PROJECT AND APPLIED GEOLOGY

GEOLOGY OF THE MOUNT ATTWOOD-PHOENIX AREA, GREENWOOD (82E/2)

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INTRODUCTION

Regional mapping of 250 square kilometres in the Mount Attwood-Phoenix area near Greenwood has been prompted by continuing mineral exploration mainly by Noranda Mines, Ltd. and Kettle River Resources Ltd. This mapping utilizes the Granby Mining Company Ltd.'s 1:12 000-scale topographic base map and information from previous detailed studies of the Lexington mine (Church, 1970), Oro Denoro mine (Church, 1983), Skomac mine (Church, 1977), Sappho (Church and Robertson, 1983), and Sylvester K (Church, 1984) prospects.

The Mount Attwood-Phoenix area is underlain by 22 mappable units comprising a variety of sedimentary, volcanic, metamorphic, and intrusive rocks that range from Paleozoic to Tertiary in age (Fig. 1).

BEDDED ROCKS

The Paleozoic (?) age Knob Hill Group is the oldest of four major mutually unconformable assemblages. These rocks consist of massive and banded metacherts and lesser amounts of quartz-chlorite schist, some amphibolitic schists and gneisses, and a few marble bands. The rocks have been affected by deformation and metamorphism causing recrystallization and the development of foliation, quartz sweats parallel to foliation and much deformation of individual beds.

The Attwood Group is Permo-Carboniferous, according to much fossil evidence. The rocks consist mainly of black argillite, some sharpstone conglomerate beds, greywacke, limestone lenses, and metavolcanic units.

The Brooklyn Group is Triassic and commonly overlies Knob Hill rocks in 'valleys' eroded through the Attwood sequence. It is characterized by

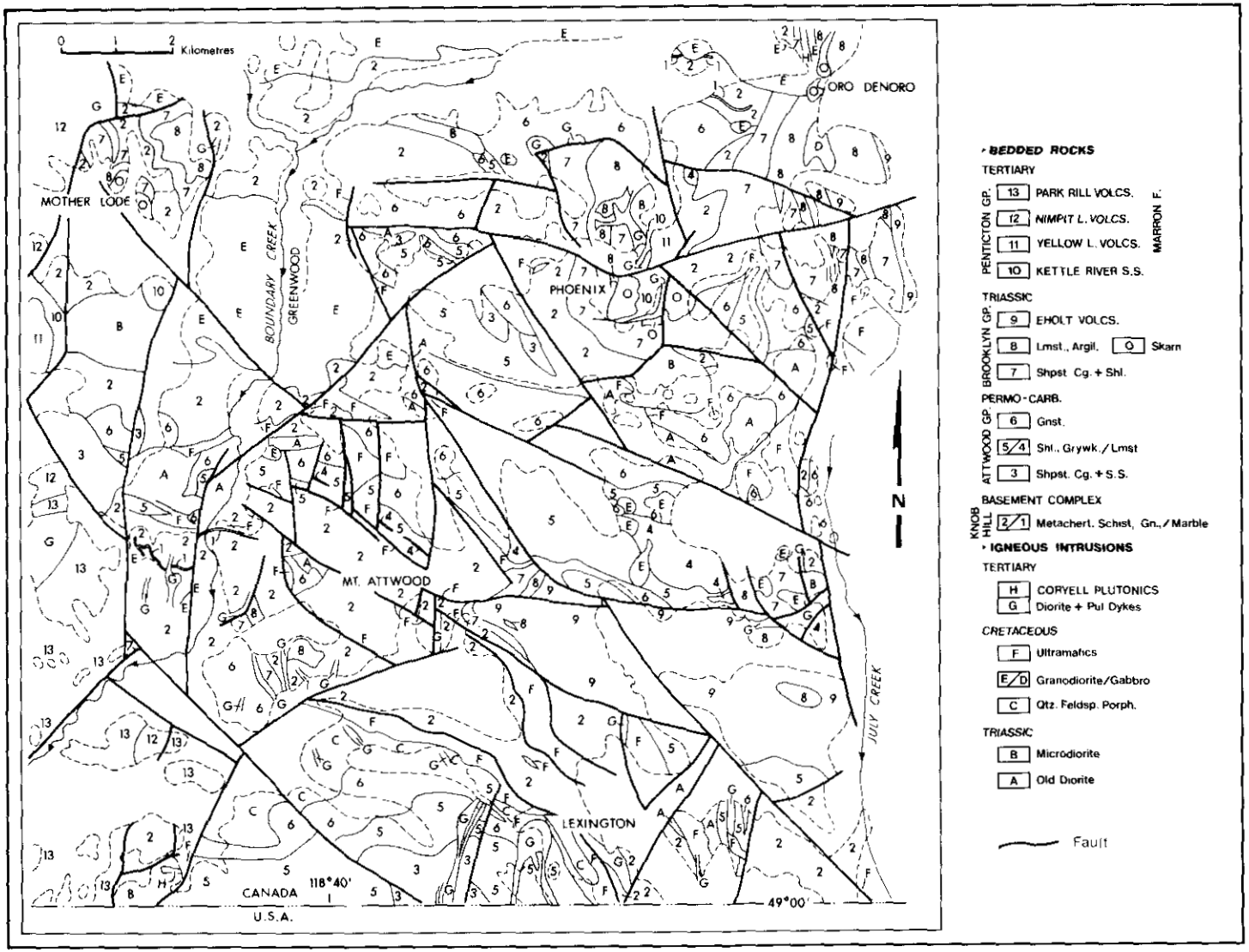

Figure 1. Detailed geology of the Greenwood mining camp.

thick basal conglomerates, interfingering shales and limestones, and an upper sequence of volcanic breccias. Abundant chert clasts derived from the underlying Knob Hill formations characterize both the Attwood and Brooklyn sharpstone conglomerates.

Both Attwood and Brooklyn rocks were affected by chlorite to amphibole grade regional metamorphism and important tectonic movements. Locally this deformation resulted in development of tight recumbent and overturned folds.

The Eocene Penticton Group is the youngest assemblage in the area. This group comprises the Kettle River Formation consisting mostly of arkosic sandstones, and the Marron Formation consisting of three volcanic members - the Yellow Lake mafic phonolites, the Nimpit Lake tan trachytes, and the Park Rill andesites. These rocks have been tilted by block faulting related to graben development.

IGNEOUS INTRUSIONS

The igneous intrusions range from ultramafic rocks and a small gabbro stock to an assortment of granite to syenite and diorite plutonic rocks and related hypabyssal bodies. Ages range from Triassic to Tertiary.

The oldest intrusions are heterogeneous hornblende diorites. These occur as numerous small, stock-like bodies that are associated with major faults scattered across the central part of the map-area. Partly digested xenoliths of Attwood sedimentary and volcanic rocks are common in the diorite, suggesting a post-Permian age. Clasts of this diorite are found in the Brooklyn sharpstone conglomerate, indicating a probable Lower or Middle Triassic age for this intrusive rock.

The largest intrusions are the Greenwood and Wallace Creek batholiths. These biotite-hornblende granodiorite bodies are associated with many of the skarns and quartz veins in the area. Potassium/argon analyses of these rocks yield Upper Jurassic/Lower Cretaceous dates of 143±5 Ma and 125±5 Ma from Oro Denoro mine and the Dentonia mine at Jewel Lake, respectively.

Microdiorite intrusions are scattered widely across the map-area occurring as small stocks and feeder dykes to the Park Rill andesites and older andesitic volcanic rocks. The older microdiorite bodies, such as the 206±8 Ma Providence Lake stock, and the Hartford Junction and Buckhorn intrusions, are of special note because of the contained disseminated sulphides and their proximity to orebodies in host rocks.

Serpentinized ultramafic rocks are also widely distributed throughout the map-area. These rocks are assigned a Cretaceous age because of cutting relationships. The serpentine was intruded as sills and dyke-like bodies, probably in semi-solid state, along unconformity surfaces and in

major fault zones. The serpentine is hosted by a variety of rocks types, including Knob Hill, Attwood and Brooklyn Formations, and phases of both the Greenwood batholith and the older diorites.

MINERALIZATION

Most mineral production in the Greenwood mining camp has been from copper skarn deposits. To a lesser extent, production has come from gold and silver-bearing quartz veins with ancillary lead and zinc values.

Recent exploration has focused on stratabound volcanogenic (?) gold-sulphide mineralization in Triassic beds (Sylvester K prospect) and precious metal veins peripheral to the Wallace Creek batholith (Dentonia mine at Jewel Lake). Other mineral occurrences of note, that have received current and past attention, are the Phoenix and Oro Denoro copper sulphide-magnetite-bearing skarn deposit, and the Lexington and Buckhorn porphyry copper prospects. The Tam O'Shanter prospect is a good example of epithermal vein mineralization associated with Tertiary faulting peripheral to the Toroda Creek graben. Sappho is a similarly situated gold-silver-platinum copper prospect hosted in a small Tertiary Coryell syenite-shonkinite intrusion. Older (Cretaceous) breaks containing dyke-like ultramafic intrusions have related gold-silver quartz vein systems, such as the Number 7 and the Skomac mines.

In the Greenwood area, the combination of a long history of mineralization and a wide range in types of deposits insures good potential for new discoveries.

REFERENCES

Church, B. N. (1970): Lexington, *B.C. Ministry of Energy, Mines & Pet. Res.*, GEM, 1970, pp. 413-425.

..... (1977): Geological Investigations in the Greenwood Area, *B.C. Ministry of Energy, Mines & Pet. Res.*, Geological Fieldwork, 1976, pp. 7-10.

..... (1983): Geology in Vicinity of the Oro Denoro Mine, *B.C. Ministry of Energy, Mines & Pet. Res.*, Geology in B.C., 1976, pp. G1-G13.

..... (1984): Geology and Self-potential Survey of the Sylvester K Gold-sulphide Prospect, *B.C. Ministry of Energy, Mines & Pet. Res.*, Geological Fieldwork, 1983, Paper 1984-1, pp. 7-14.

Church, B. N. and Robertson, S. (1983): Geology and Magnetometer Survey of the Sappho Gold-silver-platinum-copper prospect, *B.C. Ministry of Energy, Mines & Pet. Res.*, Geological Fieldwork, 1982, Paper 1983-1, pp. 27-31.

Little, H. W. (1983): Geology of the Greenwood Map-area, British Columbia, *Geol. Surv., Canada*, Paper 79-29, 37 pp.

McNaughton, D. A. (1945): Greenwood-Phoneix Area, British Columbia, *Geol. Surv., Canada*, Paper 45-20.

Seraphim, R. H. (1956): Geology and Copper Deposits of Boundary District, British Columbia, *C.I.M.*, Trans., Vol. LIX, pp. 384-394.

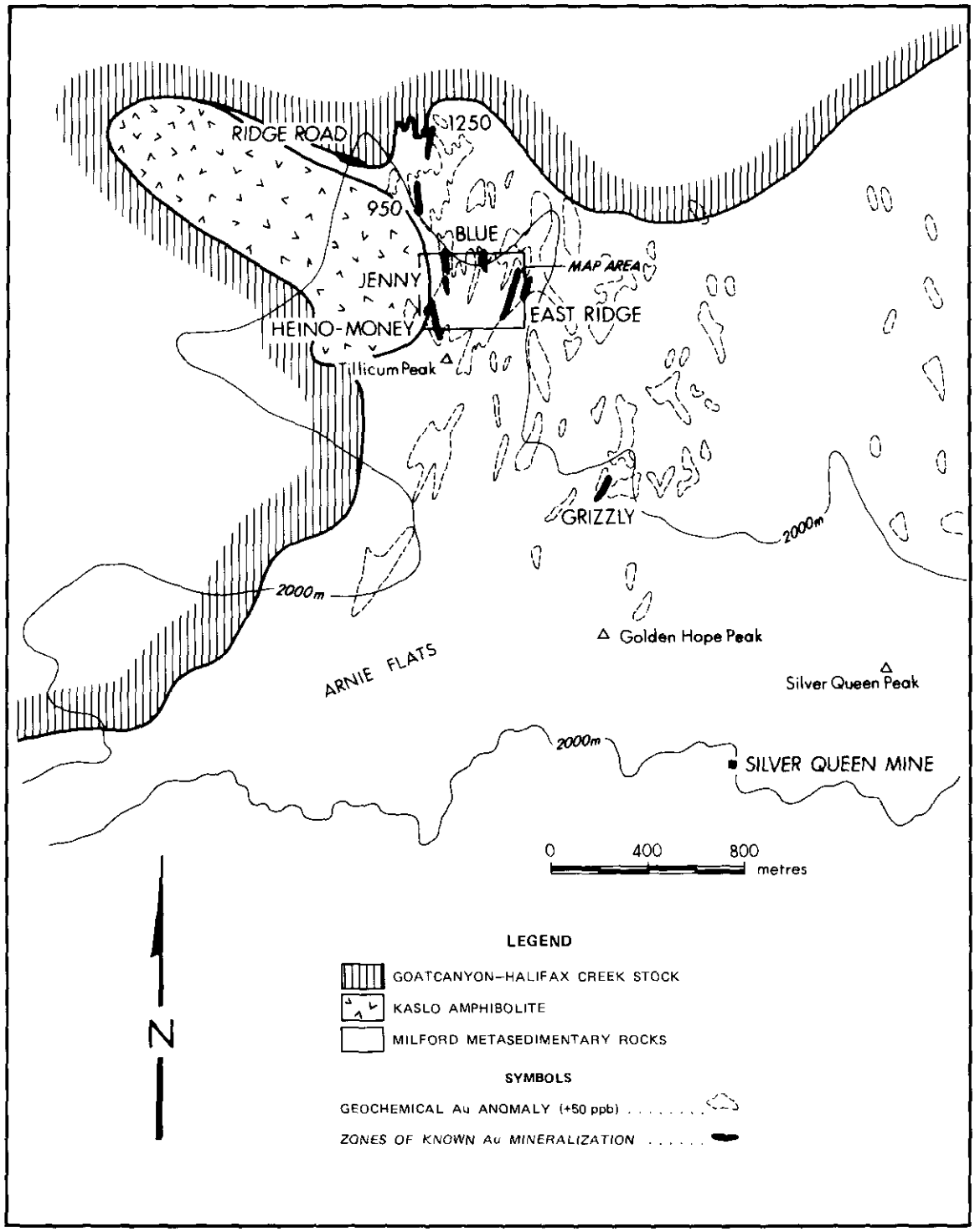

Figure 2. General geology and location of identified gold zones in the Tillicum Mountain gold property as of 1983 (geology after Hyndman, 1968; gold data courtesy of Esperanza-La Teko).