

**GEOLOGY OF THE ROBB LAKE  
 PB - ZN DEPOSIT, NORTHEASTERN B.C.**

NTS 94B/13 TRIM 094B092  
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SCALE 1 : 20 000



**SULPHIDE MINERALIZATION**

Breccias (crackle, mosaic and rubble) with dolomite and sulphide matrix; sphalerite-galena veins and stockworks. Breccias range from mono- to polymictic; fragments tend to be highly angular. In addition to dolostones, sulphides and vein dolomite form clasts in the rubble breccias (pattern covers surface showings and near-surface drill-indicated extensions, Cordilleran Engineering 1972)

**PLATFORMAL UNITS**

**UPPER DEVONIAN**  
 Bessa River Formation  
 uDBw Western facies: Black to dark grey siliceous argillite and shale, locally with silt laminae  
 uDBe Eastern facies: Light brown to grey-weathering, well laminated soft calcareous mudstone/siltstone

**LOWER TO MIDDLE DEVONIAN**  
 Stone and Duncedin formations, unroofed

ImDsd Interbedded dark grey fossiliferous dolostone and light to medium grey non-fossiliferous dolostone

**SILURIAN-DEVONIAN**  
 Muncho-McConnell Formation

SDMu Upper unit: Thick to medium bedded, light to medium grey dolostone alternating with thin-bedded dolostone. Algal laminae and fenestrae common. Local dolostone-chip breccias at bed tops, and minor quartz sand

SDMbx Polymictic breccia unit, large dolostone and limestone clasts; dolostone matrix, laminated in part

SDMls Cliff-forming dolostone and minor remaining limestone

SDMl Lower unit: Thick to medium-bedded, light to medium grey algal-laminated to massive dolostone. Sparse fossils particularly towards top

**SILURIAN**  
 Nonda Formation

SN Medium to dark grey laminated fossiliferous dolostone with corals (favosites, halysites)

**BASINAL UNITS**

Sbx Medium-dark grey dolostone breccia with fragments of dolostone, black secondary nodular chert and corals (favosites, halysites)

**SILURIAN**  
 SDdq Dolostone and grey quartzite

**ORDOVICIAN TO SILURIAN**  
 Road River Group

OSRR Dark grey to black slate, calcareous slate and dark grey carbonaceous limestone; minor quartzite, laminated dolostone

**ORDOVICIAN**  
 Skoki Formation

Os Muddy, carbonaceous thick-bedded dolostone overlain by thin-bedded, fossiliferous silty dolostone

**CAMBRIAN TO ORDOVICIAN**  
 Kechika Group

LOK Laminated medium to dark grey, glossy orange-brown to olive-weathering flaggy calcareous slate

**SYMBOLS**

Contact defined	-----
approximate	- - - - -
assumed	.....
Facies defined	-----
approximate	- - - - -
Fault - normal defined	-----
assumed	.....
Fault - thrust defined	-----
approximate	- - - - -
Fold anticline	-----
syncline, overturned	-----
Bedding (tops unknown)	-----
Bedding (vertical)	-----
S1 cleavage	-----
L1 lineation	-----
F1 fold axis (symmetric)	-----
Fracture (vertical)	-----
Vein	-----
Vein (vertical)	-----
Stickensides	-----
Outcrop	-----

**PROPERTY SUMMARY**

The Robb Lake Mississippi Valley-type Pb-Zn deposit (MINFILE 094B 005) is hosted by platform carbonate rocks in the Rocky Mountains of northeastern British Columbia (56°56'N, 123°43'W; 94B/13). The deposit, hosted by Silurian-Devonian dolostone of the Muncho-McConnell Formation, consists of a series of interconnected bedding-parallel and cross-cutting breccia bodies with sparry dolomite, sphalerite, galena, pyrite, quartz, calcite, and pyrophen in the matrix. It is the most promising and the best developed carbonate-hosted lead-zinc occurrence in the northern Rockies, with significant showings over an 8 square km area.

Lead-zinc mineralization was discovered near Robb Lake in 1971 by Arrow-Interamerican Corp., Barrier Reef Resources Ltd., and Escal Mining Ltd. Drilling between 1972 and 1975 led to the incomplete delineation of three deposits, the "lower zone", the East Webb ridge zone, and the West Webb ridge zone (at depth south of the Webb showing). Drilling was continued by Texasgulf in the summers of 1980 and 1981. The geological resource at Robb Lake is quoted as 6.5 million tonnes at 7.7% combined lead and zinc (2.4 metre mining width, 5% cutoff grade, Consolidated Barrier Reef Resources, Rights Offering Circular, November 29, 1984). Core is stored at an airstrip at the confluence of Mississippi Creek and the Halfway River.

Most of the lead-zinc mineralization at Robb Lake occurs within the Muncho-McConnell Formation, although a few occurrences lie within a thin overlying sequence attributed to the Stone-Duncedin formations. The deposit is located next to the tectonically telescoped shelf-slope facies boundary. The strata that host Robb Lake lie in the immediate footwall of a major thrust fault, which has deep water, early Paleozoic strata in its hanging wall.

The showings are in and near the valley of Mississippi Creek. Mineralization occurs as breccias, veins and vein stockworks, with breccia mineralization the most important. The breccias form interconnected, bedding-parallel and/or crosscutting bodies, which are partly to wholly mineralized. The favorable mineralized sections form a stratobound zone occupying the upper 200 metres of the lower unit of the Muncho-McConnell Formation and the lower 130 metres of the upper unit. The base of the cliff-forming unit exerted a strong control on the location of the main stratiform breccia bodies, as is illustrated on the cross-section of the valley of Mississippi Creek. The steep slope of Tennessee Mountain is more or less a dip slope, and the showings along the creek - the Lower Canyon, and Cascade zones - are stratigraphically equivalent to those on the south side of Tennessee Mountain - the Upper, Waterfall, Camp, and North Face zones.

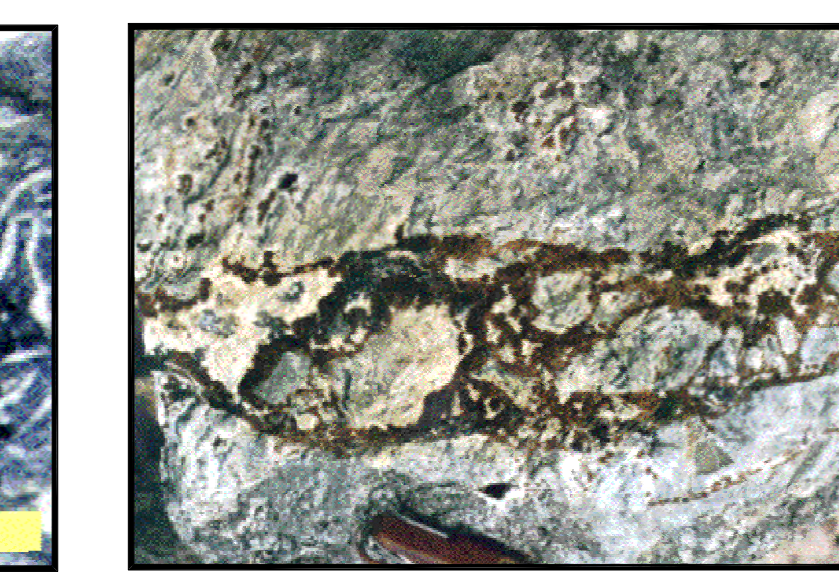
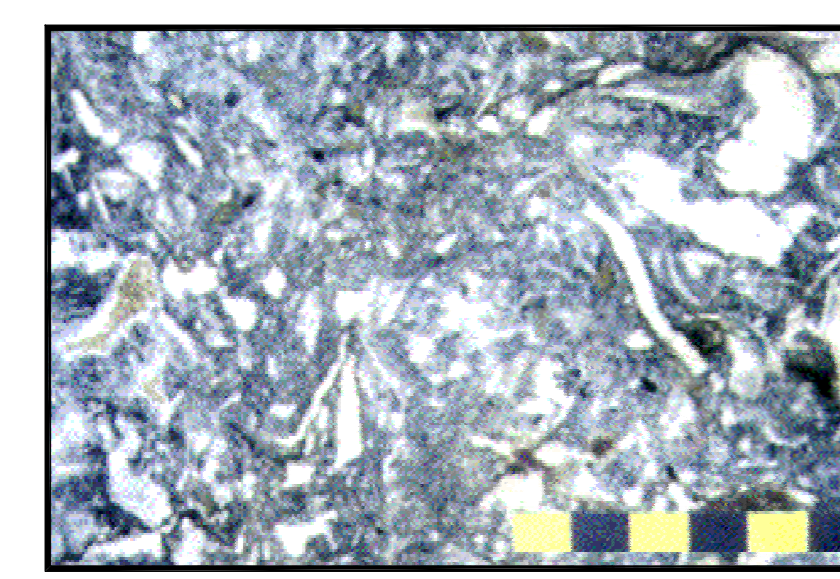
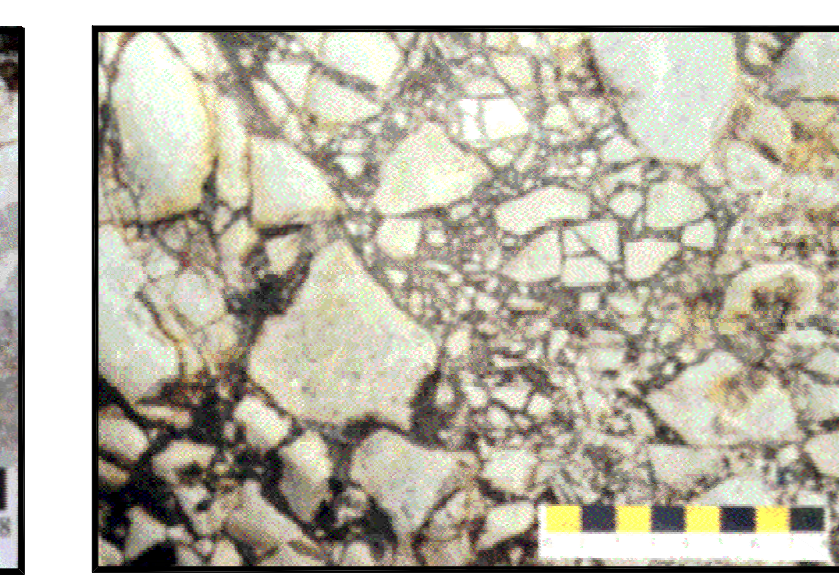
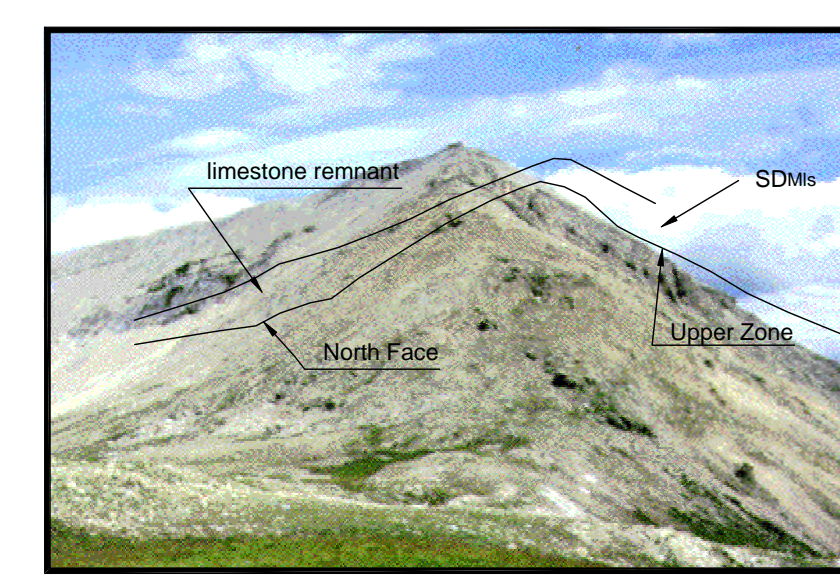
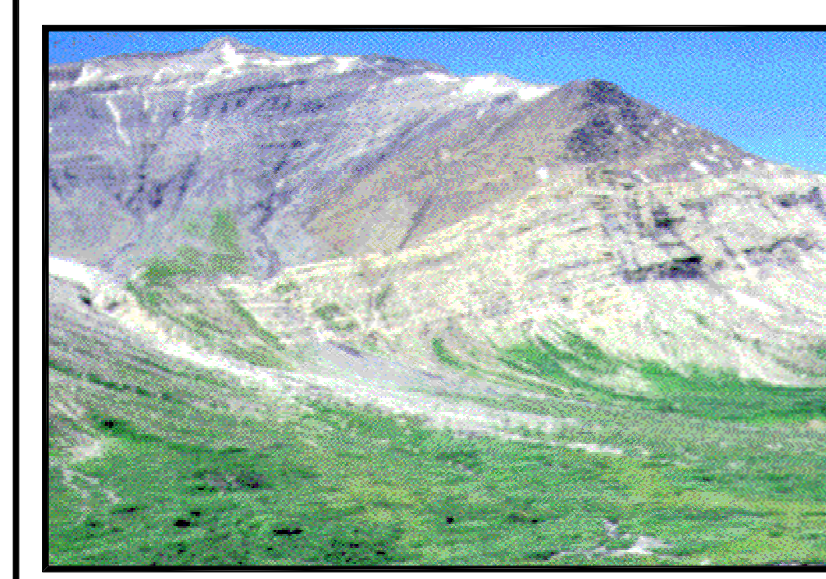
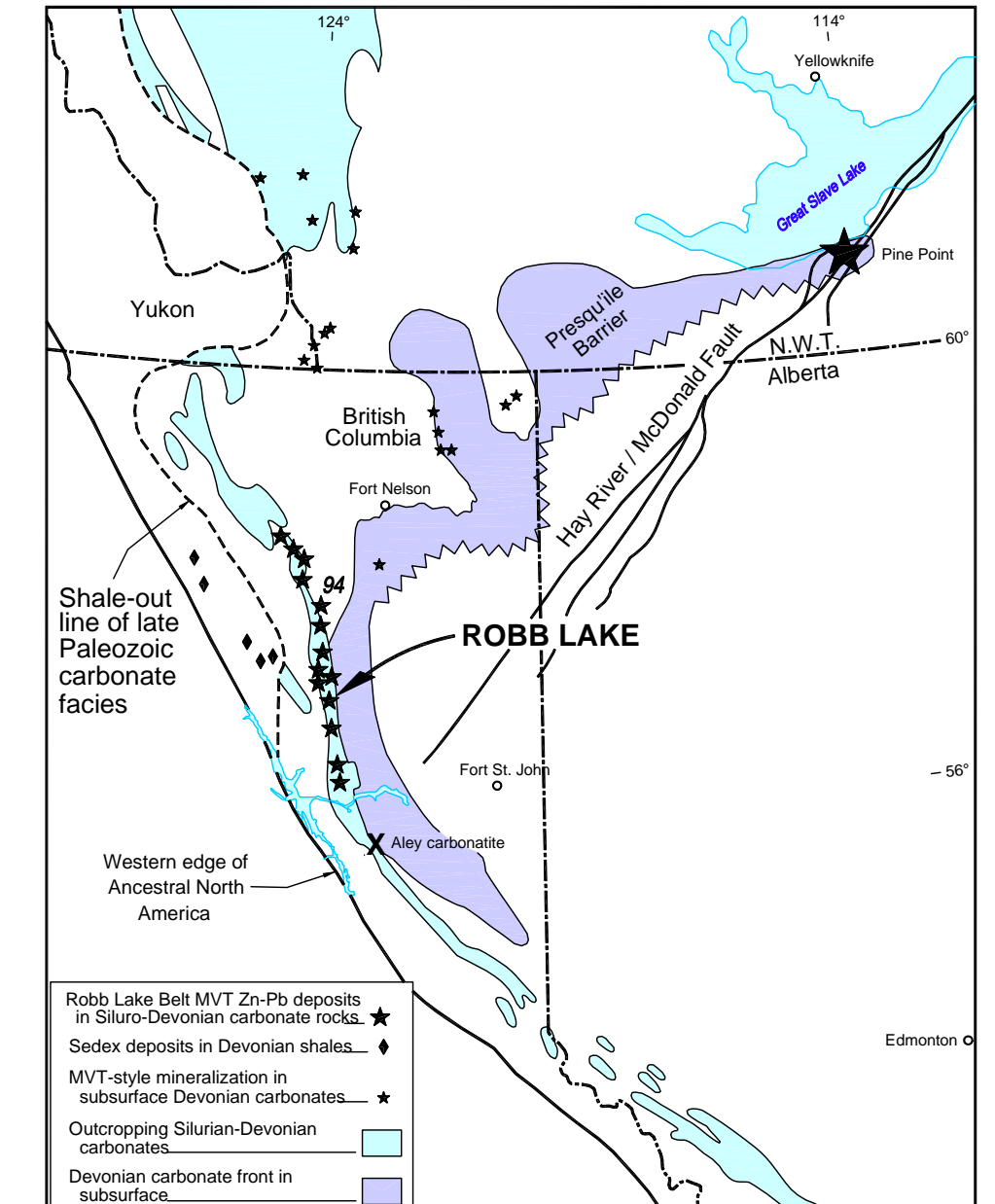
Conclusions  
 The Robb Lake deposit has unexplored stratobound potential in the zone bounded above by unit SDMls. Breakthrough zones of cross-cutting mineralization may be associated with zones of more intense mineralization, such as Webb Ridge and the as yet unexplored zone around Tennessee Mtn., Monocline and Bear on the south side of Tennessee Mountain. The area of the Tails zone is also of interest because of the steep faults outlined there.

References  
 Nelson, J., Paradis, S. and Zantvoort, W. (1999): The Robb Lake carbonate-hosted lead-zinc deposit, northeastern British Columbia: a Cordilleran MVT deposit. C. Ministry of Energy and Mines Geological Fieldwork 1998, Paper 1999-1, pages 89 - 102.

Paradis, S., Nelson, J.L. and Zantvoort, W. (1999): A new look at the Robb Lake carbonate-hosted lead-zinc deposit, northeastern British Columbia. Current Research 1999-A, Geological Survey of Canada, pages 61-70.

Acknowledgments  
 We acknowledge data on showing locations from unpublished map, Cordilleran Engineering, 1972.  
 Drafting by ArmigedCAD, Computer Drafting

**REGIONAL GEOLOGICAL SETTING**



Mountain slope southwest of Mississippi Creek, showing structural succession. Beige cliff-forming dolostones of the upper Muncho-McConnell Formation in the footwall of the Mississippi Creek Fault are overlain by hanging wall basinal stratigraphy: brown Kechika Group and dark grey Road River Group; Silurian breccia caps the highest peak.

Looking east at the North Face and Upper zones on Tennessee Mountain, approximately on the line of cross section A-A'. The showings lie immediately below the cliff-forming, mostly dolomitized limestone that forms the uppermost unit of the lower Muncho-McConnell Formation (SDMls). A remnant of dark grey, intact limestone lies above the North Face showing (left of photograph).

Zebra texture in secondary dolomite, which commonly occurs peripheral to breccias.

Mosaic breccia with hydrothermal dolomite and sphalerite inclusions. Sphalerite tends to coat clasts. No preferred "snow on the roof" geopetal growth shown in this example.

Rubble breccia with highly angular clasts in sulphide-rich, pyrite-sphalerite matrix.

Trash breccia with abundant clasts of hydrothermal dolomite vein selvages. Some trash breccias also contain sulphide fragments.

Vein-style mineralization, Webb showing. Greenish and reddish brown sphalerite and hydrothermal dolomite fill cracks in previously zebra-altered dolostone.

Open space crystalline quartz from a vein occurrence high in the upper Muncho-McConnell Formation near the summit plateau of Tennessee Mountain.