode, standard deviation and sample variance were calculated using MS Excel. Histograms of selected elements from data subsets were generated by MS Excel for specific projects to aid in establishing five ranges for the results, ideally; background, slightly above background, weakly anomalous, moderately anomalous and anomalous.

The stream sediment data procured from the Geological Survey of Canada's, 'Regional Stream Sediment and Water Geochemical Data', open files were also statistically analyzed in a similar manner using MS Excel. Histograms and calculated thresholds for project areas, where applicable, are attached.

Where Histograms and statistical were not used in generating geochemical plots, ESRI Arview 3.2a was used utilizing natural breaks in the data. Occasionally where there was a large number of values below, at or near the detection limit, or obviously anomalous samples were observed, threshold were adjusted visually, either in Arcview 3.2a or from a MS Excel histogram that was not printed.

2002 Fieldwork, Mineral Assessments
GPS Waypoint and Geochemical Sample Data Handling Protocol

June 18, 2002 RWH

GPS data

1 Create folder with project name in L:\fieldwork\2002fieldwork\GPS coord . Dump GPS waypoints in new file, named with GPS owners' initials and date (XX_June18), and place in project folder.

2 Open new file in excel, make columns and clean up data; delete extraneous points and place columns in following order: Ident Easting Northing Date. Save as excel file.

3 On L:\fieldwork\2002fieldwork\GPS coord\ open: All_dnload_gps_pts.xls, copy from new GPS file data to be added and add appropriate data to complete columns.

Sample data

4 Open sample_data.xls in L:\fieldwork\2002fieldwork and copy GPS data with sample numbers over to GPS_all_samples sheet. Fix any problems or add any missing samples to this table.

5 Copy GPS data to appropriate sample description sheet (ie. rock_descriptions).

6 Add sample descriptions, notes etc. in sample description file after sample number and GPS data is appended.

7 Other waypoint stations (geology etc.) are copied from All_dnload_gps_pts.xls to Other_Stations sheet and notes etc. added if required.

8 Geochemical data from the lab is added to the geochemical sheet and is merged with the sample descriptions in the merged sample sheet appropriate to each sample type. Sample location data with descriptions are merged with the geochemical data in MS Access.

9 The merged samples are used in GIS program of choice

10 Problems or questions? See your friendly data guy.

B - IV. ROCKS & DRILL CORE

Review the information under the headings of "Notice" and "Safety" at the beginning of this "Sample Preparation" section of the manual!!

Ensure that the equipment is properly adjusted and lubricated as per the equipment maintenance instructions at the end of this sub-section.

1. Set out the samples on a mobile workbench, making sure they are all present in their proper order and the matching pulp bags are in the exact same order. Locate the workbench near the jaw crusher where the samples can be reached conveniently. However, if there are samples in open containers, make sure they are not located where they could be susceptible to contamination by stray rock chips that may be ejected from the crushers.

2. Ensure that you are wearing the required safety equipment. Ensure that the jaw crusher, cone crusher and riffle splitter and its 3 pans are thoroughly clean.

Start the dust extractor. Start the jaw crusher and run the first sample through it. The best procedure for feeding the sample into the crusher depends on the nature of the sample and you will develop a feel for this with experience. Generally, large samples consisting of relatively small fragments can be poured directly from the sample bag into the crusher, maintaining enough material on top of the jaws to prevent pieces from spitting out. Individual, hard rocks will require quickly covering the opening with a block of wood or a pan to prevent material from ejecting. Some rocks may not crush until they are forced down into the jaws with the block of wood. Large rocks will have to be broken with a sledgehammer before they will go into the jaws.

Try to avoid spilling any sample as you feed it into the crusher. With large samples, be careful that the pan collecting the crushed material does not overflow; frequently shaking the pan to level the contents will help.

3. Brush any loose chips from the crusher (particularly the pan channel) into the pan. Remove the pan and pour the sample into the hopper of the empty, clean cone crusher. Move the empty sample bag along the crushing line, next to the cone crusher to track the sample.

Thoroughly blow the jaw crusher and its pan clean with compressed air. Make sure no sample material remains in hidden nooks and crannies. If sample remains stuck to the jaws it must be brushed away or cleaned by crushing some barren rock and then cleaning with compressed air again. Replace the pan in its slot under the crusher.

4. After the sample has passed through the cone crusher, blow the head of this crusher clean with compressed air. Open the side flap and blow clean the inside of the crusher, paying particular attention to the peak of the slides at the centre of the machine, where material tends to accumulate.

Remove the receiving pan, shake to level the crushed rock in the pan and pour it into the splitter (with empty pans in place on each side). Be careful to hold the pan laterally level so that the sample pours out evenly along the entire width of the slot and through all the vanes of the splitter. Move the sample bag along the line to the splitting hood.

Blow the cone crusher pan clean with compressed air and, after ensuring that the cone crusher is thoroughly blown clean, replace the pan in it. If barren rock was needed to clean the jaw crusher, run it through the cone crusher to clean it too and again blow the unit clean. Be sure to dispose of the cleaning rock so it does not end up in a pulp bag in place of the next sample.

5. Remove one pan from under the splitter and replace it with the third pan. Level the sample in the removed pan and pour it out the wide side into the splitter, again making sure it is distributed evenly into all the vanes. This even distribution of sample through the riffles is critical to obtaining a sample split that is compositionally near identical to the original whole sample. Do not bang the pan against the top of the vanes or they will gradually become burred and splitting efficiency will be lost.

Repeat the splitting process as many times as necessary, resplitting the same side pan until it contains just enough sample to fill the pulp bag about _ full (about 250 grams). Make sure no sample material is stuck in the riffles; sharply rocking and banging the unit will help clear it.

Pour the sample split into the pulp bag without spilling any of it, making sure you have the right pulp bag labelled to match the original sample bag. If there is a sample tag, place it in the pulp bag. Fold over the top of the bag to prevent contaminants from getting into it and place on a cardboard tray. The bags are arranged in order on the tray in 4 rows of 5 samples (20 per full tray), beginning at the front left.

Pour the sample from the other pan (the reject) into the original sample bag; the splitting hood contains a chute to the floor to facilitate this for larger samples. Fold and staple the top of this bag, making sure the sample label remains visible, and place it in a rice sack that has been marked with the work order number and client name.

Blow the splitter and all three pans clean with compressed air and leave set up for the next sample.

NEVER add or remove sample by hand to adjust the size of a split. If it is too large, resplit the split until one pan contains the right amount. If you have riffled it down too small, resplit the reject to make up the requisite amount.

Note that if a sample is small enough that it will be all used for the pulp, it can be dumped directly from the crusher pan into a splitter pan and then transferred to the pulp bag. Place the empty sample bag in the rejects sack so no one searching through the rejects will think the sample is missing.

5. Continue crushing and splitting the remaining samples.

In practice, for efficient production, you will have consecutive samples in different stages of the process simultaneously and one person may be crushing while another splits and bags the samples. This makes it vital to be well organised and methodically consistent to prevent sample mix-ups. Always remember to double check that each piece of equipment is empty and clean just before you dump in a sample and always move each sample bag along the line with its corresponding sample. If there are sample tags, these also must accompany the samples throughout the process (but don't let them go through the crushers) and end up in the pulp bags as a further check.

When a tray of crushed sample splits is full or completes a work order, place it in a drying oven to ensure that the samples will be completely dry for pulverizing.

6. Turn on the dust extractor for the pulverizing station hood. Ensure that you are wearing the required safety equipment, including safety glasses and a dust mask.

Before starting to pulverize a work order, place a handful of cleaning gravel in each of two pulverizing pots containing their rings and puck. Position the lid on one pot and clamp it in place in the pulverizer, ensuring that it clamps securely with the lid centred so that it seals properly. Close the lid of the pulverizer box and press the start button to begin the pulverizing cycle.

When the machine stops at the end of the timed cycle, unclamp the pot and replace it with the other pot. While the pulverizer is cycling with the second pot, carefully dump the contents of the first pot (including rings and puck) onto a sheet of Kraft paper in the dust hood. Blow the bowl, rings, puck and lid clean with compressed air. Discard the pulverized cleaning gravel in the garbage and blow the sheet of paper clean.

Reassemble the rings and puck in the bowl and dump in the first crushed sample split to be pulverized, distributing it fairly evenly. Continue as above, always having one pot pulverizing while you clean out the other.

With the samples, be careful to minimize sample loss as light components will blow away more readily, changing sample composition. Pour the pulverized sample from the sheet of paper back into the correct pulp bag, replace the sample tag if there is one, fold the top and place it back on the cardboard tray. Blow the sheet of paper clean with compressed air.

Always pulverize the samples in order to facilitate keeping track so you do not put any pulps in the wrong bags.

It is important that the samples be pulverized to the consistency of flour. You should feel no grittiness when you rub some pulp between your thumb and a finger. For average samples, the standard pulverizing time of 80 seconds should be satisfactory. Very hard minerals require longer. If a pulverized sample remains gritty, pulverize it for part of another cycle until it is fine enough; this is a process of trial and error. The timer can be reset for a series of similar samples that require a non-standard pulverizing time.

Soft samples require reduced pulverizing time or they will cake and stick inside the pot. Sticking may still occur even with appropriately less pulverizing. Note that samples will stick if they are not perfectly dry so make sure this is not the problem. Adding a few drops of acetone or ethanol to the crushed sample in the pot just before pulverizing may reduce sticking of hygroscopic samples which always retain some moisture.

Brushing may help remove slightly stuck material. Otherwise, if the bowl, rings and puck do not blow clean they must be cleaned by pulverizing a load of cleaning gravel, the same as at the start of a work order.

Also use cleaning gravel after any sample that has been noted as "high grade" or any sample that has obvious mineralization, especially if the next sample to be pulverized in the same pot is not mineralized.

The friction of pulverizing will heat up the pots until eventually they are too hot to handle comfortably. Switch to another set of cleaned pots when that happens. Samples requiring critical analysis for mercury, arsenic or tellurium may be flagged to be pulverized only in cool pots because there could be significant losses of these elements in hot pots.

Samples that are very high in sulphide minerals also require cool pots and minimum pulverizing time or they may ignite. **DANGER!** Do not let such samples start a fire. Avoid breathing the toxic fumes, which smell like rotten eggs. Burning may not be apparent immediately, as oxidation begins slowly and accelerates, so after pulverizing sulphide-rich samples monitor the bags of pulp for increasing temperature and the smell. Sealing an oxidizing sample in a pulverizer pot may stop the process. However, the composition of the sample will have changed so a new split must be riffled from the crushed reject. Be very careful pulverizing the new split to avoid igniting it too; a series of very brief pulverizing cycles may be necessary. If there is no reject for a new split, notify the senior chemist. He may authorize analysis of an oxidized sample if it is quenched before the pulp shows any lightening of colour, but this must be noted to the client.

7. Occasionally, you may be instructed to "roll" pulps. This is done to ensure that the pulps are homogeneous, without stratification of light and heavy components.

Roll a sample when it is on the Kraft paper after emptying it from the pulverizer pot. Grasp one corner of the paper and pull it gently towards the opposite corner, keeping it low over the surface so that the pulp rolls rather than slides. Before sample spills off the sides of the sheet, return the lifted corner to flat, then roll the sample from the opposite corner but stop when the pulp is centred on the paper. Next, grasp an adjacent corner and repeat the rolling process along the other diagonal. Repeat at least five times in each direction before pouring the pulp into its bag.

8. When preparation of a tray of samples has been completed, take it into the lab. Place the trays in order on the "in" shelves or at a work station where you have been instructed to take them.

When the last tray of a work order is brought into the lab, write the date in the log book by the "X" under "Sample Prep" on the line for that work order. Make sure the work order copy and the Sample Sorting and Preparation form are brought in with the last tray.

9. Equipment Maintenance:

Jaw Crusher: The adjustment of the crusher should be checked before each use. The drive belts should be snug with minimal free play but should not be strung tight. Also check that they are in good condition, free of cracks. The jaws should have a maximum ½ inch gap at the widest opening and the moveable jaw should just contact the stationary plate at maximum closure. If adjustment is needed, it should be done by someone who is familiar with the procedure. Whenever adjustments are made, it should be ensured that the tension spring is adjusted for a gap of _ inch between the coils at maximum compression; if it is too tight the crusher may be damaged by the excessive force, but too little tension will result in inadequate crushing of hard rocks. The crusher must be greased using a grease gun at the three nipples about every two hours of use or whenever there is an apparent increase in noise or heat in the bearing area. Inject grease until it starts to ooze out between the parts, then wipe off the excess so it will not fall into any samples. Failure to inject grease when necessary will result in the bearing being destroyed.

Cone Crusher: Before each use, check the condition and tension of the drive belts. Verify that the machine runs smoothly and quietly when it is not crushing and that the head is not spinning violently and moves freely. If this does not appear to be in order, notify the general manager immediately and do not use the machine as a seized head bearing can lead to much more extensive damage. Ejection of rock chips from the head is another sign of a seized bearing. The crusher should produce a crush of at least 60% minus 10 mesh and a supervisory employee should verify this regularly, at least daily during full production, using cleaning rock for consistency. Run about a kilogram of the rock through the jaw crusher and the cone crusher, sieve it through a 10 mesh screen and weigh the plus and minus fractions. When the crusher needs to be adjusted, this is done by loosening the bolts securing the top plate and rotating the plate, which is threaded. Retighten the bolts and recheck the fineness of crush, repeating the procedure until 60% minus 10 mesh is achieved. Do not tighten the gap more than necessary or the crusher will be more susceptible to failure.

Pulverizer: The only routine maintenance required for the pulverizer is oiling of the joints in the clamping mechanism, daily during full production. Wear eventually will necessitate shimming to keep the mechanism clamping the pots tightly. The O-rings of the pot lids should be monitored closely and replaced if there is visible damage or evidence that any powdered sample is leaking during pulverizing. The components of the pots gradually will wear to the point that they no longer pulverize efficiently and have to be retired. Wear will be obvious as reduced size of the rings and puck and slight concave curvature of the bottom of the bowl and the lid. Pulverizing efficiency for each pot should be checked periodically by pulverizing 250 grams of cleaning gravel for the standard 80 seconds and sieving it thoroughly through a 100 mesh screen. The product should be at least 98% minus 100 mesh. A supervisor also should routinely spot check each employee's pulverizing by screening random pulps to verify they meet the specification of 98% minus 100 mesh, and should check pulps in every tray using the feel test for grittiness. Senior employees performing sample prep without direct supervision must do these tests on their own work.

Dust Collector System:

B - V. REVERSE DRILL CUTTINGS

Generally, these samples are treated the same as rocks and drill core, except they usually do not require jaw crushing. Cone crushing must be done unless they contain no fragments larger than 10 mesh. Drill cutting samples usually are large and most are received wet. You may be given special instructions regarding the recording of wet samples and overweight.

Review the section titled "Rocks & Drill Core".

B - VI. SOILS & SEDIMENTS

1. Set out the dried samples in order by the work location, which preferably should be in a dust hood. Have the corresponding pulp bags at hand in the same order.

Obtain a sheet of Kraft paper and a sieve of the required mesh size, which normally is 80 mesh unless otherwise specified. Inspect the screen to make sure it is in good condition with no tears, distortion or separation at the edge.

Ensure that you are wearing safety glasses and a dust mask.

2. Starting with the first sample, if it has dried into a hardened mass, pound it with a rubber mallet to break up the material, being careful to try to avoid rupturing the sample bag.

Empty the sample into the sieve, which should be sitting on the sheet of paper. Agitate the sieve in a side to side motion to shake the fine material through the screen. An occasional sharp rap may help clear the holes so the material passes through more efficiently. Agglomerated material should be broken up between the fingers or in a separate container such as a mortar and pestle, but do not break down stones or vegetation. Do not rub sample material against a fine screen as these screens are easily damaged; you can stack a 10 mesh screen on top and rub material through it to help break it up.

Do not let any of the sample escape out the top of the sieve onto the paper. If this happens and you cannot separate and remove 100 percent of the coarser material from the pulp, then the pulp has to be returned into the sieve and rescreened.

Fold the paper and pour the screened sample into its pulp bag.

3. Usually at least 30 grams of pulp is required unless you are told differently. A balance is available to check how much you have obtained. Tare the balance with an empty pulp bag before weighing the pulp.

If you cannot obtain enough pulp, first make sure all agglomerated material has been liberated including particles stuck to stones. If you still need more, then transfer the sample oversize from the 80 mesh sieve into a 40 mesh sieve and screen what will pass through that. Transfer this "-40 mesh" fraction into a separate pulp bag that you have marked with the sample number and "-40". Fold this bag tightly and place it inside the bag of -80 mesh pulp after first inspecting it to make sure it will not leak into the finer pulp.

4. Fold over the top of the pulp bag to prevent contaminants from getting into it and place on a cardboard tray. The bags are arranged in order on the tray in 4 rows of 5 samples (20 per full tray), beginning at the front left.

Dump the oversize material from the screen onto the paper and pour it back into the original sample bag. (If the bag is torn, patch or replace it.) Place the bags of oversize in a plastic sample bag and when this is full or the end of a work order is reached, seal the plastic bag with tape and place it in a rice sack that has been marked with the work order number and client name.

5. After each sample, clean the sieve(s) and the sheet of paper with compressed air. Be careful not to damage fine screens when blowing them clean; never contact the screen with the nozzle.

6. When preparation of a tray of samples has been completed, take it into the lab. Place the trays in order on the "in" shelves or at a work station where you have been instructed to take them.

When the last tray of a work order is brought into the lab, write the date in the log book by the "X" under "Sample Prep" on the line for that work order. Make sure the work order copy and the Sample Sorting and Preparation form are brought in with the last tray.

B - VII. CONCENTRATES

Various types of concentrates may be received and their preparation will vary somewhat depending on type. Generally, they require riffle splitting if they are much larger than 300 grams and most require pulverizing. Review these parts of the section titled "Rocks & Drill Core".

Pan concentrates usually are small. Extra care must be taken to avoid loss of sample, not only because there may be no surplus material to waste but also because light or heavy components of the sample may tend to be lost preferentially and this will alter the analysis. Recover all particles of the sample from the bag or other container in which it was received. For this purpose, a wet sample in a non-porous container can be washed into a beaker using a wash bottle and the sample can be dried in the beaker in a drying oven where it is safe from contamination or on a warm hotplate (being very careful not to overheat it). Pulverize cleaning gravel before and after each sample, even if no visible material sticks in the pots. Be sure the lid seal on the pot will not leak and take care to minimize loss of sample when cleaning out the pot.

Placer concentrates also must be thoroughly recovered from their sample containers or small, heavy gold particles may easily be left behind, especially in bag seams. Again, it is important to clean the pulverizing pots with cleaning gravel after every sample. The pulps should be rolled to ensure that the gold grains are distributed as homogeneously as possible.

Mine mill concentrates usually are extremely high grade so the greatest concern with these samples is to not contaminate other samples. They should be prepared away from any other samples and care should be taken to avoid raising dust from them. All equipment must be cleaned meticulously afterwards. These samples also require careful adherence to proper preparation procedures because the utmost accuracy of analytical results is demanded. Pulps should be rolled, especially in the case of gold concentrates.

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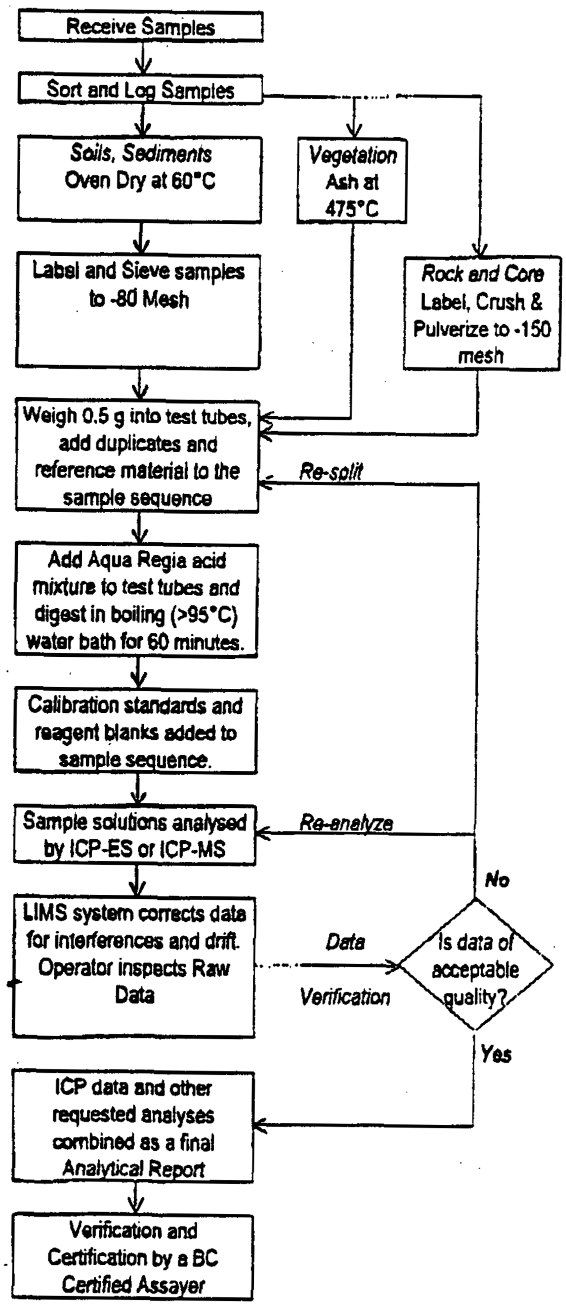
METHODS AND SPECIFICATIONS FOR ANALYTICAL PACKAGE
GROUP 1D & 1DX - ICP ANALYSIS – AQUA REGIA

Analytical Process



Comments

Sample Preparation

Soil or sediment is dried (60°C) and sieved to -80 mesh (-177 µm). Vegetation is dried (60°C) and pulverized or ashed (475°C). Moss-mats are dried (60°C), pounded and sieved to yield -80 mesh sediment. Rock and drill core is jaw crushed to 70% passing 10 mesh (2 mm), a 250 g aliquot is riffle split and pulverized to 95% passing 150 mesh (100 µm) in a mild-steel ring-and-puck mill. Aliquots of 0.5 g are weighed into test tubes. QA/QC protocol includes inserting a duplicate of pulp to measure analytical precision, a coarse (10 mesh) rejects duplicate to measure method precision (drill core samples only), two analytical blanks to measure background and an aliquot of in-house reference material STD DS3 to measure accuracy in each analytical batch of 34 samples.

Sample Digestion

Aqua Regia, a 2:2:2 mixture of ACS grade concentrated HCl, concentrated HNO_3 and de-mineralised H_2O, is added to each sample. Samples are digested for one hour in a hot water bath (>95°C). QA/QC protocol requires simultaneous digestion of two regent blanks randomly inserted in each batch.

Sample Analysis

Group 1D: sample solutions are aspirated into a Jarrel Ash AtomComp 800 or 975 ICP emission spectrograph to determine the following 30 elements: Ag, Al, As, Au, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, K, La, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Sr, Th, Ti, U, V, W, Zn.

Group 1DX: sample solutions are aspirated into a Perkin Elmer Elan 6000 ICP mass spectrometer to determine the following 35 elements: Ag, Al, As, Au, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, *Ga*, *Hg*, K, La, Mg, Mn, Mo, Na, Ni, P, Pb, *S*, Sb, *Sc*, *Tl*, Sr, Th, Ti, U, V, W, Zn.

Data Evaluation

Raw and final data undergoes a final verification by a British Columbia Certified Assayer who then signs the Analytical Report before it is released to the client. Chief Assayer is Clarence Leong, other certified assayers are Dean Toye and Jacky Wang.

GEOCHEMICAL – ICP by Aqua Regia Digestion

GROUP 1C MERCURY BY COLD VAPOUR AA OR ICP-MS

Accurate, low level determination of Hg by Aqua Regia digestion followed by either cold vapour AA or ICP-MS analysis.

Element	Method	Detection	Cdn	U.S.
Hg	Cold Vapour AA or ICP-MS	10 ppb	**$4.40**	**$3.30**
Hg	Cetac Cold Vapour AA	1 ppb	**$7.70**	**$5.80**

Analysis is not suitable for high-grade Au, Pt or elevated Se samples (cold vapour method only). Acme retains the right to select the method of determination.

GROUP 1D, 1DX & 1DA: ICP & ICP-MS ANALYSIS – AQUA REGIA

NEW!

Now you can choose ICP-ES or **ICP-MS** analysis at very economical prices to complement your geochemical survey. You can also select a larger split size to ***get better Au values without a second, costly analysis***. A 0.5 g split is leached in hot (95°C) Aqua Regia then analysed by ICP-ES **(Group 1D)** or ICP-MS **(Group 1DX)**. **Group 1DA** offers a choice of 10 g, 20 g or 30 g splits.

Group 1D	Cdn	U.S.
Any 1 element	**$3.85**	**$2.90**
Any 5 elements	**$5.20**	**$3.90**
All 30 elements	**$6.25**	**$4.75**
‡Include Hg and Tl add	**$0.50**	**$0.40**

Group 1DX	Cdn	U.S.
Any 1 element	**$6.00**	**$4.50**
Any 5 elements	**$7.50**	**$5.60**
All 35 elements	**$9.00**	**$6.75**

Group 1DA	Cdn	U.S.
10 gm split	add **$2.50**	**$1.90**
20 gm split	add **$3.75**	**$2.80**
30 gm split	add **$5.00**	**$3.75**

See Page 6 for Group 1F-MS Aqua Regia / ICP Mass Spec analysis for ultratrace elements

	Group 1D Detection	Group 1DX & 1DA Detection	Upper Limit
Ag	0.3 ppm	0.1 ppm	100 ppm
Al*	0.01 %	0.01 %	10 %
As	2 ppm	0.5 ppm	10000 ppm
Au	2 ppm	0.5 ppb	100 ppm
B*	3 ppm	1 ppm	2000 ppm
Ba*	1 ppm	1 ppm	1000 ppm
Bi	3 ppm	0.1 ppm	2000 ppm
Ca*	0.01 %	0.01 %	40 %
Cd	0.5 ppm	0.1 ppm	2000 ppm
Co	1 ppm	0.1 ppm	2000 ppm
Cr*	1 ppm	1 ppm	10000 ppm
Cu	1 ppm	0.1 ppm	10000 ppm
Fe*	0.01 %	0.01 %	40 %
Ga*	-	1 ppm	1000 ppm
Hg‡	1 ppm	0.01 ppm	100 ppm
K*	0.01 %	0.01 %	10 %
La*	1 ppm	1 ppm	10000 ppm
Mg*	0.01 %	0.01 %	30 %
Mn*	2 ppm	1 ppm	10000 ppm
Mo	1 ppm	0.1 ppm	2000 ppm
Na*	0.01 %	0.001 %	10 %
Ni	1 ppm	0.1 ppm	10000 ppm
P*	0.001 %	0.001 %	5 %
Pb	3 ppm	0.1 ppm	10000 ppm
S	-	0.05 %	10 %
Sb	3 ppm	0.1 ppm	2000 ppm
Sc	-	0.1 ppm	100 ppm
Sr*	1 ppm	1 ppm	10000 ppm
Th*	2 ppm	0.1 ppm	2000 ppm
Ti*	0.01 %	0.001 %	10 %
Tl‡	5 ppm	0.1 ppm	1000 ppm
U*	8 ppm	0.1 ppm	2000 ppm
V*	1 ppm	1 ppm	10000 ppm
W*	2 ppm	0.1 ppm	100 ppm
Zn	1 ppm	1 ppm	10000 ppm

*Some elements are partially leached

Appendix B

2002 Geochemistry Results

2002 Mineral Assessments - Proposed Wellesley Lake SMA
EMR Rock Sample Geochemistry

Sample Number	Albers X	Albers Y	Sample Type	Project	Ba ppm	Cr ppm	Ga ppm	La ppm	Mn ppm	Sr ppm	V ppm	Zn ppm	Al %	Ag ppm	As ppm	Au ppb	B ppm	Bi ppm	Ca %	Cd ppm	Co ppm
140304	118438.3281	887128.3103	rock	Wellesley	111	71	10	11	1074	57	114	80	1.71	0.05	3.1	1.3	3	0.05	2.13	0.1	14.9
176523	116437.7093	894103.4722	rock	Wellesley	12	156	2	0	116	248	35	5	0.58	0.05	0.7	0.25	0.5	0.05	0.89	0.05	1.3
176524	116437.7228	894112.4529	rock	Wellesley	41	69	12	2	1124	11	190	77	3.18	0.05	1.7	0.25	10	0.05	2.21	0.05	34.2
176525	116400.8123	894534.4734	rock	Wellesley	388	148	7	3	312	20	50	39	1.15	0.05	1.4	0.25	1	0.1	0.75	0.05	12.1
176526	116304.2495	894865.8338	rock	Wellesley	651	34	13	3	779	18	34	78	1.68	0.05	1.8	0.6	6	0.05	1.57	0.05	11.1
176527	116134.0547	896111.9864	rock	Wellesley	952	48	8	14	2729	23	55	70	1.07	0.05	2.5	3.3	0.5	0.1	0.35	0.05	12.4
97174	122483.1433	890718.6002	rock	Wellesley	509	183	3	6	111	11	50	19	0.79	0.1	7	0.25	1	0.1	0.16	0.05	9.2
97663	129918.5718	905110.5746	rock	Wellesley	494	495	6	10	976	361	84	65	2.16	0.1	2.7	0.25	9	0.05	0.95	0.05	58.4

Sample Number	Cu ppm	Fe %	Hg ppm	K %	Mg %	Mo ppm	Na %	Ni ppm	P %	Pb ppm	S %	Sb ppm	Sc ppm	Th ppm	Ti %	Tl ppm	U ppm	W ppm	Utmzone	X	Y
140304	32.9	3.69	0.01	0.12	1.26	0.2	0.049	22	0.103	7.4	0.025	0.2	8.6	1.7	0.235	0.1	0.8	0.3	07V	558677	6905744
176523	5.5	0.81	0.01	0.01	0.04	0.4	0.005	3.5	0.004	0.8	0.025	0.05	2.2	0.05	0.038	0.1	0.05	0.1	07V	555764	6912385
176524	17.5	6.16	0.5	0.01	2.53	0.1	0.051	46.3	0.07	1.3	0.025	0.1	10.5	0.1	0.347	0.1	0.05	0.1	07V	555763	6912393
176525	9.8	1.68	0.5	0.01	0.87	0.3	0.036	37.5	0.023	3.6	0.025	0.3	4.5	1.6	0.112	0.1	0.3	0.2	07V	555670	6912806
176526	3.2	4.99	0.01	0.07	0.63	0.2	0.108	0.05	0.182	0.8	0.025	0.05	7.4	0.1	0.139	0.1	0.05	0.05	07V	555530	6913122
176527	44.9	2.92	0.04	0.05	0.84	0.2	0.061	18.4	0.066	5.8	0.025	0.1	6	1.7	0.018	0.1	0.2	0.1	07V	555195	6914333
97174	74.7	1.7	0.5	0.5	0.67	6.4	0.046	36.8	0.045	2.4	0.6	0.2	4.9	2.3	0.036	0.3	1.5	0.1	07V	562208	6909838
97663	111.6	5.11	0.5	1.09	9.52	0.4	0.727	689.1	0.233	4.4	0.025	0.1	2	2.3	0.122	0.1	1.2	0.1	07V	567660	6925079

Sample Number	Datum	Date	Person	Quality	Description	Width	Attitude
140304	NAD83	20020830	RH		Rock grab from cliff outcrop of brn wea lithic - basalt conglomerate. 5-10% chert clasts and approx. 1% red chert. Variably siliceous matirx. Red chert (jasper) or siliceous ??		
176523	NAD83	20020830	RS		quartz-epidote vein dark green fine grained andesite.	0.05	000/12E
176524	NAD83	20020830	RS		andesite wall rock to quartz-epidote vein	0.5	
176525	NAD83	20020830	RS		very fine grained light grey green rhyolite or silicified altered andesite.	1	
176526	NAD83	20020830	RS		massive fine grained and medium grained andesite. With trace pyrite disseminated.	1	
176527	NAD83	20020830	RS		finely laminated maroon grey chert.	1	bed 160/63E
97174	NAD83	20020614	RH		Float medium orange-brown quartz-feldspar gneiss (granite?), 1% diss blebs pyrite, tr-.5% diss chalcopyrite.	grab	
97663	NAD83	20020614	RS		massive to weakly bedded basalt - Carmacks Gp.	2	

2002 Mineral Assessments - Proposed Wellesley Lake SMA
EMR Soil Sample Geochemistry

Sample Number	Albers X	Albers Y	Sample Type	Project	Ba ppm	Cr ppm	Ga ppm	La ppm	Mn ppm	Sr ppm	V ppm	Zn ppm	Al %	Ag ppm	As ppm	Au ppb	B ppm	Bi ppm	Ca %
176258	115818.5324	903560.2291	soil	Wellesley	322	40	9	10	243	11	94	77	2.32	0.2	39.2	2.2	0.5	0.2	0.13
176259	115720.3549	903477.5038	soil	Wellesley	268	49	9	8	339	17	98	59	2.84	0.2	38.8	5.4	2	0.2	0.24
176260	115624.9205	903470.8168	soil	Wellesley	253	41	9	12	353	22	91	50	2.46	0.5	10.8	3.7	1	0.2	0.25
176261	115524.4221	903386.1249	soil	Wellesley	893	30	8	15	570	17	75	66	2.42	0.1	74.5	7.3	1	0.2	0.24
176262	115446.7156	903340.2893	soil	Wellesley	343	49	8	8	525	21	100	68	3.05	0.2	32.6	3.1	1	0.2	0.3
176263	115339.1535	903358.6263	soil	Wellesley	235	51	8	9	362	22	87	68	3.45	0.4	15	4.5	1	0.2	0.31
176264	115929.5002	903575.193	soil	Wellesley	467	49	7	13	491	29	90	58	2.35	0.05	7.3	5.4	1	0.1	0.38
176265	116030.5022	903607.0583	soil	Wellesley	297	42	8	9	471	34	88	49	3.03	0.1	40.5	4.5	1	0.2	0.39
176266	116145.4387	903620.4376	soil	Wellesley	292	43	8	8	418	22	87	60	2.98	0.1	65.3	5.1	1	0.2	0.33
176267	116216.1408	903809.726	soil	Wellesley	335	49	8	9	523	27	103	58	2.53	0.1	67.3	33.5	1	0.2	0.38
176268	116266.0548	903994.7315	soil	Wellesley	387	41	10	7	427	22	109	93	2.41	0.1	29.5	7.3	1	0.2	0.26
176269	116406.692	904155.5562	soil	Wellesley	355	48	8	8	336	27	92	62	3.09	0.1	24.7	3.8	2	0.2	0.36
176270	115929.5002	903575.193	soil	Wellesley	472	49	7	13	531	30	92	60	2.43	0.1	7.4	5.7	1	0.1	0.42
176271	116494.6933	904465.206	soil	Wellesley	355	32	6	13	551	19	53	62	1.99	0.1	82.7	3	2	0.3	0.25
176272	116538.8391	904716.0242	soil	Wellesley	314	40	8	11	316	31	81	65	2.78	0.3	210.3	56.7	1	0.2	0.37
176273	116612.4435	904956.6304	soil	Wellesley	577	34	11	9	593	26	130	79	3.48	0.1	103.7	3.4	1	0.1	0.48
176274	116704.3362	905123.2135	soil	Wellesley	222	40	7	8	385	22	90	82	2.4	0.3	27.3	3.7	1	0.2	0.26
176275	116772.2093	905328.5644	soil	Wellesley	438	45	9	9	560	21	94	64	2.9	0.1	12.7	6.8	1	0.2	0.25
176276	116986.182	905292.1095	soil	Wellesley	540	48	8	8	312	19	82	59	3.01	0.2	24.5	4.3	2	0.1	0.26
176277	117159.8791	905178.4413	soil	Wellesley	483	44	8	9	682	28	97	84	2.18	0.2	13	4.9	1	0.2	0.38
176278	117472.8028	905134.8565	soil	Wellesley	292	46	7	10	427	35	93	70	2.34	0.1	30.3	6.1	2	0.2	0.56
176279	117756.7599	904884.7306	soil	Wellesley	447	38	5	8	620	41	76	54	1.79	0.1	13.1	6.8	2	0.1	0.67
176280	116538.8391	904716.0242	soil	Wellesley	297	39	7	10	310	26	74	58	2.39	0.2	191.8	55.3	1	0.1	0.3
176616	118496.4834	887223.6787	soil	Wellesley	182	66	8	8	445	28	94	58	2.88	0.1	10.5	2.9	1	0.2	0.45
176617	118178.5849	887230.4964	soil	Wellesley	201	39	7	10	360	32	78	51	1.95	0.1	8.4	6.9	1	0.1	0.52
176618	117866.4756	887443.234	soil	Wellesley	160	43	8	7	346	24	92	61	2.82	0.1	10.1	2.9	1	0.2	0.34
176619	117868.2073	887748.3912	soil	Wellesley	186	36	7	11	280	36	75	46	2.29	0.1	8.5	4.8	1	0.2	0.46
JVR02017	128674.519	904793.3937	soil	Wellesley	165	47	6	10	408	35	77	47	1.9	0.05	7.5	12.6	1	0.1	0.73
JVR02018	128721.1598	904437.8604	soil	Wellesley	126	37	5	15	385	37	78	44	1.79	0.05	5.1	1.5	2	0.1	0.76
JVR02019	128657.3581	904156.6785	soil	Wellesley	135	42	6	15	381	36	79	49	1.87	0.1	9.3	4.8	2	0.2	0.71
RS02W04	128304.8375	905084.8379	soil	Wellesley	222	286	8	17	653	171	133	60	2.75	0.1	4.7	6.7	5	0.1	0.84
RS02W06	128072.918	904873.4044	soil	Wellesley	226	219	7	17	768	158	112	63	2.57	0.1	6.1	15.4	4	0.1	0.82

Sample Number	Cd ppm	Co ppm	Cu ppm	Fe %	Hg ppm	K %	Mg %	Mo ppm	Na %	Ni ppm	P %	Pb ppm	S %	Sb ppm	Sc ppm	Th ppm	Ti %	Tl ppm	U ppm	W ppm	Utmzone
176258	0.1	9.4	65.4	3.71	0.02	0.07	0.4	1.4	0.011	62.6	0.027	6.6	0.025	5.1	4.7	3	0.085	0.1	0.4	0.2	07V
176259	0.1	15	38.3	3.97	0.02	0.06	0.53	1.4	0.011	39.4	0.036	6.6	0.025	2.4	5	2.2	0.115	0.1	0.5	0.1	07V
176260	0.1	9.5	33.4	3.37	0.04	0.04	0.46	2	0.014	23.9	0.035	9.5	0.025	1.3	5	1.8	0.089	0.1	0.7	0.1	07V
176261	0.1	10.5	61.8	2.92	0.01	0.18	0.78	0.5	0.011	35.4	0.021	5.1	0.025	4.4	7.7	3.3	0.125	0.1	0.5	0.3	07V
176262	0.2	17.5	34.3	4.76	0.02	0.06	0.62	1.6	0.019	40.4	0.046	8.4	0.025	4.4	5.2	2.1	0.111	0.1	0.5	0.1	07V
176263	0.1	15.1	32.8	3.93	0.03	0.04	0.67	2	0.019	35.4	0.076	9	0.025	1	5	2.5	0.097	0.1	0.7	0.1	07V
176264	0.1	14	40	3.19	0.02	0.05	0.7	0.7	0.02	32.6	0.018	5.8	0.025	1.1	8.3	2.6	0.146	0.1	0.6	0.1	07V
176265	0.1	16.8	51.6	3.07	0.01	0.04	0.7	0.8	0.023	32.9	0.029	6.6	0.025	1.1	4.6	2.2	0.116	0.1	0.5	0.2	07V
176266	0.1	15.1	36.1	3.92	0.02	0.06	0.67	1	0.015	41.1	0.031	7.3	0.025	2.7	5.3	2.1	0.127	0.1	0.4	0.1	07V
176267	0.1	15.6	40.2	3.47	0.02	0.06	0.68	1	0.015	35.4	0.024	6.9	0.025	41.9	5.3	1.8	0.137	0.1	0.4	0.2	07V
176268	0.4	12.8	25.6	4.26	0.03	0.06	0.54	1.9	0.01	34.2	0.05	9	0.025	4.7	3.6	1.3	0.1	0.1	0.4	0.1	07V
176269	0.1	18.7	24.1	3.84	0.02	0.07	0.7	1.3	0.018	43.7	0.035	8.5	0.025	1.6	5.1	2.3	0.131	0.1	0.5	0.1	07V
176270	0.1	14.5	40.8	3.29	0.02	0.06	0.7	0.7	0.019	31.2	0.019	6.1	0.025	1	8.6	2.8	0.155	0.1	0.6	0.1	07V
176271	0.05	12.9	87.1	2.7	0.01	0.04	0.46	1	0.007	32	0.019	10.3	0.025	5.7	5.4	3.1	0.052	0.1	0.4	0.2	07V
176272	0.1	12.6	27.6	3.28	0.03	0.06	0.64	0.9	0.026	25.4	0.033	8.6	0.025	12.5	5.4	3.5	0.087	0.1	0.9	0.1	07V
176273	0.1	13.6	15.9	5.04	0.01	0.56	1.36	0.5	0.016	18.7	0.031	6.6	0.025	1.4	10.2	5.7	0.28	0.3	0.7	0.2	07V
176274	0.3	12.5	27.8	3.1	0.02	0.05	0.55	1.1	0.014	34.6	0.021	7.7	0.025	3.8	3.7	2	0.069	0.1	0.5	0.2	07V
176275	0.1	16	34.2	4.15	0.03	0.06	0.61	1.7	0.014	36.8	0.036	11.9	0.025	1.6	5.2	3	0.083	0.1	0.5	0.1	07V
176276	0.2	14.2	33	3.5	0.02	0.06	0.66	1	0.012	39.2	0.029	10	0.025	1.5	4.4	2.6	0.077	0.1	0.4	0.1	07V
176277	0.2	13.5	27.2	3.64	0.01	0.05	0.62	1.6	0.016	29.9	0.033	8.8	0.025	1.4	3.8	1.9	0.082	0.1	0.4	0.1	07V
176278	0.2	13.4	28	3.49	0.02	0.09	0.74	2.1	0.025	31.7	0.057	7.9	0.025	1.3	5.1	2.6	0.097	0.1	0.4	0.1	07V
176279	0.2	12.9	27.4	2.82	0.02	0.06	0.59	0.6	0.034	24	0.047	6	0.025	0.6	4.5	2.1	0.119	0.1	0.4	0.1	07V
176280	0.1	12.7	24.1	3.27	0.03	0.05	0.6	0.9	0.021	24.2	0.033	7.7	0.025	10.9	5	3.4	0.065	0.1	0.7	0.2	07V
176616	0.1	17.7	56.1	3.88	0.02	0.07	0.84	1.1	0.017	38.5	0.027	6.2	0.025	0.6	6.4	2.7	0.115	0.1	0.5	0.4	07V
176617	0.1	12.5	28.7	3.06	0.01	0.04	0.55	1.2	0.022	26.9	0.037	7.4	0.025	0.3	4.4	2.3	0.088	0.1	0.6	0.1	07V
176618	0.2	14.5	25.4	3.62	0.02	0.05	0.67	1.2	0.014	31.7	0.037	7.9	0.025	0.3	4.3	2.2	0.106	0.1	0.4	0.1	07V
176619	0.1	11.8	26.8	2.81	0.02	0.04	0.55	1.2	0.024	25.8	0.035	8.2	0.025	0.4	4.4	2.7	0.081	0.1	0.6	0.1	07V
JVR02017	0.1	12.7	30	3.03	0.01	0.11	0.66	0.6	0.036	31.6	0.024	4.8	0.025	0.4	7	2.7	0.136	0.1	0.3	0.1	07V
JVR02018	0.1	11.5	36.1	2.9	0.01	0.08	0.71	0.5	0.051	33.2	0.025	4.2	0.025	0.4	6.7	3	0.137	0.1	0.4	0.1	07V
JVR02019	0.1	14.5	43.6	3.16	0.02	0.07	0.69	0.8	0.037	40.1	0.016	8	0.025	0.6	6.8	3.1	0.136	0.1	0.4	0.2	07V
RS02W04	0.05	31	83.9	4.1	0.02	0.24	2.75	0.4	0.076	219.5	0.166	5.2	0.025	0.3	6	3.2	0.174	0.1	1	0.2	07V
RS02W06	0.1	29.9	72.2	4.18	0.02	0.23	2.5	0.6	0.042	225.7	0.099	5.2	0.025	0.4	6.5	2.8	0.161	0.1	0.8	0.1	07V

Sample Number	X	Y	Datum	Date	Person	Quality	Description
176258	553889	6921666	NAD83	20020830	FA	good	or-br soil with 10% rock chips. Tan siltstone
176259	553803	6921571	NAD83	20020830	FA	good	br soil, 25cm depth. Tan quartzite
176260	553709	6921551	NAD83	20020830	FA	fair	dark br soil, 25cm depth. Brown siltstone
176261	553621	6921454	NAD83	20020830	FA	good	or-br soil , 10cm depth. Metamorphosed siltstone
176262	553550	6921398	NAD83	20020830	FA	good	or-br soil, 30cm depth. Dark grey siltstone
176263	553441	6921402	NAD83	20020830	FA	fair	br soil below ash layer. >30cm depth.
176264	553997	6921695	NAD83	20020830	FA	fair	dup of 176270. Br clay rich soil, 15cm depth. Beige chert
176265	554093	6921740	NAD83	20020830	FA	fair	br loess & soil, 15cm depth. Diorite & quartzite
176266	554205	6921769	NAD83	20020830	FA	good	br soil, 40cm depth. Beige chert
176267	554250	6921966	NAD83	20020830	FA	fair	clay rich and damp. 10cm depth. Brown chert
176268	554275	6922155	NAD83	20020830	FA	good	or-br soil, 10cm depth. Brown chert
176269	554393	6922333	NAD83	20020830	FA	good	yw-br soil, 30cm depth. Laminated cherty siltstone. Brown chert
176270	553997	6921695	NAD83	20020830	FA	fair	dup of 176264. Br clay rich soil, 15cm depth. Beige chert
176271	554439	6922652	NAD83	20020830	FA	good	pale br soil, 25cm depth. Laminated cherty siltstone.
176272	554449	6922906	NAD83	20020830	FA	good	dup of 176280.Br soil, 20cm depth. Brown weathered intrusive
176273	554490	6923154	NAD83	20020830	FA	good	br soil, 15cm depth. Rotten intrusive.
176274	554559	6923331	NAD83	20020830	FA	good	rd-br soil, 15cm depth. Black quartzite
176275	554599	6923544	NAD83	20020830	FA	good	yw-br clay rich soil, 25cm depth. Brown chert
176276	554816	6923536	NAD83	20020830	FA	good	yw-br soil, 20cm depth. Dark grye chert
176277	555003	6923447	NAD83	20020830	FA	fair	rocky rd-br soil,15cm depth. Tan chert
176278	555319	6923445	NAD83	20020830	FA	good	br soil, 40cm depth. No rock
176279	555634	6923235	NAD83	20020830	FA	good	gry-br soil, 20cm depth, metamorphosed siltstone.
176280	554449	6922906	NAD83	20020830	FA	good	dup of 176272. Br soil, 20cm depth. Brown weathered intrusive
176616	558722	6905846	NAD83	20020830	RH	fair	brown soil, some loess and ash, located above basalt lithic conglomerate.
176617	558406	6905811	NAD83	20020830	RH	poor	all but useless, loess and ash rich, some organics.
176618	558068	6905980	NAD83	20020830	RH	poor	loess, cobbles and pebbles of basalt andesite.
176619	558029	6906282	NAD83	20020830	RH	poor	brn, loess rich,
JVR02017	566469	6924599	NAD83	20020614	JvR	poor	soil with lots of organics in 80cm hole
JVR02018	566563	6924254	NAD83	20020614	JvR	fair	light brown soil from overturned tree 40cm pit
JVR02019	566537	6923967	NAD83	20020614	JvR	fair	red brown soil from overturned tree 60cm pit
RS02W04	566064	6924839	NAD83	20020614	RS	fair	0.5m deep, uprooted tree, orn-brn w/ basalt float
RS02W06	565862	6924598	NAD83	20020614	RS	fair	0.4m deep yl-brn soil, uprooted tree

2002 Mineral Assessments - Proposed Wellesley Lake SMA
EMR Silt Sample Geochemistry

Sample Number	Albers X	Albers Y	Sample Type	Project	Ba ppm	Cr ppm	Ga ppm	La ppm	Mn ppm	Sr ppm	V ppm	Zn ppm	Al %	Ag ppm	As ppm	Au ppb	B ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cu ppm	Fe %
176528	113311.8164	887952.1508	silt	Wellesley	123	32	4	9	344	39	63	58	1.44	0.1	4.6	2.2	1	0.1	0.8	0.1	10.6	25.7	2.34
176529	111140.5947	893991.9607	silt	Wellesley	133	34	5	9	636	51	69	61	1.49	0.1	5.6	2.6	2	0.1	1.19	0.1	12.3	33.4	2.54
176530	115281.3054	904961.2047	silt	Wellesley	98	25	4	9	232	34	51	51	1.22	0.05	14.6	12.4	0.5	0.1	0.68	0.1	8.5	16.1	1.88
176531	115026.6794	904663.4437	silt	Wellesley	101	37	5	10	314	38	61	53	1.39	0.1	7.2	1.7	1	0.1	0.77	0.1	10.4	23.6	2.2
176620	115826.0246	889111.744	silt	Wellesley	115	33	5	10	468	40	70	56	1.32	0.1	5.8	237.5	1	0.1	0.91	0.1	11.2	24.1	2.41
176621	116553.9572	896819.3313	silt	Wellesley	95	26	4	8	250	38	58	52	1.28	0.05	3.1	4.3	1	0.05	0.81	0.05	8.6	15.4	1.97
97173	122482.2442	890715.3367	silt	Wellesley	145	29	4	9	1662	50	61	68	1.36	0.1	8.2	1.9	3	0.1	1.24	0.2	12.2	18.4	2.36
97604	124707.4149	891586.8086	silt	Wellesley	142	34	5	10	1686	56	69	80	1.63	0.1	8.1	3.1	2	0.1	1.23	0.1	16.5	25	2.98
97605	125250.59	891920.604	silt	Wellesley	72	25	4	9	264	40	55	48	1.18	0.05	1.9	8.1	2	0.1	0.91	0.1	6.9	11.2	1.82
JVR02020	128586.9288	904113.0915	silt	Wellesley	114	30	4	10	387	81	64	47	1.23	0.1	4.2	4.3	3	0.1	2.55	0.2	10.2	28.6	2.25

Sample Number	Hg ppm	K %	Mg %	Mo ppm	Na %	Ni ppm	P %	Pb ppm	S %	Sb ppm	Sc ppm	Th ppm	Ti %	Tl ppm	U ppm	W ppm	Utmzone	X	Y	Datum	Date	Person	Quality
176528	0.03	0.05	0.6	0.4	0.035	23.5	0.079	6.1	0.025	0.4	4.3	1.9	0.103	0.1	1.4	0.1	07V	553486	6905877	NAD83	20020830	RS	poor
176529	0.03	0.06	0.67	0.4	0.044	25.6	0.077	4	0.025	0.3	4.6	1.6	0.109	0.1	0.6	0.1	07V	550528	6911568	NAD83	20020830	RS	poor
176530	0.02	0.04	0.55	0.3	0.032	21.1	0.104	3.7	0.025	1.6	3.4	2	0.106	0.1	0.5	0.2	07V	553170	6922981	NAD83	20020830	RS	poor
176531	0.02	0.07	0.7	0.4	0.038	28.6	0.095	3.6	0.025	0.3	3.9	2	0.128	0.1	0.5	0.1	07V	552957	6922653	NAD83	20020830	RS	poor
176620	0.03	0.06	0.67	0.5	0.039	23.9	0.082	4.3	0.025	0.3	3.8	2.2	0.101	0.1	0.6	0.2	07V	555823	6907360	NAD83	20020830	RH	good
176621	0.02	0.05	0.62	0.2	0.04	17.7	0.073	3.4	0.025	0.1	3.3	1.8	0.105	0.1	0.4	0.2	07V	555517	6915089	NAD83	20020830	RH	poor
97173	0.04	0.07	0.59	0.6	0.043	22.9	0.086	3.6	0.025	0.3	4	1.6	0.114	0.1	0.5	0.2	07V	562207	6909835	NAD83	20020614	RH	poor
97604	0.03	0.1	0.74	0.7	0.048	26	0.09	5.4	0.025	0.5	5.3	2.2	0.134	0.1	0.7	0.1	07V	564297	6910994	NAD83	20020614	FA	poor
97605	0.01	0.06	0.53	0.3	0.041	15.4	0.078	3	0.025	0.2	3.3	1.8	0.121	0.1	0.5	0.2	07V	564791	6911397	NAD83	20020614	FA	fair
JVR02020	0.01	0.09	0.8	0.6	0.051	26.4	0.08	4	0.025	0.4	4	2.1	0.12	0.1	0.6	0.1	07V	566473	6923914	NAD83	20020614	JvR	poor

Sample Number	Description
176528	black silt on organic stream bed
176529	black silt on organic stream bed
176530	grey brown silt on black organic stream bed
176531	grey brown clay-silt on black organic stream bed, mica flakes
176620	sandy silt, brn, rounded pebbles of intermediate volc and intrusives.
176621	all but useless, till, ash and muck.
97173	mouth of creek, sample consists of reworked glacial material.
97604	organic silt from toe of dam on upstream side of log/moss jam at mouth of creek. Moderate water flow & moderate grade as streamm drops to lake level. Stn FA02032
97605	located streamm by where it enters Wellesley lake. Source of 13ppb gold RGS sample. Cannot guess at quality of sample but trap site would be good if there was an actual streaming flow. Mix of intermediate volcanics, granites,,,,
JVR02020	dark grey/brown silt is barely moving water

Appendix C

Detailed Mineral Assessment
Relative Mineral Potential Tract Ranking

Appendix C

Wellesley Lake Proposed SMA
Detailed Mineral Assessment
Mineral Deposit Models applied to each tract

Tract 1
VMS – Besshi/Cyprus Type
Au-Qz veins

Tract 2
VMS – Besshi/Cyprus Type
Gabbroic Ni-Cu
Au-Qz veins

Tract 3
VMS – Besshi/Cyprus Type
Au-Qz Veins
Gabbroic Ni-Cu
Minor Podiform Chromite

Tract 4
Epithermal Au (High S Type)

Tract 5
Epithermal Au (High S Type)

Tract 6
Epithermal Au (High S Type)

Tract 7
VMS – Besshi/Cyprus Type
Epithermal Au (High S Type)

Relative Mineral Potential Ranking of Tracts

Tract	Rank
1	3
2	1
3	2
4	5
5	7
6	6
7	4

Appendix D

2002 Photographs

View of Wellesley Lake from northwest ridges

Shoreline southeast side of Wellesley Lake

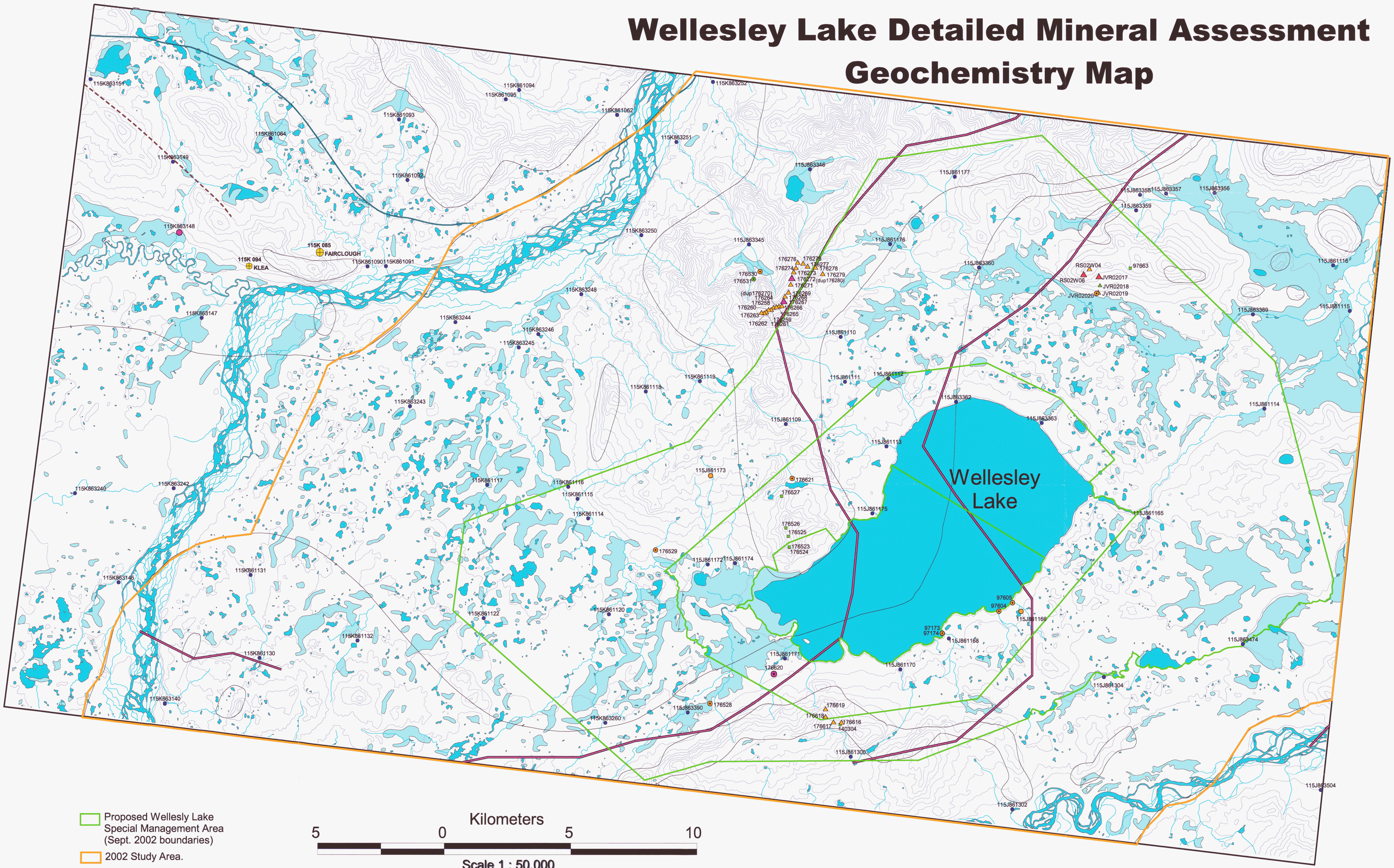

Outlet of Wellesley Lake looking northeast


Outlet of Wellesley Lake looking southwest from Windy/McKinley Ridge


North end of Wellesley Lake with wetlands in foreground looking easterly


Quartz-epidote veinlet in Windy/McKinley mafic volcanic rocks

Wellesley Lake Detailed Mineral Assessment
Geochemistry Map



Proposed Wellesly Lake Special Management Area (Sept. 2002 boundaries)
2002 Study Area.
Yukon Minfile Occurrence
- SHOWING
- UNKNOWN

Fault, extrapolated, movement undefined
Fault, extrapolated, thrust, upright
Aeromagnetic Trends
Mineral Assessment Tract
Wetlands
Lakes

Kilometers

5 0 5 10

Scale 1 : 50,000

Legend for Au values in ppb

2002 Rock Au ppb	2002 Soil Au ppb	2002 Silt Au ppb	RGS Au ppb	2002 Pancon Au ppb
0.25 - 5.25	>17	>30	98	3.7
0.25	9 - 17	12.61 - 30	10 - 20	
	2 - 9	1.81 - 12.6	0.5 - 10	
	1 - 2	0.71 - 1.8		
	<1	<0.70		

NTS Map Sheets:
115 J/5 & 115 K/8

December, 2002

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Arcview GIS Version 3.2a - RS, RWH, FA - March 2003

Sample Location and Au (ppb) Geochemistry

Figure 5