

## **FAA- Site # 5: Yukon Plateau-YK-Canada**

The west-central part of the Yukon and eastern Alaska are referred to as the Yukon-Tanana Terrane, with the Yukon part described as the Yukon Plateau. This is an area which has had a complex geological history and historically been known as an important placer gold producing area. Currently the Minto copper mine is the only producing deposit with the area, although there was important lode gold, VMS and porphyry style deposits under examination. Mapping is not easy as there is extensive regolithic cover in this area than other parts of the Yukon due to the lack of major glaciation. To facilitate the better understanding of the geology and economic potential of the area, the Geological Survey of Canada in conjunction with the Yukon Geological Survey has carried out a series of airborne geophysical surveys over the area. These results along with the historic mapping and company data available via assessment forms the core geoscience cover for the area (Fig. 1).

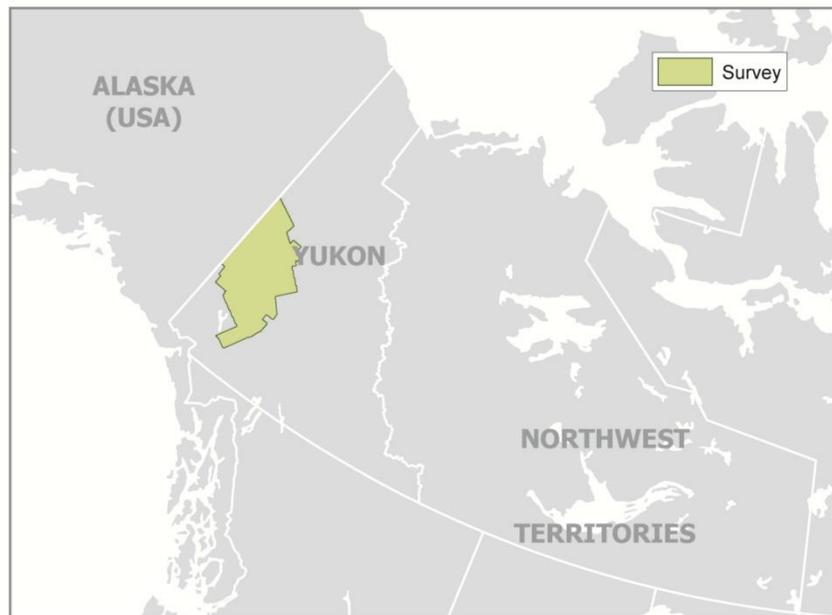


Figure 1: Location of Yukon Plateau study area.

## **Geological Summary**

The region is characterized by intrusion-related and orogenic styles of mineralization that has formed during a complex series of geological events over a period of the past 370 million years. Sedimentary exhalative Pb-Zn mineralization and porphyry-style Cu-Au mineralization are associated with Late Devonian to Early Mississippian formed in a continental arc built on pre-Late Devonian continental margin sediments along the ancient Pacific margin of North America. Volcanogenic massive sulfide-style Pb-Zn-Cu-(Ag-Au) mineralization formed in subvolcanic to volcanic rocks of the Late Permian Klondike arc assemblage that was built on the Devonian-Mississippian arc. Together these assemblages make up the Yukon-Tanana Terrane.

This was followed by five metallogenic events that coincide with magmatic episodes superimposed on the Yukon-Tanana Terrane: (1) Cu-Au mineralization formed during an Early Jurassic (e.g., Minto); (2) Au-mineralized breccia complexes, skarns, intermediate-sulfidation epithermal systems, and polymetallic veins are associated with mid-Cretaceous magnetite-series arc magmas in the Dawson Range; (3) variably Cu and Au rich porphyry systems formed within the mid-Cretaceous arc in the early Late Cretaceous (e.g. Casino, Nucleus-Revenue); (4) porphyry Mo and Cu systems and Ag-rich polymetallic veins, carbonate-replacement, and skarn bodies are temporally and spatially associated with NE-trending, sinistral oblique-extensional fault systems in the latest Cretaceous; and (5) examples of disseminated U, Cu-Pb-Ag skarn, and Au-Ag epithermal systems are associated with dominantly felsic

but locally bimodal Paleocene-Eocene magmatism, emplaced into zones of extension during early activity on the Tintina Fault Zone. (after Allan et al 2013\_a). The major zones of known mineralization are noted in Fig. 2 along with the metamorphic basement domains (after Allan et al 2013\_b)

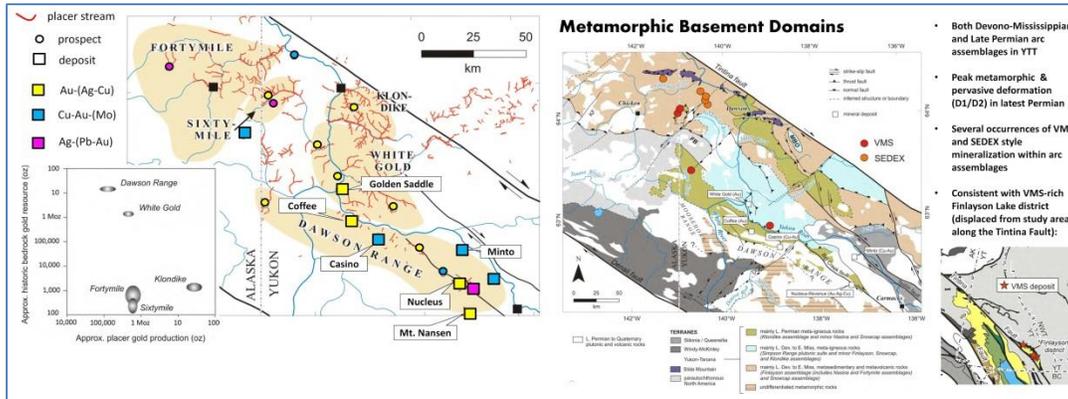


Figure 2: Outline of major known mineralized areas (left) and metamorphic basement (right).

## Regional Geophysical Summary

The geophysical data for this site is largely airborne surveys carried out by the Geological Survey of Canada in conjunction with the Yukon Geological Survey. These are summarized in Table 1. The coverages comprise a combination of magnetic, radiometric and EM surveys acquired since the early 1990s. Individual surveys as well as stitched grids are available.

Table 1.

Survey	Year	Line Spacing	Height	Survey Type
1. Nisling River	2011	400 m	100 m	Fixed wing
2. Kluane	2010	400 m	100 m	Helicopter
3. Northern Stevenson Ridge	2009	400 m	100 m	Fixed wing
4. McQuesten	2009	400 m	150 m	Fixed wing
5. Central Stevenson Ridge	2008	400 m	60 m	Fixed wing
6. Southern Stevenson Ridge	2008	400 m	125 m	Helicopter
7. Minto	2001	500 m	120 m	Helicopter
8. Stewart River I	2000	500 m	120 m	Helicopter
9. Stewart River II	2001	500 m	120 m	Helicopter
10. Stewart River III	2001	500 m	120 m	Helicopter
11. Brewery Creek	1997	250-500 m	120 m	Helicopter
12. Mount Nansen	1994	500 m	120 m	Helicopter
13. Selwyn River	1993	500 m	120 m	Helicopter
14. Scroggie Creek Block A	2012	400 m	150 m	Helicopter
15. Scroggie Creek Block B	2012	400 m	150 m	Fixed-wing
16. Wolverine Creek	2012	400 m	150 m	Fixed-wing
17. Eagle Plains	2009	800 m	300 m	Fixed-wing
18. Flat River	2009	800 m	300 m	Fixed-wing
19. Little Nahanni	2010	800 m	300 m	Fixed-wing
20. Dawson	2014	400 m	150 m	Fixed-wing

## Exploration Challenge

The data sets cover a large area and while there is considerable variety of deposit styles, only one small copper deposit is in production. In such remote areas, large deposits with good grades usually have the best chance of being developed.

### **Data Source Acknowledgments**

The data for this project was provided by the Geological Survey of Canada and Yukon Geological Survey.

### **Preference Projection**

NAD83 Zone 8N

### **Reference**

Allan, M.M., Mortensen, J.K., Hart, C.J.R., Bailey, L.A., Sánchez, M.G., Ciolkiewicz, W., McKenzie, G.G., and Creaser, R.A., 2013\_a, Metallogenic framework for the White Gold and Dawson range districts of west-central Yukon and Eastern Alaska; presentation at Whistler 2013 Geoscience for Discovery, Sept 24-27, 2013 Whistler BC.

Allan, M.M., Mortensen, J.K., Hart, C.J.R., Bailey, L.A., Sánchez, M.G., Ciolkiewicz, W., McKenzie, G.G., and Creaser, R.A., 2013\_b, Magmatic and Metallogenic Framework of West-Central Yukon and Eastern Alaska; 2013 Society of Economic Geologists, Inc. Special Publication 17, pp. 111–168