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**Towards a  
Detailed Mineral Assessment  
of the  
Proposed Snafu/Tarfu  
Natural Environment Park  
Special Management Area**

Phase 1, Compilation

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Internal Report  
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## **Introduction**

The Carcross/Tagish First Nation proposed Snafu/Tarfu (also called Agay Mene Lakes) as a Chapter 10 special management area (SMA) by November 1998. The area was originally negotiated as a Habitat Protection Area, however government of Yukon approved the proposed SMA as a proposed Natural Environment Park with no mineral withdrawal upon effective date of a final agreement with the First Nation.

Carcross/Tagish First Nation recently (March 31, 2002) signed a Memorandum of Understanding with Canada and Yukon governments and the status of the proposed SMAs are yet to be provided by Land Claims Implementation Secretariat (YTG).

Mineral assessments are required land use planning tools to be used during the management planning stages of the proposed SMA and to allow governments to make informed decisions regarding any withdrawals of land within the Yukon Territory. The geology, regional stream sediment surveys, areomagnetic data, and Yukon minfile occurrences have been compiled for the region during the fourth phase of the regional mineral potential exercise of the Yukon. The same data sets has been messaged for a study area slightly larger than the proposed SMA to outline 2002 fieldwork requirements to complete a future detailed mineral assessment of the area.

### Work carried out by YTG

To date, a contractor for the Yukon Department of Energy, Mines and Resources have carried out cursory fieldwork in 2001. A total of 6 rock and soil samples were taken within the proposed SMA area but results of this study were undocumented and sample results are not currently available.

## **Location and Access**

The proposed SMA is located on NTS sheets 105C/3, 4, & 5 southeast of the junction between the Atlin Road (highway # 7) and the Alaska Highway at Jakes Corner. This 716 square kilometer proposed SMA utilizes the Yukon/British Columbia border as its southern extent, Atlin road as its western limit, Alaska Highway as its Northern most extension, and the Western shore of Dalayee Lake as part of its eastern boundary (Figure 1). The proposed SMA encompasses the 5000-foot Mt. White, the Snafu & Tarfu chains of lakes, Snafu Creek, as well as Nokudsay & Hawdt Lakes.

The proposed Snafu/Tarfu SMA is within the Yukon Southern Lakes Ecoregion(#177) and a small portion of the Boreal Mountains and Plateaus Ecoregion (# 180) of the Boreal Cordillera Ecozone (figure 2). Each ecoregion shares distinctive regional ecological factors including climate, physiography, vegetation, soil, water and fauna. Broad valleys and large lakes with a dry and cool climate characterize the Yukon Southern Lakes Ecoregion. Soil types tend to be alkaline with wetlands dominated by marl formation in a discontinuous permafrost zone.

Access to the proposed SMA is by helicopter and by foot from both the Atlin Road & Alaska Highway. A four wheel drive road cuts through the southern portion of the proposed SMA from a point approximately 35 kilometers down the Atlin Road and continues past Tarfu Lake south, southeast to the British Columbia border.

Figure1 (Location Map)

2  
3  
4

Figure 2 (Ecoregions)

## **Exploration History**

Currently, the proposed SMA area covers the Calahan, Big Sqid, & Adam&Erin placer claims in good standing in the south central portion of the proposed SMA. P42028 has a registered owner of Tracie Decin Guidolin and an expiry date of 2006/05/29. P47089 and P47090 are also owned by T. Guidolin and have current expiry dates of 2002/06/25 and 2002/06/27 respectfully. Work on these properties to date has been exploratory in nature with no reported production figures. Backhoe trenching on the properties was conducted in 2001 (M. Burke pers com).

Geologists Mike Burke and Jeff Bond of the Yukon Geology Program visited the property in 2000. Jeff conducted a simple terrain analysis, interpreting the aerial photographs to better define the glacial history of the area for the claim owner. The property is located over a glacial outwash channel composed of mostly intrusive rock debris and native gold placers. The source for these coarse grained gold nuggets is not defined and the glacial history of the area is poorly understood.

At the Tarfu minfile occurrence (#105C007), quartz claims were held by Kerr-Addison in 1963 & 1964 but today no hard rock claims are valid in this area. Quartz claims were staked in 1980 at the Lisa minfile occurrence (#105C039) however they have since lapsed. In 1987, the Hannka minfile occurrence (#105C053) was held under valid mineral claim and again in 1997 but there are currently no valid claims in this area. A description of each mineral occurrence is located in Appendix 1.

## **Regional Geology**

Regional 1:250 000 scale bedrock mapping of the area was carried out by the Geological Survey of Canada between 1994 & 1997 by S. Gordy and R. Stevens and reported in GSC open file 2886. Their work updated efforts by R. Mulligan in 1950-1953, also 1:250 000 scale mapping (GSC memoir 321). The regional geology is shown on the accompanying figure 3 and taken from the digital compilation by S. Gordy and A. Makepeace in 2001 (GSC open file 3754). No 1:50 000 scale bedrock geological mapping is reported in this area.

The proposed Snafu/Tarfu SMA is located in oceanic Cache Creek Terrane rocks of south central Yukon. Cache Creek Terrane is composed of structurally complex succession of Mississippian to Permian basalt, carbonate, chert and greywacke and ultramafic units. These rocks are overlain by a package of structurally imbricated interbedded chert and greywacke of Triassic to Early Jurassic age (YEG, 1995).

Locally crinoidal Carboniferous to Jurassic grey limestone of the Cache Creek Group underlies the northwestern portion of the proposed SMA. A small roof pendant of strongly magnetic ultramafic Cache Creek group rocks (map unit CTRC<sub>1</sub>) is exposed in the north, northeast corner of the proposed SMA.

The majority of the proposed SMA is underlain by well-bedded ribbon chert interbedded with shale, siltstone and greywacke that is middle Triassic to lower Jurassic in age (mTrIJC). The southwest corner of the proposed SMA is underlain by Mid-Jurassic Bryde Suite granitic rocks predominantly hornblende +/- biotite monzodioritic in composition (MJgB).

Figure 3 (Regional Geology & Minfile)

## Regional Mineral Potential

A regional mineral assessment study of the southwest Yukon (including the proposed SMA area) was completed in December of 2001 by YTG's Mineral Resources Branch of the Department of Economic Development. During the regional mineral assessment process, tracts composed of similar geological units (consisting of approximately 1000 km<sup>2</sup> in area) were ranked with respect to each other. The proposed SMA covers portion of two tracts ranked moderate to lowest relative regional mineral potential (figure 4).

Expert panelists assessed the area covered by the proposed SMA for the potential to host the following deposit types: gold-quartz vein, copper-gold quartz vein, polymetallic vein, epithermal gold-silver, copper skarn, and porphyry molybdenum deposits. Descriptions of the deposit models used are appended to this report (B.C. G.S. open file 1996-13).

Table 1. Mineral potential tract results for the proposed SMA.

Tract #	Relative Tract Rank	Au-quartz Veins	Poly-Metallic Veins	Copper-gold Quartz Vein	Copper Skarn	Porphyry Molybdenum	High-S Epithermal Au-Ag
26	Moderate	Yes	Yes	Yes	Yes	Yes	Yes
21	Lowest	Yes	Yes				Yes

### Limitations

Mineral potential maps portray the best estimation at the time of the assessment. Since mineral potential studies assess for 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 were once thought to have lower potential.

### Minfile Occurrences

Three Yukon minfile occurrences are within the boundary of the proposed SMA and an active placer operation is located on the access road in the southern end of the proposed SMA boundary.

Table 2. Minfile Occurrences within the proposed Special Management Area.

Minfile Number	Name	Status	Target	Commodity
105C007	TARFU	Drilled Prospect	Geophysical anomalies	Unknown
105C039	LISA	Trenched	Unknown	Unknown
105C053	HANNKA	Unknown	Unknown	Unknown

Figure 4 (Regional Mineral Potential)

Mineralization is not documented for the Minfile occurrences that fall within the proposed SMA boundary however some occurrences located near the area of study have. At the TOG mineral property (Minfile 105C028), gold bearing quartz veins and quartz carbonate alteration occur in faults associate with tectonically-emplaced ultramafic bodies. Visible gold is associated with malachite, azurite, pyrite, galena and sphalerite (Yukon Exploration, 1990, p.10). This occurrence is located north of the proposed SMA but a similar ultramafic body with coincident geochemical anomalies is mapped at the north end of the proposed SMA [*Target Area 2, Fig. 5*].

### **Regional Stream Sediment Geochemistry**

A total of 46 stream sediment samples reported in GSC open file 1217 fall within the proposed boundaries of Snafu/Tarfu SMA. An area slightly larger than the proposed SMA boundary (composed of 122 samples) was statistically manipulated to identify anomalous samples within the local area and identify potential field targets.

The geochemical plots in Appendix II show sample location and analytical results for 20 elements, loss on ignition, and pH in the region. Each plot at 1:250 000 scale shows the detection limit & analytical method used, the maximum & median value and a histogram used to determine color ranges for display purposes.

The proposed SMA area was glaciated by the McConnell (ca 22ka) ice sheet with generalized ice flow directions to the northwest and melt water flow directions largely controlled by topography (GSC open file 3694 by Duk-Rodkin 1999 map 1:1 000 000 scale map).

#### **Precious Metals-**

Anomalous gold value of 86 ppb Au is reported in the center of the proposed SMA near a chain of lakes [*Target Area 1*]. A cluster of detectable gold (11-12 ppb Au) is located around creeks draining into Snafu Lake on the SE arm of the proposed SMA. A further significant result of 19 ppb Au is located at the northern most point of the proposed SMA in rocks regionally mapped as limestone [*Target Area 2*].

Although outside of the proposed SMA boundary, sample 105C851297 located in the extreme southeast corner yielded a value of 761 ppb Au [*Target Area 4*]. Similarly, a sample just north of the SE arm of the proposed SMA gave a 1460 ppb gold assay [*Target Area 3*].

Silver values are generally low and range from 0.1 to a high of 2.0 ppm Ag within the proposed SMA. Only 4 samples are reported higher than 0.2 ppm Ag in the SMA area. Relatively high numbers of 0.6 and 2.0 are located within the limestone unit at its southern contact with the chert. Gold and silver values do not correlate well in this area.

#### **Base Metals –**

A coincident anomaly of 60 ppm nickel, 45 ppm copper, 75 ppm zinc, 7 ppm lead, and 3.1% iron is located within the central portion of the proposed SMA, north of Haunka Creek [*Target Area 5*]. This sample site (#105C851064) is at the contact between the limestone and chert +/- shale, siltstone greywacke unit.

Sample Locations and Target Areas figure 5

The highest copper value of 65 ppm reported within the proposed SMA is on the SE boundary near Snafu Creek. Three other mid-30 ppm range of copper values are reported along the eastern edge of the proposed SMA.

An area of elevated copper and mercury values with higher than the median gold, zinc, iron, vanadium, uranium, and molybdenum is located south of Snafu Lake on the eastern side of the proposed SMA [*Target Area 6*].

The highest zinc value within the east margin of the proposed SMA boundary returned 85 ppm Zn with a cluster of slightly elevated values between 61 – 71 ppm reported for the surrounding samples.

No other anomalous samples for nickel and lead fall within the proposed SMA area and values are generally between 15 & 20 ppm Ni and 3 & 4 ppm Pb throughout. The highest iron value of 5.6% falls outside the proposed SMA boundary and values ranging from 0.4% to a high of 3.1% Fe are within the proposed boundary.

Other metals –

Tin values are very low overall with values of 1 or 2 ppm except for a site north of Snafu Lake that yielded 4 ppm Sn.

An arsenic & antimony anomaly is coincident with the multi element base metal 105C851064 sample previously described as *Target Area 5*. The same sample produced 1.3 ppm Sb and 11.2 ppm As (both in the highest relative ranges for each element). A second arsenic/antimony anomaly of 9.2 ppm As & 0.8 ppm Sb is located on the eastern margin of the mid Jurassic monzodioritic body.

An area of elevated arsenic, antimony, barium, vanadium, uranium, and molybdenum values is located south of Tarfu Lake in the south central portion of the proposed SMA [*Target Area 7*].

Indicator elements –

The PH values for the area are generally neutral with results ranging from 6 to 8.2 with the vast majority being slightly basic. Blue indicates samples above the neutral level while red indicates samples below the neutral level (all values below neutral plot outside the proposed SMA area).

The Loss on Ignition plot shows three sample sites within the proposed SMA as having values greater than 25% indicating higher organic content at these sites. Two of these sites are located in the central portion of the proposed SMA with a third located on the SE arm of the proposed SMA near Snafu Creek. The vast majority of the sites however, have low LOI values.

### **Areomagnetic Survey**

The regional areomagnetic survey (as shown in the attached Figure 6) indicates a strong magnetic high centered over the mapped ultramafic body in the northeast corner of the proposed SMA [*Target Area 2*]. A halo around the anomalous magnetic feature trends to the south and northeast.

Mag map figure 6

A second smaller zone of increased magnetic susceptibility is located in the south, southeast corner of the proposed SMA [*Target Area 8*]. This anomaly is coincident with the TARFU minfile occurrence (105C007) and has a magnetic low feature associated with it directly to the north. This distinct feature has a very weak elevated halo associated with it that trends north, northwest which roughly parallels the chain of lakes in the area. No mapped geological feature explains this magnetic signature.

The only other notable feature on the areomagnetic map is a weak magnetic high with no associated lows or halos located near the Atlin Road north of the southern contact of the limestone and chert units.

## **Conclusions**

To host a detailed mineral assessment panel for the proposed Snafu/Tarfu Special Management Area, fieldwork and further compilation work is required.

The area proposed for the Snafu/Tarfu SMA does not have recent detailed geological bedrock mapping and the areas geology has never been documented at a 1:50 000 scale. Regionally, the geology of the Cache Creek Terrain is structurally complex and poorly understood. Studies conducted outside the study area needs to be compiled to aid in understanding the geological context.

Numerous Regional Stream Sediment Sample (RGS) anomalies require field investigation and further detailed sampling. Attention should be paid to gold, copper, silver, and antimony RGS anomalies. Elevated molybdenum, tungsten, and lead/zinc values deserve careful investigation as all these elements are listed in the characteristic geochemical signatures section of the evaluated mineral deposit profiles.

Little is known about the Minfile occurrences within the proposed SMA and the status of the occurrences should be characterized using the most current deposit models assessed for during the regional mineral potential study for SW Yukon. No quartz claims are valid within the proposed SMA at this time.

The source of the gold found at the placer property requires investigations into the glacial history and surficial geology of the area to better characterize the current valid placer claims within the proposed SMA and aid in understanding the mode of deposition.

The regional areomagnetism indicates that the geology is more complex, with possible unmapped intrusive units, than currently displayed on the map of the area. The magnetic signature shows three areas of unexplained anomalies that require field investigation.

## **Recommendations and further work**

- It is recommended that at a minimum the 10 targets areas be examined and evaluated for indications of mineral potential.
- Field visit the Minfile occurrences to better characterize known mineralization and to determine the type of target, or deposit model, for the occurrences that are currently characterized as unknown.
- Follow up the unexplained aeromagnetic anomalies to clarify the current geologic map. The mapped ultramafic unit at Target Area 2 requires field investigation aided by the pronounced areomagnetic signature and known mineralization styles.
- Further compilation work is needed to reference the geological fieldwork that has been conducted recently by the BCGS on the map sheets directly south of the area of study (in the Atlin Area).
- Prior to the 2002 fieldwork, the RGS and areomagnetic anomalies require plotting at a scale of 1:50,000, for traverse planning.

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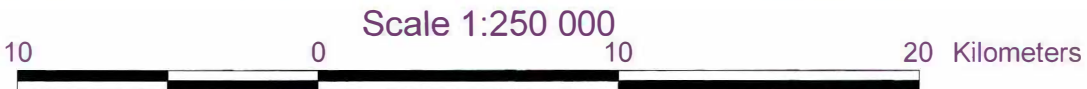
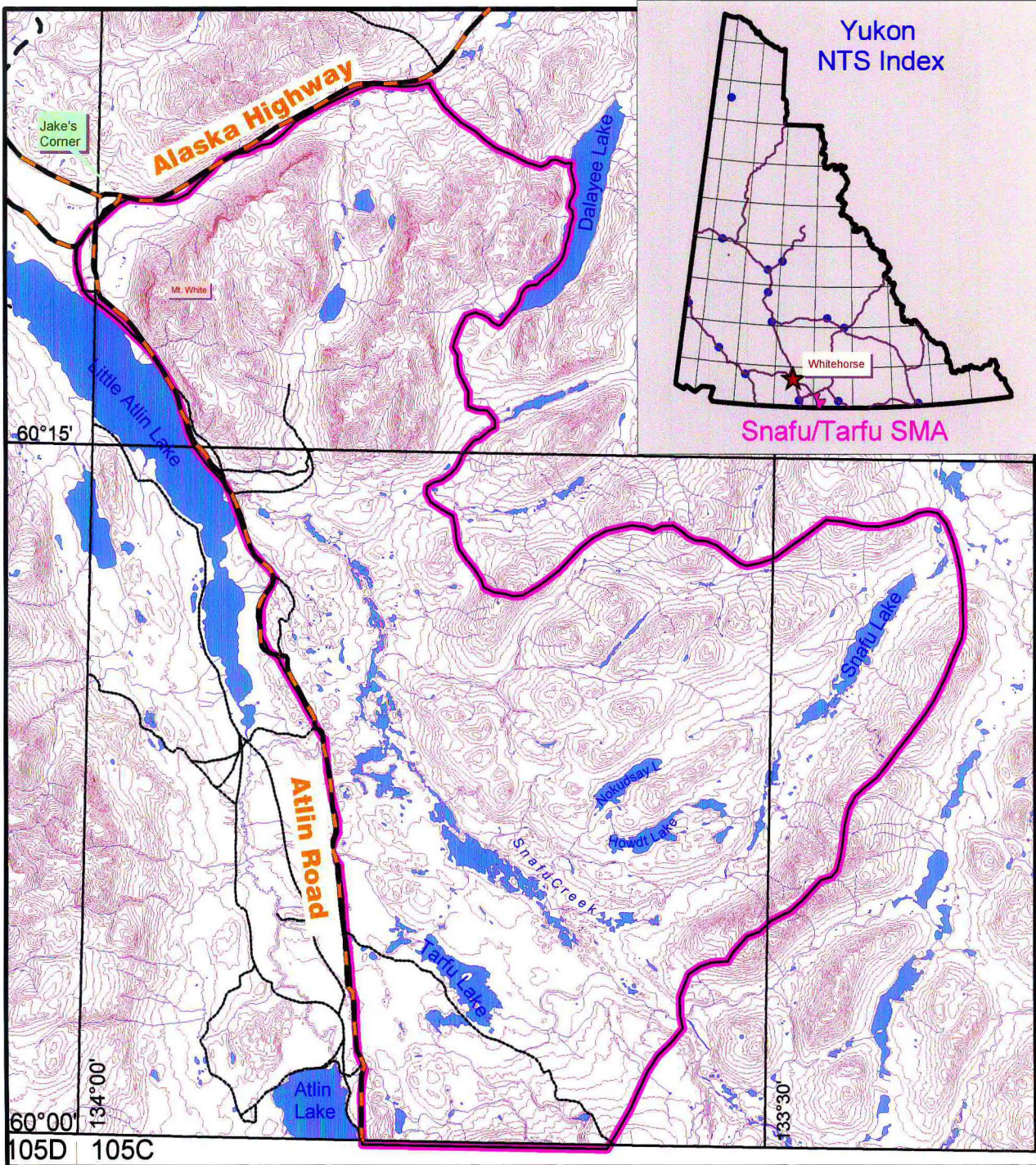
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Yukon Minfile-Mineral Occurrence Map: 105C – Teslin (1:250 000 scale), 2001. Exploration and Geological Services Division, Yukon Indian and Northern Affairs Canada.

# Location Map

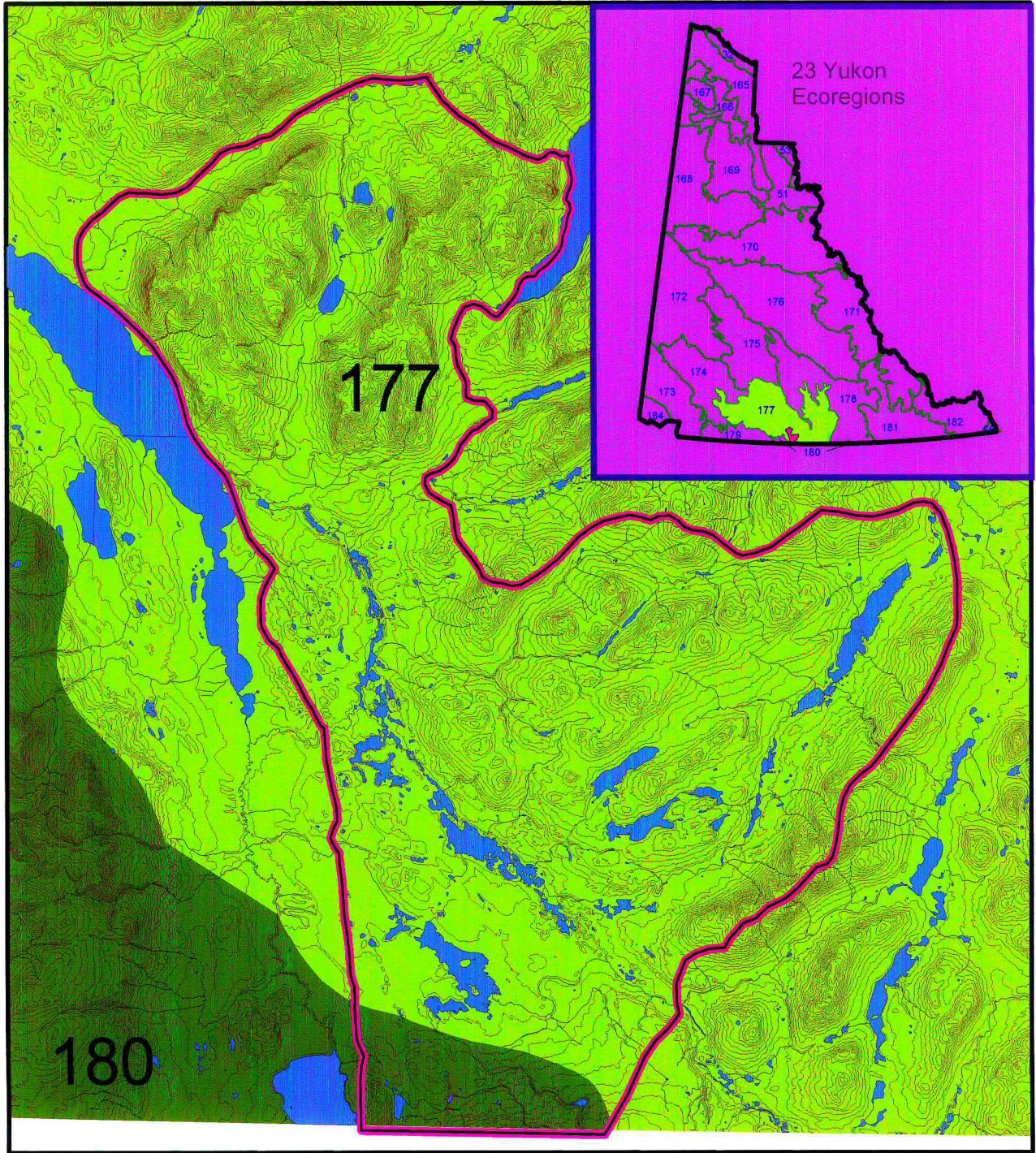


Proposed Snafu / Tarfu  
Natural Environment Park  
Special Management Area

Confidential

Figure 1

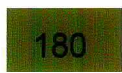
# Snafu/Tarfu Area Ecoregions



10 0 Scale 1:250 000 10 20 Kilometers



177 Yukon Southern Lakes Ecoregion



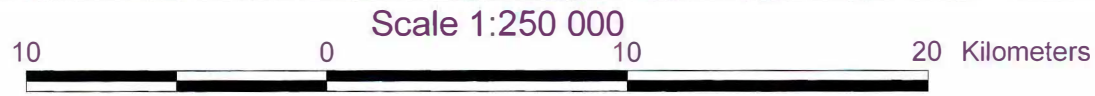
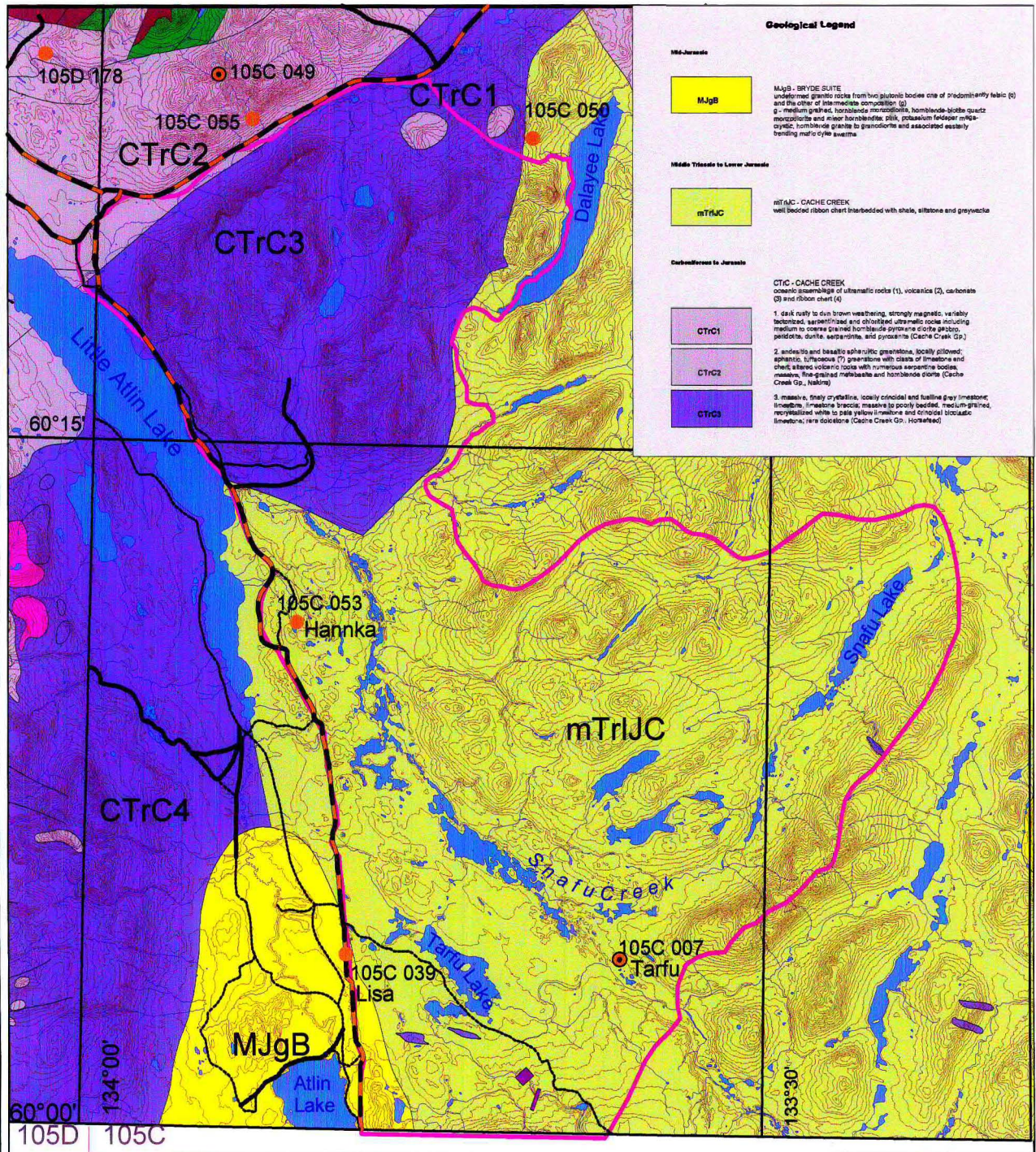
180 Boreal Mountains & Plateaus Ecoregion



Proposed Snafu/Tarfu Natural Environment Park Special Management Area

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# Geology Map



-  Proposed Snafu / Tarfu Natural Environment Park Special Management Area
-  Placer Claims (April 2002)



- Yukon Minfile Occurrence**
-  Drilled Prospect
  -  Anomaly, Unknown

Figure 3