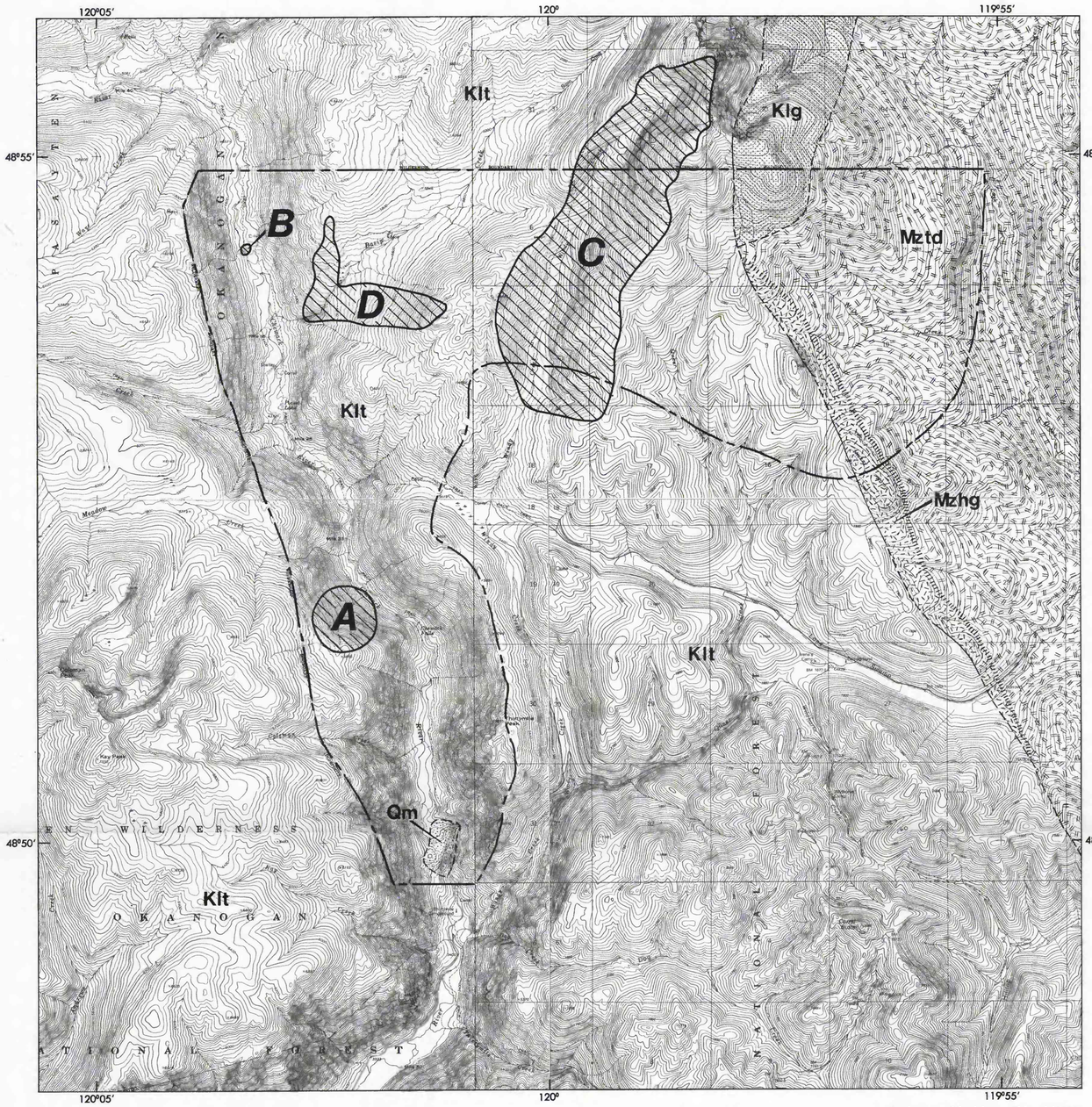
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY



Base from U.S. Geological Survey, 1:24,000
Bauerman Ridge, Coleman Peak, 1969; Corral Butte, Horseshoe Basin, 1981

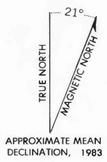
SCALE 1:48 000

1 ½ 0 1 2 3 MILES

CONTOUR INTERVAL 40 FEET AND 10 METERS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Geology modified from Hibbard (1971)

Explanatory pamphlet accompanies map



APPROXIMATE MEAN DECLINATION, 1983

MINERAL RESOURCE POTENTIAL MAP OF THE LONG SWAMP ROADLESS AREA, OKANOGAN COUNTY, WASHINGTON

By

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and

John R. Benham

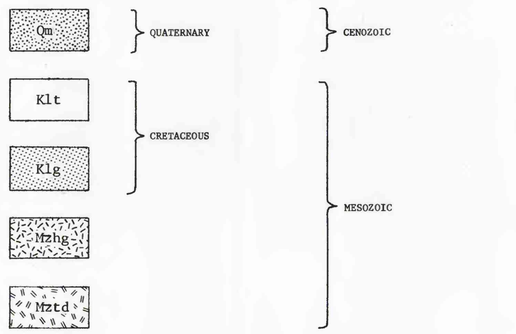
U.S. Bureau of Mines

1983

EXPLANATION

AREA OF MINERAL POTENTIAL--Letter indicates commodities as discussed in text

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

Qm — GLACIAL MORAINE (QUATERNARY)--Terminal moraine on Chewack River

Klt — BIOTITE LEUCOGRANITE TO TRONDHJEMITE (CRETACEOUS)--Homogeneous coarse-grained biotite leucogranite[1] to trondhjemite comprising the Cathedral Peak batholith

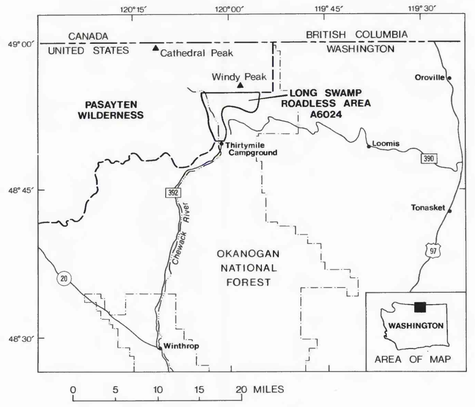
Klg — LEUCOCRATIC GNEISS (CRETACEOUS)--Medium-grained massive to gneissic hornblende-biotite trondhjemite to leucogranite [gneissic trondhjemite of Tiffany Mountain of Rinehart (1981)]

Mzhg — HYBRID GRANITOID ROCKS (MESOZOIC)--Heterogeneous fine- to coarse-grained massive to foliated biotite- and hornblende-bearing rocks of variable composition, chiefly granodiorite. Equivalent to North Fork Camp Hybrid Gneiss of Hibbard (1971)

Mztd — BIOTITE-HORNBLENDE TONALITE TO QUARTZ DIORITE (MESOZOIC)--Fine- to medium-grained typically gneissic biotite-hornblende tonalite to quartz diorite comprising the Tillman Mountain pluton

——— — — ıılıı CONTACT--Dashed where approximately located; hachured gradational

— — — — APPROXIMATE BOUNDARY OF ROADLESS AREA



INDEX MAP SHOWING LONG SWAMP ROADLESS AREA (A6024), OKANOGAN COUNTY, NORTHERN WASHINGTON

MISCELLANEOUS FIELD STUDIES
MAP MF-1550

STUDIES RELATED TO WILDERNESS

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to determine their mineral resource potential. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a mineral resource potential survey of the Long Swamp Roadless Area in the Okanogan National Forest, Okanogan County, Washington. Long Swamp Roadless Area (A6024) was classified as a further planning area during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

SUMMARY

Long Swamp Roadless Area has low potential for metallic mineral deposits. Anomalous amounts of copper, molybdenum, silver, lead, and zinc occur in an area (0.3 mi^2) of hydrothermally altered leucogranite west of the Chewack River. A single vein of molybdenite+quartz occurs along the Chewack River about 3 mi north of the altered area. Gold and silver were found in a single stream-sediment sample in Windy Creek, and anomalous amounts of copper and lead were found in a sample from Basin Creek; the bedrock source of the metals in these two samples is unknown but must be limited in extent because the drainage basins are small. Long Swamp Roadless Area has virtually no potential for energy or nonmetallic mineral resources.

The Long Swamp Roadless Area (A6024) comprises 15.9 mi^2 in the Okanogan Range of Okanogan County, Wash. The area lies about 6 mi south of the Canadian border and is bounded on its north and west sides by the Pasayten Wilderness (fig. 1). Access is via U.S. Forest Service Road 392 (West Chewack Road) north from Winthrop and Forest Service Road 390 (Long Swamp Road) west from Loomis. Elevations range from 3,500 ft at Thirtymile Campground on the Chewack River in the southwestern extremity of the roadless area to about 7,700 ft along the north border immediately south of Windy Peak.

GEOLOGY

The major geologic unit in the Long Swamp area is the Cathedral Peak batholith, a Late Cretaceous pluton of homogeneous coarse-grained biotite leucogranite to trondhjemite (Daly, 1912; Hawkins, 1968, 1969; Hibbard, 1971; Staatz and others, 1971). The Cathedral Peak batholith intrudes the Tillman Mountain pluton, a texturally and chemically variable unit that is typically gneissic and has an average composition of biotite-hornblende granodiorite (Hibbard, 1971; Rinehart, 1981). Intervening along the contact between the two plutonic bodies are leucocratic, massive to foliated to migmatitic rocks. The origin of these latter units is unclear; they have been interpreted as septa of metasedimentary host rocks (Staatz and others, 1971), and as hybrid syntectonic intrusions (Hibbard, 1971; Rinehart, 1981).

A small area (area A) of intensely sericitized rocks occurs within the Cathedral Peak batholith near the west boundary of the roadless area. The sericite is accompanied by coarse quartz veins, minor pyrite, and trace amounts of chalcopyrite.

The roadless area was extensively glaciated during the Pleistocene. A small terminal moraine is found in the U-shaped canyon of Chewack River above Thirtymile Campground.

GEOCHEMISTRY

Samples of bedrock, stream sediment, and panned concentrate were collected and analyzed by emission spectroscopy for elements potentially indicative of mineralization (Evarts and others, 1983). The most significant geochemical anomaly is associated with the area of hydrothermally altered granite of the Cathedral Peak batholith west of the Chewack River (area A). All samples collected from that area contain anomalous concentrations of silver, copper, molybdenum, zinc, lead, arsenic, antimony, barium, strontium, boron, manganese, bismuth, and tungsten. Bedrock samples contained as much as 1,000 parts per million (ppm) copper, 20 ppm molybdenum, and 5 ppm silver. This suite of elements, the composition of the host rock, and the character of the hydrothermal alteration are all features typical of porphyry-type copper-molybdenum deposits. Furthermore, stream-sediment-sample sites within 2 mi north and south of the altered area show relatively high levels of barium, manganese, and (or) bismuth, elements commonly found in geochemical halos around porphyry copper deposits.

A panned-concentrate sample from stream sediment on Windy Creek (area C) contained visible flakes of gold, and analysis showed 500 ppm gold and 300 ppm silver. The source of these elements is unknown; the Windy Creek drainage basin upstream from the sample site is entirely within the Cathedral Peak batholith, and analysis of a rock sample from the same locality revealed no anomalous values.

Panned concentrate from a sample site on Basin Creek (area D), contained 150 ppm lead, 50 ppm copper, and visible pyrite. However, sediment samples collected nearby do not show anomalous values, indicating that the bedrock source of the lead and copper in the anomalous sample is quite limited.

Other samples are slightly anomalous in some elements, but the suites of anomalous elements and the mineralogy of the panned concentrates suggest that the anomalous elements are related to accessory minerals widely disseminated in the bedrock and are not indicative of mineralization. For example, anomalous amounts of lanthanum, zirconium, yttrium, and thorium in samples from drainages west and south of Windy Peak are attributable to zircon, monazite, and thorite identified with use of the microscope. The tin anomalies in a few panned-concentrate samples are likewise probably due to accessory cassiterite.

MINING DISTRICTS AND MINERALIZATION

There are no mining districts in the roadless area. The nearest is Chewack mining district 6 mi north of the area. That district had numerous claims located for tungsten; the principal tungsten ore mineral was wolframite, which was found there in 1898 by surveyors of the International Boundary Commission. The area was staked in 1908 and developed during 1915 and 1916. Thirty tons of ore was shipped in 1936 but proved to be unprofitable (Culver and Broughton, 1945, p. 41).

There are no prospects, claims, or mines in the roadless area. The nearest claim, Lobo No. 1, is reportedly located near Windy Creek outside and just east of the roadless area boundary, but considerable search for this claim revealed no evidence of prospecting, mining, or other development. The commodity for which this claim was located is unknown.

ASSESSMENT OF MINERAL RESOURCE POTENTIAL

The geologic and geochemical studies suggest low potential for metallic mineral deposits within Long Swamp Roadless Area. The hydrothermally altered and geochemically anomalous area west of the Chewack River (area A) possesses a number of the important characteristics of porphyry-type copper-molybdenum deposits. However, other diagnostic features, such as porphyritic host rocks and alteration zonation to potassic or propylitic assemblages, are lacking, and the size of the altered area is small. Thus the resource potential for the deposit is considered low. The occurrence of a molybdenite+quartz vein in area B also suggests mineral potential, but the host rock is unaltered and no other veins were found; the potential of area B is, therefore, considered low.

Areas C and D are drainage basins in which anomalous amounts of gold and silver (C) or lead and copper (D) were found in stream-sediment samples. The bedrock sources of the metals have not been identified. The small size of area D in Basin Creek indicates that the mineralization is of limited extent. The gold- and silver-bearing panned concentrate from Windy Creek (area C) may indicate potential for a placer deposit in that drainage. The source of the precious metals may be quartz veins near the margins of the Cathedral Peak batholith, similar to those of the Oroville-Nighthawk district several miles northeast of Long Swamp (Koschmann and Bergendahl, 1968, p. 260).

There are no mineral, geothermal, or oil and gas leases in Long Swamp Roadless Area, and the absence of sedimentary or young igneous rocks in the vicinity indicates virtually no potential for such resources.

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