

Mineral Inventory

KNOWN SULPHIDE DEPOSITS in SELWYN BASIN

DISTRICT	TYPE	DEPOSIT	Million Tonnes	Zn %	Pb %	Ag g/t	Status (pre N43-101)
ANVIL	SEDEX	Faro	56.6	5	3	34	mined out
		Vangorda	6.3	5	3	48	mined out
		Grum	16.9	4.9	3.0	47	partly mined
		Grizzly (Dy)	21.3	7.3	5.4	81	resource
		Swim	4.8	4.7	3.8	42	resource
HOWARDS PASS	SEDEX		476	7% (Pb + Zn)		resource	
MACMILLAN PASS	SEDEX	Jason	14.1	6.6	7.1	80	resource
		Tom	9.2	7.5	6.2	69	reserve
OTHER AREAS	SEDEX	Clear Lake	6.1	11.3	2.2	41	resource
	VHMS	Marg	5.5	4.6 2.5 (1.8 %Cu, 1 g/t Au)		63	resource
	SEDEX/MVT	MEL	5.7	6.8	1.9		resource

Further Reading

Bailes, R.J., Smee, B.W., Blackadar, D.W. and Gardner, H.D., 1986. Geology of the Jason lead-zinc-silver deposits, Macmillan Pass, eastern Yukon. *In: Mineral Deposits of Northern Cordillera*, J.A. Morin (ed.), Canadian Institute of Mining and Metallurgy, Special Volume 37, p. 87-99.

Deklerk, R. and Traynor, S., 2005. Yukon MINFILE 2005, Yukon Geological Survey, CD-ROM.

Goodfellow, W.D., 2004. Geology, genesis and exploration of SEDEX deposits, with emphasis on the Selwyn Basin, Canada. *In: Sediment-hosted Lead-Zinc Sulphide Deposits, Attributes and Models of Some Major Deposits in India*, M. Deb and W.D. Goodfellow (eds.), Australia and Canada, Narosa Publishing House, New Delhi, India, p. 24-99.

Goodfellow, W.D. and Jonasson, I.A., 1986. Environment of formation of the Howards Pass (XY) Zn-Pb deposit, Selwyn Basin, Yukon. *In: Mineral Deposits of Northern Cordillera*, J.A. Morin (ed.), Canadian Institute of Mining and Metallurgy, Special Volume 37, p. 19-50.

Goodfellow, W.D., Lydon, J.W., and Turner, R.W., 1993. Geology and genesis of stratiform sediment-hosted (SEDEX) Zn-Pb-Ag sulphide deposits. *In: Mineral Deposit Modeling*, R.V. Kirkham, W.D. Sinclair, R.I. Thorpe, and J.M. Duke (eds.), Geological Association of Canada, Special Paper 40, p. 201-251.

Jennings, D.S. and Jilson, G.A., 1986. Geology and sulphide deposits of the Anvil Range, Yukon. *In: Mineral Deposits of Northern Cordillera*, J.A. Morin (ed.), Canadian Institute of Mining and Metallurgy, Special Volume 37, p. 339-361.

Pigage, L.C., 2004. Bedrock geology compilation of the Anvil District (parts of NTS 105K.2,3,5,6,7 and 11), central Yukon. Yukon

For more information, contact the Yukon Geological Survey at:

email: geology@gov.yk.ca

Yukon Geological Survey
Department of Energy, Mines
and Resources

Yukon Government
Box 2703
Whitehorse, Yukon
Canada
Y1A 2C6

phone: (867) 667-8508
fax: (867) 393-6232

Information in this brochure was
compiled by: Lee Pigage

Published on: April 2006

Yukon
Energy, Mines and Resources

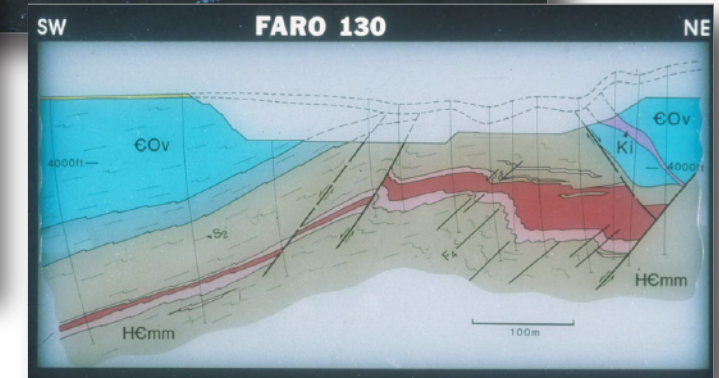
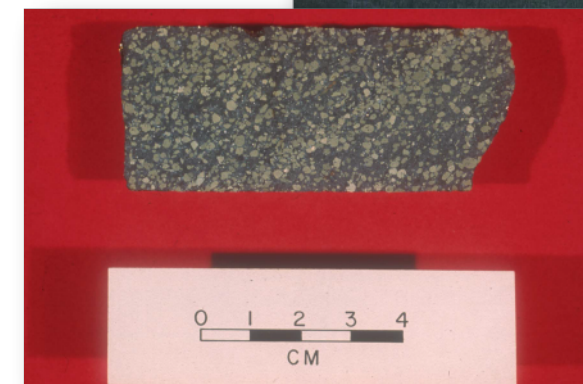
YUKON
GEOLOGICAL SURVEY

Yukon
Energy, Mines and Resources

ZINC-LEAD-SILVER-BARIUM

Selwyn Basin

YGS Brochure 2006-2



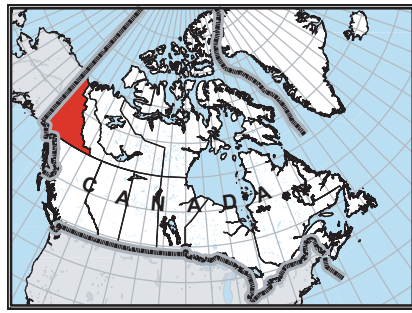
- Selwyn Basin is a Paleozoic continental margin basin with excellent exploration potential for SEDEX, VHMS and MVT deposits.
- SEDEX deposits occur at three separate time horizons and include Howards Pass - the world's largest known SEDEX deposit.
- Vast tracts of favourable stratigraphy are under-explored.

YUKON
GEOLOGICAL SURVEY

www.geology.gov.yk.ca

Introduction

Yukon Territory (in NW Canada) is the location of Selwyn Basin, a latest Precambrian-Devonian depositional basin with favourable geology for major mineral deposits. It is characterized by deposition of offshore deep water shales in a basin bounded by platform carbonates to the northeast. The strike-slip Tintina Fault truncates the basin on the southwest.



Although known primarily for SEDEX sulphide deposits, the geographic extent of Selwyn Basin also contains several other deposit types. Exploration activities have outlined tungsten skarn (e.g., Mactung), stratiform barite (e.g., Tea), intrusion hosted Au quartz vein, Ag-Pb vein (e.g., Keno Hill), stratiform Ni (e.g., Nick), and VHMS (e.g., Marg) occurrences and deposits.

SEDEX sulphide deposits in Selwyn Basin have been discovered in Cambrian (Anvil), Silurian (Howards Pass) and Devonian (MacMillan Pass, Rein) shales. Mining of Anvil deposits has occurred intermittently since 1969. Other deposits remain undeveloped.

Areas away from deposits / districts are under-explored.

Yukon databases

A more comprehensive view of metallogeny for this area is available free on the Yukon Geological Survey website, as well as interactive maps, reports, and several exploration databases (see below).

Yukon Digital Geology

The Yukon Digital geology compilation map encompasses the entire Yukon and is based on 1:250 000-scale geology maps.

YUKON MINFILE database

Yukon MINFILE is a mineral inventory database that documents exploration history and geology of prospects and occurrences in Yukon of metallic minerals, industrial minerals, and coal.

Stream sediment (RGS) database

Geochemical data for 20 elements are available for most of Selwyn Basin. Sampling density is about one sample for every 13 square kilometres.

Photos on Front

Left - High grade Faro deposit buckshot ore - pyrite porphyroblasts in matrix of sphalerite and galena (Cyprus Anvil Mining Corporation photograph)

Centre - Faro mine 1979 (photograph by Lee Pigage)

Right - Vertical cross-section through Faro Deposit. Sulphide ore in red, quartzose ore in pink (Cyprus Anvil Mining Corporation photograph)

SEDEX

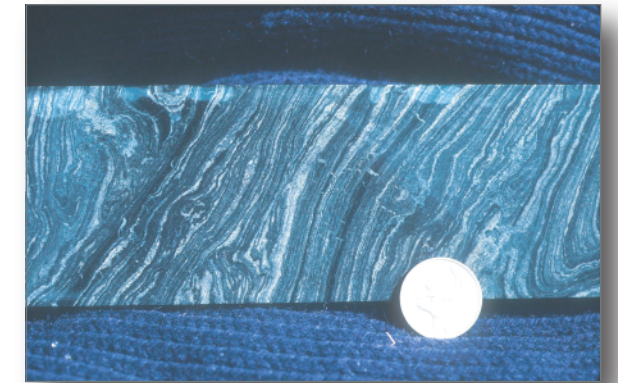


Blue-grey-weathering Earn Group on slope. Earn Group hosts the MacMillan Pass SEDEX prospects and deposits. Photograph by Grant Abbott.

Finely laminated mineralization from Howards Pass. Photograph by Mike Burke



Finely laminated mineralization from the Tom deposit, MacMillan Pass. Photograph by Grant Abbott



Deposit models

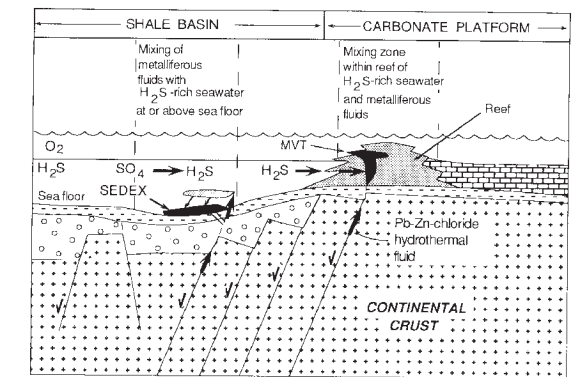


Figure from Goodfellow (2004)

Three deposit models encompass the major sulphide deposit types occurring in Selwyn Basin: sedimentary exhalative (SEDEX), Mississippi Valley type (MVT) and volcanic-hosted massive sulphide (VHMS).

SEDEX and MVT deposits can be correlated through a basin-wide genetic model involving large-scale flow of deep, basinal hydrothermal fluids.

SEDEX (sedimentary-exhalative)

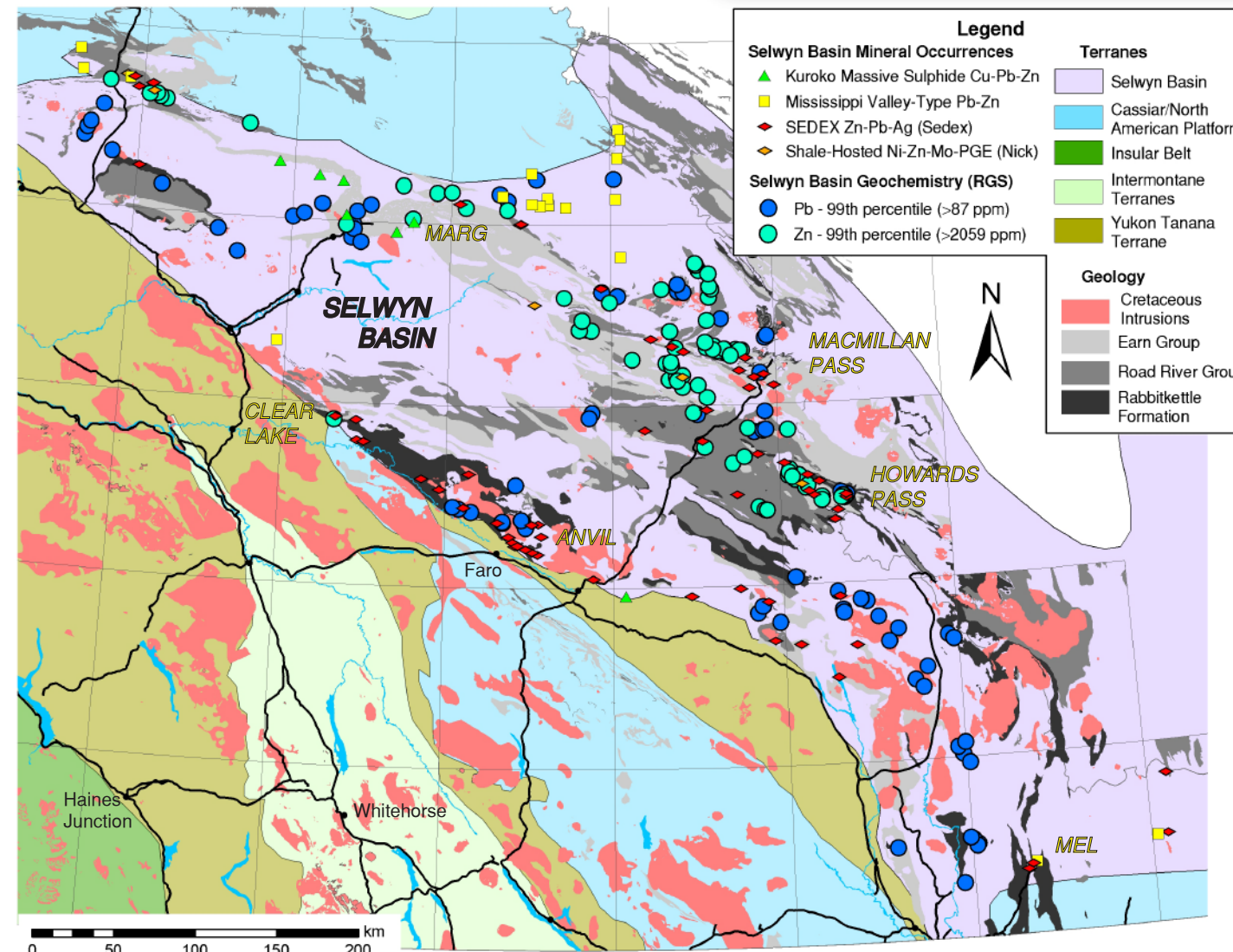
- mineralization syngenetic on sea floor or very early diagenetic
- stratiform, bedded, tabular deposits commonly associated with black shales
- 2nd or 3rd order basins associated with growth faults in continental rifting environment
- hydrothermal fluids saline, deep, basinal brines at temperatures 50-300° C
- sulphur from ambient seawater
- alteration associated with vent feeder and vent-proximal deposition

MVT (Mississippi Valley type)

- mineralization epigenetic in host platform carbonates next to large shale basins in continental setting
- stratabound, mineralization fracture fills, collapse breccias, open space fills, replacement
- dolomitization commonly with mineralization
- hydrothermal fluids saline, deep, basinal brines at temperatures 50-200° C

VHMS (volcanic-hosted massive sulphide)

- mineralization syngenetic on sea floor or very early diagenetic, typically associated with fault zones
- strata-bound, associated with contemporaneous volcanic rocks
- hydrothermal fluids modified seawater convecting through volcanic rocks at temperatures up to 400° C
- extensive footwall alteration pipes and stockwork related to upwelling hydrothermal fluids



Terrane map showing extent of Selwyn Basin in Yukon and adjacent NWT.