YUKON GEOLOGICAL SURVEY

CSA Global
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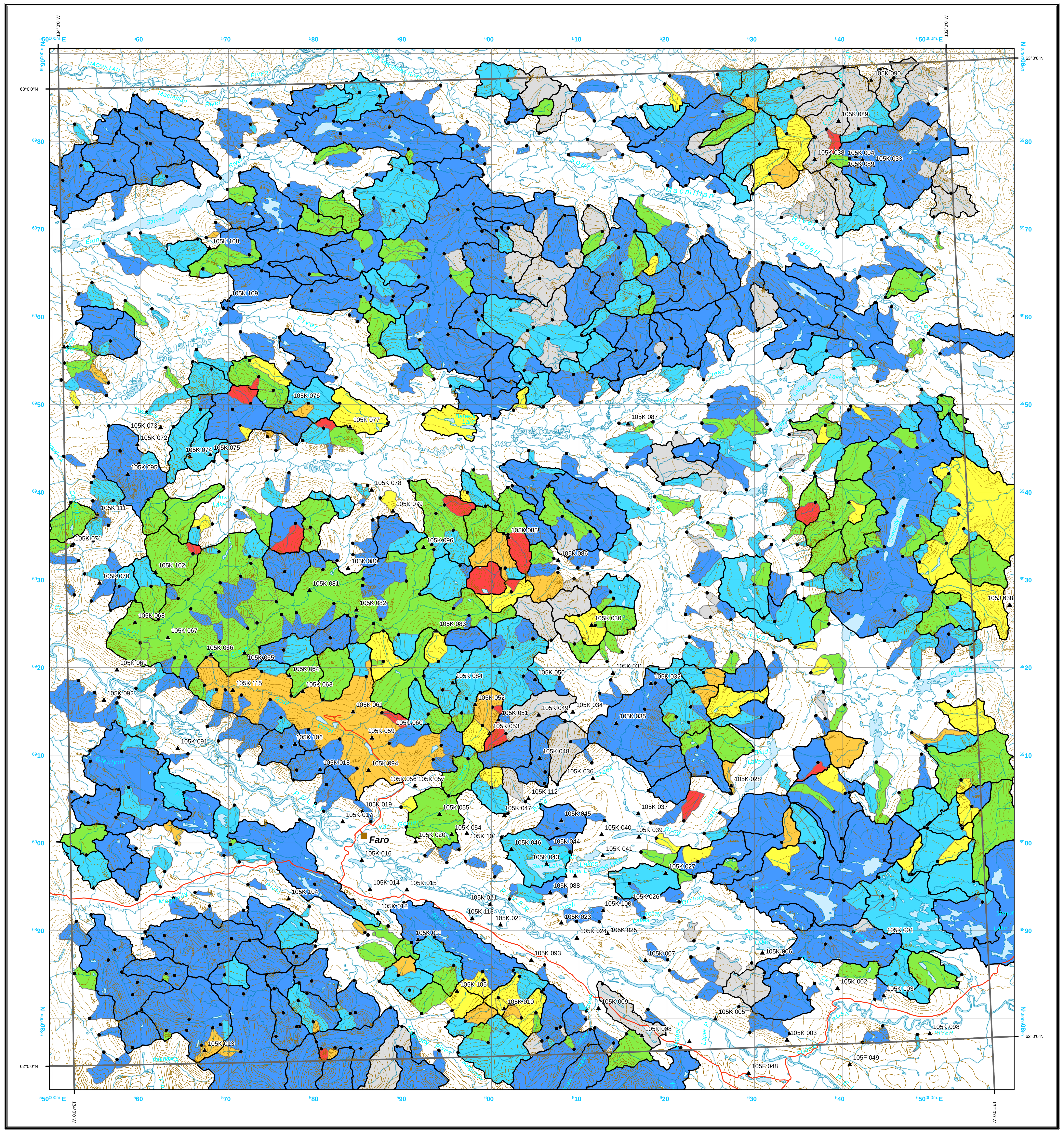
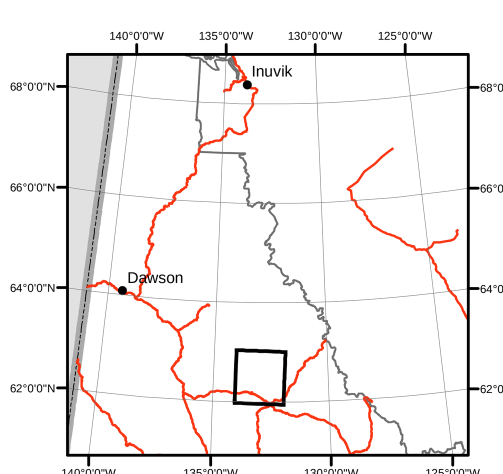
Yukon
Energy, Mines and Resources





1:250 000-scale topographic base data produced by CENTRE FOR TOPOGRAPHIC INFORMATION, NATURAL RESOURCES CANADA

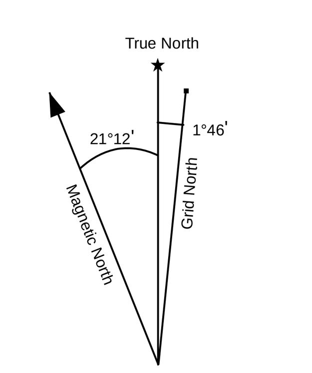
ONE THOUSAND METRE GRID
Universal Transverse Mercator Projection
North American Datum 1983
Zone 8

CONTOUR INTERVAL 100 FEET
Elevations in metres above Mean Sea Level

Polymetallic Ag-Pb-Zn Weighted sums model (Principal Component Residuals) Sheet 6 of 17

SCALE 1:250 000

0 1 2 3 4 5
kilometres



Use diagram only to obtain numerical values
APPROXIMATE MEAN DECLINATION 2015
FOR CENTRE OF MAP

105M MAYO	105N LANSING RANGE	105O NIDDERY LAKE
105L GLENLYON	105K THIS MAP	105J SHELDON LAKE
105E LAKE LABERGE	105F QUIET LAKE	105G FINLAYSON 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 methodology report that accompanies this map (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 Tay River map area (NTS 105K) were collected at a reconnaissance scale in 1988 and 1989 as part of the Canada-Yukon Mineral Development Agreement (Friske and Hornbrook, 1989; Friske *et al.,* 1990). Field descriptions and initial geochemical data for 940 sites were released in Geological Survey of Canada ("GSC") open files 1961 (473 sites) and 2174 (467 sites). New geochemical data from the re-analysis of archived sample material were released in Yukon Geological Survey ("YGS") open files 2011-29 and 2012-7 (Jackaman, 2011 & 2012). The reader is referred to these open files for detailed descriptions of sampling techniques, analytical procedures and quality control measures.

MINERAL OCCURRENCES

A variety of types of base and precious-metal mineralization are known to occur in the Tay River area as shown in Table 1 (Yukon MINFILE, 2015). These include sedimentary exhalative Zn-Pb-Ag (past-producing Faro, Vangorda and Grum mines; and Swim and Dy deposits) and epithermal Au-Ag (Grew Creek) deposits. Polymetallic vein, Pb-Zn skarn, Cu skarn, intrusion-related Au and volcanogenic Zn-Pb-Ag-Cu-Au and Cu-Co massive sulphide mineralization are also documented within the map area. Along strike towards the southeast, in the Finalyson Lake district, numerous volcanic and sedimentary-hosted massive sulphide deposits occur, including Yukon Zinc Corporation's Wolverine mine (currently on care-and-maintenance).

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 variation 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 selected 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.

For certain pathfinder elements (*e.g.,* As, Sb and Cd) levelling by dominant lithology did not fully subdue the interpreted stratigraphic control on the spatial distribution of these elements. In order to reduce this impact on the WSM these elements were given low importance rankings (or were omitted) for certain deposit types. Additionally, strong responses for Zn, Pb and Ag related to SEDEX and polymetallic vein mineralization prevented using these elements as pathfinders for other deposit types. For example, negative rankings for Pb and Zn are used in the WSM for epithermal Au-Ag in order to reduce the contribution of Ag related to SEDEX mineralization. In the case of the WSM for porphyry copper, a negative ranking was assigned to Cd in order dampen a terrane effect (high Ag) in the north part of the map area.

The first principal component, accounting for ~34% of the total variation, shows high loadings for Se, S, Mo, Cd, Sb, Hg, Ag, Ba and Zn and forms a spatial trend that matches the distribution of the Road River and Earn Groups which contain shale horizons that are likely to be elevated in these metals. Similarly the second principal component, accounting for ~12% of the total variation, shows high loadings for Sb, As, Pb, Ni, Mo and Ag and forms a spatial trend matching the distribution of Tay, Mount Christie and Jones Lake formations which also contain shale. Regression analysis of these metals against the relevant principal component effectively subdued these terrane-effects while preserving, and in some cases enhancing, responses related to known occurrences. As above, negative rankings were used to differentiate deposit types with similar metal associations.

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 (10 km^2). 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 increase in catchment size, marginally high WSM scores in large catchments could also be of interest.

Table 2: Importance rankings for weighted sums models using residuals on principal components.

Target Deposit Type[a]	Other Deposit Types	Mn	Fe	Co	Ni	Cu	Mo	Zn	Pb	Ag	Au[1]	As	Ba	Cd	Sn	Sb	Te	Hg	Tl	Bi	W[1]
SEDEX Zn-Pb-Ag	Polymetallic Ag-Pb-Zn; VMS; Pb-Zn skarn							4	4	2		1	1			-2					
Polymetallic Ag-Pb-Zn	SEDEX; VMS; Pb-Zn skarn							3	2	3		3		2	1			-2			
VMS (Cu-rich)	Cu skarn; Cu porphyry			2		3		-1	-1	-1											
Intrusion-related Au	Epithermal Au; replacement-style Au							-1	-1		4	2								2	
Epithermal Au-Ag	Intrusion-related Au							-1	-1	4	3					1		3			
Porphyry Cu-Mo	Cu-Au porphyry; Cu skarn; Mo porphyry				-2	4	3	-1	-1	2	1										
W Skarn	Sn skarn; Porphyry W							-1	-1						2					2	3
Hydromorphic Anomaly		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

[a]SEDEX = sedimentary exhalative; VMS = volcanic-hosted/associated massive sulphide deposits; Hydromorphic Anomaly = inverse principal component 4.
[1] For heavily censored elements raw data is used following a log_{10} transformation.

LEGEND

Town
Mineral Occurrence
Road
Contour
River
NTS map sheet
Water Body
Wetland
Sample Location
Catchment >10km [2]
Catchment

Weighted Sums Model (PC residuals)
Polymetallic Ag-Pb-Zn Deposits

incomplete element suite
0-50th percentile
50-75th percentile
75-90th percentile
90-95th percentile
95-98th percentile
98-100th percentile

REFERENCES

Friske, P.W. and Hornbrook, E.H., 1989. National Geochemical Reconnaissance Stream Sediment and Water Geochemical Data, Central Yukon (105K/W and 105L). Geological Survey of Canada, Open File 1961.

Friske, P.W.B., Hornbrook, E.H.W., Lynch. J.J., McCurdy, M.W., Gross, H., Galletta, A.C., and Durham, C.C., 1990. National Geochemical Reconnaissance Stream Sediment and Water Geochemical Data, Central Yukon (105K/E). Geological Survey of Canada, Open File 2174.

Jackaman, W., 2011. Regional Stream Sediment Geochemical Data, Tay River Area, Central Yukon (NTS 105K East). Yukon Geological Survey, Open File 2011-29.

Jackaman, W., 2012. Regional Stream Sediment Geochemical Data, Glenlyon Area, Central Yukon (NTS 105K west & 105L). Yukon Geological Survey, Open File 2012-7.

Mackie, R., Arne, D. and Brown, O., 2015. Enhanced interpretation of regional stream sediment (RGS) geochemical data from Yukon: catchment basin analysis and weighted sums modeling. Yukon Geological Survey, Open File Report 2015-10.

Yukon MINFILE, 2015. Yukon MINFILE – A database of mineral occurrences. Yukon Geological Survey, www.data.geology.gov.yk.ca, accessed May 2015.

RECOMMENDED CITATION

MACKIE, R., ARNE, D. AND BROWN, O., 2015. Weighted sums model for Polymetallic Ag-Pb-Zn deposits using principal component residuals. In: Enhanced interpretation of stream sediment geochemical data for NTS 105K. Yukon Geological Survey, Open File 2015-25, scale 1:250 000, sheet 6 of 17.

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.

Table 1: List of Mineral Occurrences for NTS map sheet 105K (Yukon MINFILE, 2015)

Number	Name	Type	Status	Commodities
105K 001	SKEENA	Unknown	Unknown	
105K 002	WOP	Vein Polymetallic Ag-Pb-Zn±Au	Drilled Prospect	Copper, Molybdenum
105K 003	RAGS	Vein Cu±Ag Quartz	Showing	Copper
105K 004	DARCY	Vein Polymetallic Ag-Pb-Zn±Au	Deposit	Zinc, Lead, Silver
105K 005	DEEJAY	Unknown	Anomaly	
105K 006	SNOWCAP	Skarn Cu	Drilled Prospect	Copper
105K 007	CITATION	Unknown	Unknown	
105K 008	MOURNE	Epithermal Au-Ag-Cu: High Sulphidation	Prospect	
105K 009	GREW CREEK	Epithermal Au-Ag: Low Sulphidation	Deposit	Gold, Silver, Mercury, Arsenic
105K 010	FARGO	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (Sedex)	Drilled Prospect	Lead, Silver, Zinc
105K 011	LYN	Vein Polymetallic Ag-Pb-Zn±Au	Drilled Prospect	Lead, Silver, Zinc
105K 012	CASCA	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (Sedex)	Anomaly	
105K 013	THOMAS	Skarn Pb-Zn	Prospect	Lead, Tin, Zinc
105K 014	TILLMAN	Unknown	Unknown	
105K 015	EYE	Epithermal Au-Ag-Cu: High Sulphidation	Unknown	
105K 016	BRIDGE	Unknown	Unknown	
105K 017	FAN-TAN	Unknown	Unknown	
105K 018	TAKU	Unknown	Anomaly	
105K 019	GLYN	Unknown	Unknown	
105K 020	NESBITT	Unknown	Showing	Copper
105K 021	SPIT	Unknown	Unknown	
105K 022	BOBCAT	Epithermal Au-Ag-Cu: High Sulphidation	Drilled Prospect	
105K 023	GREEN VALLEY	Unknown	Showing	Antimony, Gold, Silver, Zinc, Lead, Copper
105K 024	HOLLY	Unknown	Unknown	
105K 025	ORCHAY	Ultramafic Mafic Gabbroid Cu-Ni-PGE	Showing	Copper
105K 026	SOCK	Unknown	Drilled Prospect	
105K 027	SPUR	Unknown	Drilled Prospect	Lead, Zinc, Silver
105K 028	DOMO	Unknown	Unknown	
105K 029	LAD	Skarn	Drilled Prospect	Lead, Zinc, Copper, Silver
105K 030	WELD	Unknown	Drilled Prospect	Lead, Zinc, Copper, Tin, Molybdenum
105K 031	TRUMP	Unknown	Unknown	
105K 032	LODGE	Unknown	Unknown	
105K 033	DARIN	Vein Polymetallic Ag-Pb-Zn±Au	Deposit	Lead, Zinc, Copper, Silver
105K 034	ADAMSON	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (Sedex)	Drilled Prospect	Copper, Lead, Zinc
105K 035	TEL	Unknown	Drilled Prospect	
105K 036	BETA	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (Sedex)	Drilled Prospect	Lead, Zinc
105K 037	BLIND	Unknown	Anomaly	
105K 038	GENTIAN	Vein Polymetallic Ag-Pb-Zn±Au	Showing	Zinc, Lead, Silver, Antimony, Cadmium, Arsenic, Copper
105K 039	CUB	Vein Polymetallic Ag-Pb-Zn±Au	Drilled Prospect	Lead
105K 040	NASTY	Unknown	Drilled Prospect	
105K 041	ABRAHAM	Vein Polymetallic Ag-Pb-Zn±Au	Drilled Prospect	
105K 042	SEA	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (Sedex)	Drilled Prospect	Copper, Zinc, Lead, Silver
105K 043	SB	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (Sedex)	Drilled Prospect	Copper, Zinc, Lead, Silver
105K 044	BLACKWOOD	Skarn Pb-Zn	Drilled Prospect	Copper, Lead, Zinc
105K 045	BEA	Unknown	Drilled Prospect	
105K 046	SWIM	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (Sedex)	Deposit	Lead, Silver, Zinc, Gold, Copper
105K 047	WANN	Vein Polymetallic Ag-Pb-Zn±Au	Showing	Copper, Lead, Zinc
105K 048	ELBOW	Unknown	Unknown	
105K 049	ST. LUCIE	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (Sedex)	Drilled Prospect	Copper
105K 050	O'CONNOR	Unknown	Drilled Prospect	
105K 051	Bubble	Vein Polymetallic Ag-Pb-Zn±Au	Showing	Gold, Silver, Lead, Zinc
105K 052	CIRQUE	Vein Polymetallic Ag-Pb-Zn±Au	Drilled Prospect	Silver, Gold, Lead, Zinc, Arsenic
105K 053	ARSENO	Vein Polymetallic Ag-Pb-Zn±Au	Drilled Prospect	Gold, Zinc, Silver, Lead, Tin, Indium
105K 054	SHRIMP	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (Sedex)	Drilled Prospect	
105K 055	VANGORDA	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (Sedex)	Past Producer	Lead, Silver, Zinc, Gold
105K 056	GRUM	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (Sedex)	Past Producer	Gold, Zinc, Silver, Lead
105K 057	KULAN	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (Sedex)	Drilled Prospect	Lead, Silver, Zinc
105K 058	KIM	Unknown	Prospect	Copper
105K 059	LO	Unknown	Drilled Prospect	
105K 060	TAY	Unknown	Unknown	
105K 061	FARO	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (Sedex)	Past Producer	Silver, Gold, Zinc, Lead
105K 062	FLAGSTONE	Skarn Cu	Drilled Prospect	Copper
105K 063	BRIDEN	Unknown	Drilled Prospect	
105K 064	JACOLA	Plutonic Related Au	Drilled Prospect	Lead, Silver, Zinc
105K 065	CROWN	Unknown	Drilled Prospect	
105K 066	LEON	Unknown	Unknown	
105K 067	LORNA	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (Sedex)	Drilled Prospect	Lead
105K 068	RESERVE	Skarn Cu	Drilled Prospect	Copper
105K 069	PARADOX	Unknown	Unknown	
105K 070	MARY	Unknown	Drilled Prospect	
105K 071	COWARD	Vein Cu±Ag Quartz	Unknown	Copper
105K 072	PAIGE	Plutonic Related Au	Anomaly	
105K 073	TWOPETE	Unknown	Drilled Prospect	
105K 074	COLT	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (Sedex)	Drilled Prospect	Zinc
105K 075	BLUE	Unknown	Unknown	
105K 076	HOOT	Skarn Pb-Zn	Anomaly	Lead
105K 077	OWL	Vein Polymetallic Ag-Pb-Zn±Au	Drilled Prospect	Copper, Zinc, Silver, Lead, Tin, Indium
105K 078	KEG	Skarn	Deposit	Lead, Zinc, Silver, Copper, Tin, Indium, Cadmium
105K 079	IVAN	Plutonic Related Au	Drilled Prospect	Copper, Lead, Zinc
105K 080	SHANNON	Unknown	Anomaly	
105K 081	COMPLICATION	Unknown	Unknown	
105K 082	TRY	Unknown	Drilled Prospect	
105K 083	REBEL	Vein Polymetallic Ag-Pb-Zn±Au	Drilled Prospect	Copper, Zinc, Lead, Silver, Tin, Indium
105K 084	HAMMER	Epithermal Au-Ag-Cu: High Sulphidation	Drilled Prospect	Silver, Antimony, Gold, Lead, Zinc
105K 085	YETI	Unknown	Anomaly	
105K 086	MARKS	Manto Polymetallic Ag-Pb-Zn	Showing	Lead, Zinc
105K 087	TEDDY	Volcanogenic Sulphide - type not determined	Drilled Prospect	Copper, Zinc
105K 088	SIROLA	Unknown	Drilled Prospect	
105K 089	ANDREW	Vein Polymetallic Ag-Pb-Zn±Au	Deposit	Lead, Zinc, Silver, Germanium, Copper
105K 090	MYSCHKA	Vein Polymetallic Ag-Pb-Zn±Au	Prospect	Antimony, Gold, Zinc, Silver, Tin, Lead
105K 091	EL PINO	Epithermal Au-Ag: Low Sulphidation	Anomaly	Antimony, Arsenic, Gold
105K 092	GALWAY	Vein Polymetallic Ag-Pb-Zn±Au	Showing	Arsenic, Lead, Mercury, Silver, Zinc, Gold
105K 093	PARLIAMENT	Epithermal Au-Ag-Cu: High Sulphidation	Drilled Prospect	Arsenic, Gold, Mercury, Zinc, Lead, Copper
105K 094	CESSNA	Unknown	Drilled Prospect	
105K 095	BUNBURY	Unknown	Showing	
105K 096	JON	Unknown	Anomaly	
105K 098	CHAPLIN	Volcanogenic Sulphide - type not determined	Drilled Prospect	Copper, Lead, Silver, Zinc, Gold
105K 100	MOR	Unknown	Drilled Prospect	Copper
105K 101	DY	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (Sedex)	Deposit	Gold, Zinc, Silver, Lead
105K 102	SELLMER	Unknown	Anomaly	
105K 103	TENAS	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (Sedex)	Prospect	Arsenic, Bismuth, Gold, Lead, Zinc
105K 104	DEV	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (Sedex)	Drilled Prospect	Lead, Silver, Zinc
105K 105	SIR JOHN A.	Sediment hosted Sedimentary Exhalative Zn-Pb-Ag (Sedex)	Drilled Prospect	Lead, Zinc
105K 106	URN	Sediment hosted Stratiform Barite	Showing	Barium
105K 107	WEDEKIND	Epithermal Au-Ag-Cu: High Sulphidation	Unknown	
105K 108	LADY DI	Plutonic Related Au	Drilled Prospect	Lead, Zinc, Silver
105K 109	PRINCE CHARLES	Unknown	Anomaly	
105K 110	MT. MENZIE	Sediment hosted Stratiform Barite	Showing	Barium
105K 111	UNION	Skarn W	Showing	Copper, Molybdenum, Silver, Zinc
105K 112	STARLIGHT	Vein Cu±Ag Quartz	Drilled Prospect	Copper, Zinc
105K 113	PONTOON	Epithermal Au-Ag-Cu: High Sulphidation	Drilled Prospect	
105K 115	MULTI	Unknown	Drilled Prospect	

Yukon Geological Survey
Energy, Mines and Resources
Government of Yukon

Open File 2015-25

Weighted sums model for Polymetallic Ag-Pb-Zn deposits using principal component residuals (NTS 105K) Sheet 6 of 17

by

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