



105L	105K	105J
GLENYON	TAY RIVER	SHELDON LAKE
105E	105F	105G
LAKE LABRIE	THIS MAP	FINLAYSON LAKE
105D	105C	105B
WHITEHORSE	TESLIN	WOLF LAKE

INTRODUCTION

New geochemical data from re-analysis of archived stream sediment samples have been assessed using weighted sums modeling and catchment basin analysis as described in the accompanying open file report (Mackie et al., 2015). Both commodity and pathfinder element abundances are evaluated to highlight areas that show geochemical responses consistent with a variety of base and precious-metal mineral deposit types. The results of modeling, completed using two approaches, are presented as a series of catchment maps and associated data files. This release is part of a regional assessment of stream sediment geochemistry that covers a large part of Yukon.

SAMPLING AND ANALYSIS PROGRAMS

Stream sediment and water samples from the Quiet Lake area (NTS 105F) were collected at a reconnaissance scale in 1978 as part of the Federal Uranium Reconnaissance program. The sediment samples were analysed in several stages and the geochemical data was released in Geological Survey of Canada (GSC) Open Files 564, 734, and 1290 (Goodfellow & Lynch, 1978; Coker et al., 1981; Hornbrook et al., 1985). A recent re-analysis program conducted by the Yukon Geological Survey (YGS) has generated new geochemical data from analysis of archived sample material as described in YGS Open File 2015-8 (Jackman, 2015). The reader is referred to these reports for detailed descriptions of sampling techniques, analytical procedures, and quality control measures. Not all samples have been analysed for gold using preferred Fire-Assay or Neutron Activation methods. Given the uncertainty in quality of ICP-MS analysis of gold stream sediments, as described by Arne & MacFarlane (2014), no attempt has been made to incorporate data by this method.

MINERAL OCCURRENCES

The main mineral occurrences within the Quiet Lake area are classed as polymetallic Ag-Pb-Zn (Au) veins (Groundhog and Ketzakey deposits), replacement/manto-styke Ag (Ketzakey River Deposit) and W skarn (Stormy and Risky deposits). Other deposit types represented in the map area include Cu-Pb-Zn volcanogenic massive sulphide (MM and Tub prospects), Mo skarn (Molly prospect), quartz-vein Au (Seagull Creek prospect), high sulphidation Au-Ag-Cu (Beautiful prospect), and sedimentary exhalative Zn-Pb-Ag ("High-grade" and Angie prospects). The Anvil SEDEX and Finlayson Lake VMS districts are located in the adjacent NTS map sheets to the north and east, respectively. Notably, the Red Mountain porphyry Mo deposit is located less than 2 km from the southern boundary of the map area.

WEIGHTED SUMS MODELING

As described in the methodology report (Mackie et al., 2015), two approaches have been used to subdue the influence of background lithological variations and secondary absorption on the composition of stream

sediments. One uses data levelled by the dominant geology mapped within each catchment, while the other uses residuals calculated from regression against principal components. Weighted sums models (WSM) have been generated using the processed data. The importance rankings used in WSMs are summarized in Table 2 for a variety of deposit types. Each model is optimized for a target deposit type however other deposit types may be represented in a given model due to similarities in elemental abundances and associations. Given that not all samples have been analyzed for Au, models using Au data present results for fewer catchments.

Exploratory data analysis using both raw element data and principal components reveals that the distribution of many commodity and pathfinder elements is strongly influenced by lithological variation. The first principal component, accounting for ~39% of the total variation, shows high positive loadings for Sb, Ag, Cd, Zn, Se, Ca, Ba, Cu, and Zr and high negative loadings for Rb, Li, Ti, Al, Ca and Ce. These groupings form spatially coherent trends that match, respectively, the distribution of sedimentary rocks, including shale and slate horizons, of the St. Cr. and Eam groups and Jones Lake Formation, and felsic intrusive rocks of the Cassiar Suite. The second principal component, accounting for ~14% of the total variation, shows high loadings for Co, Cr, Ni, Sc, Cu and Mg, and negative loadings for U, Mo and Y. These groupings form spatial trends matching the distribution of ultramafic rocks and some carbonate units, and felsic intrusive rocks, respectively. Regression analysis of selected metals against the relevant principal component(s) effectively filters these terrain-effects while preserving responses related to known occurrences.

Leveling by the dominant mapped geology has a more subdued effect on filtering the interpreted lithological control for certain elements (e.g., Ag, As, Ba, Hg, Mo, Sb and Ti). In order to reduce this impact in the WSM these elements were given low importance rankings (or were omitted) for certain deposit types. Negative rankings were assigned to certain variables to help differentiate deposit types with similar metal associations and also to dampen remaining lithological effects.

The effectiveness of historical sampling coverage has been assessed empirically using graphs of WSMs plotted against catchment surface area to determine the ideal maximum catchment size (12 km²). Catchments that cover larger areas (shown on the map with bold outlines) are interpreted to have been under-sampled and thus require further sampling to properly evaluate the area for geochemical anomalism. Given the likelihood that a mineralization 'signal' would be progressively diluted with increasing catchment size, marginally high WSM scores could also be of interest in large catchments.

Table 2: Importance rankings for weighted sums models using data levelled by dominant mapped geology.

Target Deposit Type ^a	Other Deposit Types ^a	Mn	Fe	Co	Ni	Cu	Mo	Zn	Pb	Ag	Au	As	Ba	Cd	Sb	Se	Hg	Ti	Bi	W
Polymetallic Ag-Pb-Zn	SEDEX (high Ag); VMS; Pb-Zn skarn						1	4	3		1									
VMS (Zn-rich)	SEDEX (low Ag); Pb-Zn skarn					1	-2	4	2	1										-1
Intrusion-related Au	Intrusion-related Au									3	1									1
Epithermal Au/Ag	Intrusion-related Au									3	4	2								-1
Porphyry Mo	Porphyry Cu-Mo; W skarn					1	4							-1						1
Cu skarn	Porphyry Cu-Mo; VMS (mafic); Cu-Ag Vein					4	1			2				-1						1
W skarn	Sn skarn; Porphyry W					1	1	-1	-1						1					2

^a Polymetallic Ag-Pb-Zn type includes vein and manto styles; SEDEX = sedimentary exhalative; VMS = volcanic-hosted/associated massive sulphide deposits. ¹ Au data are not levelled by dominant geology, instead log₁₀ transformed raw data are used.

Number	Name	Type	Status	Commodities
105F 002	GRAYLING	Vein Polymetallic Ag-Pb-Zn-Au	Drilled Prospect	Gold, Lead, Silver, Zinc
105F 003	COVALL	Manto Polymetallic Ag-Pb-Zn	Drilled Prospect	Bismuth, Gold, Lead, Silver
105F 005	MAM	Volcanogenic Massive Sulphide (VMS) Kurko Cu-Pb-Zn	Showing	Lead, Zinc
105F 009	GROUNDHOG	Vein Polymetallic Ag-Pb-Zn-Au	Deposit	Lead, Silver, Gold, Zinc, Copper
105F 010	IRON	Vein Au-Quartz	Showing	Antimony, Gold, Lead, Silver
105F 033	HAM	Skarn W	Deposit	Tungsten
105F 034	INSPIRE	Skarn W	Deposit	Tungsten
105F 035	AMBRIDGE	Vein Polymetallic Ag-Pb-Zn-Au	Prospect	Copper, Lead, Silver, Zinc, Gold
105F 036	TRUB	Volcanogenic Massive Sulphide (VMS) Kurko Cu-Pb-Zn	Drilled Prospect	Copper, Lead, Tungsten, Zinc, Silver, Gold
105F 037	EVA	Copper	Drilled Prospect	Copper, Lead, Tungsten, Gold
105F 038	BARTE MOUNTAIN	Vein Barite-Fluorite	Deposit	Barite, Zinc, Copper, Silver
105F 040	CANOOK	Vein Polymetallic Ag-Pb-Zn-Au	Prospect	Gold, Lead, Silver, Zinc
105F 042	OT	Volcanogenic Massive Sulphide (VMS) Kurko Cu-Pb-Zn	Showing	Lead, Molybdenum, Silver, Zinc
105F 044	WATERFALL	Vein Au-Quartz	Showing	Gold
105F 045	WAGLE	Vein Au-Quartz	Showing	Copper, Gold, Silver
105F 047	TRENCH	Coal	Prospect	Coal
105F 048	WHISKY LAKE	Coal	Prospect	Coal
105F 050	BRUCE LAKE	Ultramafic Mafic Flood basalt-associated Ni-Cu	Drilled Prospect	Copper, Lead, Nickel, Silver, Gold
105F 052	MT. MERRY	Vein Polymetallic Ag-Pb-Zn-Au	Prospect	Gold, Silver, Lead
105F 053	KIEV	Vein Polymetallic Ag-Pb-Zn-Au	Past Producer	Copper, Lead, Silver
105F 054	LABRIE	Vein Polymetallic Ag-Pb-Zn-Au	Drilled Prospect	Gold, Silver, Lead
105F 055	HOEY	Vein Polymetallic Ag-Pb-Zn-Au	Drilled Prospect	Gold, Lead, Zinc, Thallium, Silver
105F 056	STUMP	Vein Polymetallic Ag-Pb-Zn-Au	Drilled Prospect	Silver
105F 058	MAGLINDY	Vein Polymetallic Ag-Pb-Zn-Au	Showing	Lead, Silver
105F 059	HOGG	Vein Cu-Ag-Quartz	Showing	Copper
105F 060	RYCHUK	Ultramafic hosted asbestos	Prospect	Copper, Gold, Silver
105F 066	CONNELL	Vein Polymetallic Ag-Pb-Zn-Au	Showing	Copper, Silver
105F 068	REGEHR	Manto Polymetallic Ag-Pb-Zn	Showing	Copper, Zinc, Silver, Gold, Lead
105F 069	KIRWAN	Vein Polymetallic Ag-Pb-Zn-Au	Showing	Lead, Silver
105F 070	DROG	Vein Polymetallic Ag-Pb-Zn-Au	Showing	Lead, Silver, Copper
105F 072	YOUNG	Skarn Cu	Showing	Copper
105F 073	INOH	Volcanogenic Massive Sulphide (VMS) Kurko Cu-Pb-Zn	Drilled Prospect	Barite, Lead, Zinc, Silver, Copper
105F 075	BEAUFUL	Volcanogenic Au-Ag-Cu High Sulphidation	Drilled Prospect	Antimony, Silver, Zinc, Lead, Barite, Copper, Fluorite
105F 078	PAUPLE	Skarn W	Showing	Copper, Tungsten, Molybdenum
105F 079	MARPHY	Porphyry Cu-Mo-Au	Showing	Copper, Uranium, Tungsten
105F 080	NOKLUIT	Carbonatite	Prospect	Barite, Cerium, Fluorite, Gold, Lead, Niobium, Silver, Uranium, Zinc, Yttrium, Thorium, Rare Earths, Neodymium, Lanthanum, Copper
105F 081	GUANO	Carbonatite	Prospect	Fluorite, Rare Earths, Uranium, Thorium, Niobium
105F 082	FOX	Vein Polymetallic Ag-Pb-Zn-Au	Showing	Lead, Silver, Zinc
105F 084	LAP	Skarn W	Showing	Tungsten
105F 086	ENTRY	Sediment hosted Mississippi Valley Type Pb-Zn (MVT)	Showing	Lead, Zinc
105F 087	RAMBANT	Volcanogenic Supra- to epithermal	Showing	Lead, Zinc
105F 088	ENTRY	Volcanogenic Massive Sulphide (VMS) Kurko Cu-Pb-Zn	Showing	Copper
105F 090	REKLEY	Skarn W	Drilled Prospect	Molybdenum, Uranium
105F 092	MORIS	Vein Polymetallic Ag-Pb-Zn-Au	Showing	Lead, Molybdenum, Silver
105F 093	WOPRUS	Vein Polymetallic Ag-Pb-Zn-Au	Prospect	Lead, Silver
105F 094	COCHNER	Vein Polymetallic Ag-Pb-Zn-Au	Prospect	Gold, Molybdenum, Zinc, Silver, Lead
105F 095	DUNITE MOUNTAIN	Ultramafic-hosted asbestos	Showing	Asbestos
105F 098	TOWER PEAK	Vein Polymetallic Ag-Pb-Zn-Au	Showing	Copper, Silver
105F 099	DROD	Ultramafic-hosted asbestos	Showing	Asbestos
105F 101	STORMY	Skarn W	Showing	Molybdenum, Tungsten
105F 103	MAM	Volcanogenic Massive Sulphide (VMS) Kurko Cu-Pb-Zn	Deposit	Copper, Zinc, Lead, Gold
105F 103	CPA	Volcanogenic Massive Sulphide (VMS) Kurko Cu-Pb-Zn	Showing	Copper, Zinc, Lead
105F 104	SONNY	Vein Polymetallic Ag-Pb-Zn-Au	Prospect	Arsenic, Copper, Silver, Lead, Gold
105F 105	TOAD	Vein Polymetallic Ag-Pb-Zn-Au	Showing	Antimony, Silver, Zinc, Lead, Barite, Copper, Fluorite
105F 106	SHARON	Vein Polymetallic Ag-Pb-Zn-Au	Prospect	Copper, Lead, Silver, Zinc
105F 107	LOD	Manto Polymetallic Ag-Pb-Zn (MVT)	Drilled Prospect	Copper
105F 108	KOPPEE	Vein Cu-Ag-Quartz	Prospect	Copper
105F 109	KE TZA	Manto Au	Past Producer	Gold, Silver, Arsenic
105F 110	CANDY	Volcanogenic Massive Sulphide (VMS) Kurko Cu-Pb-Zn	Prospect	Arsenic, Manganese, Zinc, Silver, Lead, Copper, Gold
105F 121	BOX	Volcanogenic Massive Sulphide (VMS) Kurko Cu-Pb-Zn	Drilled Prospect	Barite, Zinc, Gold, Lead, Silver
105F 122	IGROWTH	Volcanogenic Massive Sulphide (VMS) Kurko Cu-Pb-Zn	Showing	Barite
105F 123	WOODROSE	Sediment hosted stratiform Barite	Prospect	Barite
105F 124	SPURIT	Vein Polymetallic Ag-Pb-Zn-Au	Showing	Barite, Copper, Zinc
105F 125	ANGIE	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (SEDEX)	Drilled Prospect	Silver, Zinc
105F 126	AYDULCK	Skarn W	Showing	Tungsten
105F 127	HERRIDGE	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (SEDEX)	Drilled Prospect	Lead, Zinc, Gold, Silver
105F 128	ERIVUS	Skarn W	Showing	Tungsten
105F 129	KELIARK	Skarn W	Showing	Tungsten
105F 130	FRISKY	Skarn W	Showing	Copper, Silver, Zinc, Lead
105F 131	ANVIL	Unknown	Anomaly	Uranium
105F 134	AUVIN	Porphyry W	Showing	Tungsten
105F 135	GRATER	Porphyry W	Showing	Tungsten
105F 136	HOWRU	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (SEDEX)	Prospect	Copper, Silver, Lead, Zinc
105F 112	GRAHAM	Volcanogenic Massive Sulphide (VMS) Kurko Cu-Pb-Zn	Prospect	Copper, Zinc, Silver, Lead
105F 114	BIG SAM	Skarn W	Prospect	Tungsten
105F 115	MT. ROSS	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (SEDEX)	Prospect	Barite, Lead, Zinc
105F 116	HOLLAND	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (SEDEX)	Showing	Silver, Zinc, Silver, Lead
105F 117	AMELIN	Unknown	Showing	Arsenic, Gold, Silver, Lead, Copper
105F 118	QUILBO	Vein Au-Quartz	Showing	Arsenic, Silver, Gold
105F 119	HIELD	Unknown	Anomaly	Copper, Zinc, Lead, Tungsten, Silver
105F 120	MACKENZIE	Vein Polymetallic Ag-Pb-Zn-Au	Drilled Prospect	Antimony, Gold, Silver, Lead, Arsenic, Bismuth
105F 121	SEAGULL CREEK	Vein Au-Quartz	Drilled Prospect	Arsenic, Silver, Lead, Bismuth, Gold, Copper
105F 122	BLACHAWK	Epithermal Au-Ag-Cu High Sulphidation	Prospect	Gold, Lead, Zinc, Silver
105F 129	HED	Skarn W	Drilled Prospect	Bismuth, Tungsten, Vanadium
105F 071	CHEERPOUGH	Volcanogenic Massive Sulphide (VMS) Kurko Cu-Pb-Zn	Drilled Prospect	Barite, Silver, Zinc, Lead, Copper, Fluorite
105F 074	PINNACLE	Vein Polymetallic Ag-Pb-Zn-Au	Drilled Prospect	Barite, Silver, Zinc, Lead, Copper, Gold
105F 083	BREE	Volcanogenic Massive Sulphide (VMS) Kurko Cu-Pb-Zn	Showing	Barite, Molybdenum, Zinc, Silver, Mercury, Gold, Lead
105F 122	WHYTE	Vein Polymetallic Ag-Pb-Zn-Au	Prospect	Arsenic, Silver, Copper, Gold, Lead
105F 008	TITRO	Vein Polymetallic Ag-Pb-Zn-Au	Prospect	Copper, Zinc, Silver, Gold, Lead
105F 020	BRAND	Volcanogenic Massive Sulphide (VMS) Kurko Cu-Pb-Zn	Drilled Prospect	Arsenic, Bismuth, Copper, Gold, Lead, Silver, Zinc
105F 057	KETZAKEY	Vein Polymetallic Ag-Pb-Zn-Au	Deposit	Lead, Silver, Copper, Antimony, Gold
105F 065	LUKE	Vein Polymetallic Ag-Pb-Zn-Au	Showing	
105F 123	PINKENBURG	Unknown	Unknown	
105F 096	IPSA	Unknown	Anomaly	
105F 076	BIG BUSH	Epithermal Au-Ag-Cu High Sulphidation	Anomaly	
105F 103	JAGP	Unknown	Anomaly	
105F 041	CHIR	Vein Polymetallic Ag-Pb-Zn-Au	Showing	
105F 107	BIG OX	Unknown	Anomaly	
105F 130	TRUE BLUE	Gemstone	Anomaly	Gemstones
105F 109	RAWWAYS	Unknown	Anomaly	
105F 061	CHILNS	Unknown	Drilled Prospect	
105F 051	JAPE	Unknown	Drilled Prospect	
105F 102	TIER	Unknown	Drilled Prospect	
105F 010	WALLI	Ultramafic-hosted asbestos	Unknown	
105F 017	HOLCF	Skarn W	Unknown	
105F 039	MCNEE	Vein Polymetallic Ag-Pb-Zn-Au	Showing	
105F 066	HUNT	Unknown	Anomaly	
105F 010	COLD	Unknown	Anomaly	
105F 046	DANGER	Vein Au-Quartz	Showing	
105F 066	CONTOUR	Unknown	Unknown	
105F 049	BROSS	Unknown	Unknown	
105F 066	DIRK	Sediment hosted Stratiform Barite	Prospect	
105F 068	DOY	Unknown	Unknown	
105F 064	ASKIN	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (SEDEX)	Showing	
105F 006	KOLA	Vein Polymetallic Ag-Pb-Zn-Au	Drilled Prospect	

RECOMMENDED CITATION

MACKIE, R., ARNE, D. AND BROWN, O., 2015. Weighted sums model for Cu skarn deposits levelled by geology. In: Enhanced interpretation of stream sediment geochemical data for NTS 105F. Yukon Geological Survey, Open File 2015-28, scale 1:250 000, sheet 5 of 15.

Catchment basin polygons generated by the Yukon Geological Survey (J. O. Bruce).

Any revisions or additional geological information known to the user would be welcomed by the Yukon Geological Survey.

Paper copies of this map and the accompanying report may be purchased from the Yukon Geological Survey, Energy, Mines and Resources, Government of Yukon, Room 102-300 Main St., Whitehorse, Yukon, Y1A 2B5. Ph. 867-667-3201, Email geology@gov.yk.ca.

A digital PDF (Portable Document File) file of this map may be downloaded free of charge from the Yukon Geological Survey website: http://www.geology.gov.yk.ca.

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Weighted sums model for Porphyry Mo deposits levelled by geology (NTS 105F) Sheet 5 of 15

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