UNITED STATES DEPARTMENT OF THE INTERIOR
(BUREAU OF MINES)

SUMMARY REPORT

MINERAL INVESTIGATION OF THE SELWAY-BITTERROOT WILDERNESS (FS), IDAHO COUNTY, IDAHO AND MISSOULA AND RAVALLI COUNTIES, MONTANA

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This open file report summarizes the results of a Bureau of Mines wilderness study and will be incorporated in a joint report with the U.S. Geological Survey. The report is preliminary and has not been edited or reviewed for conformity with the U.S. Bureau of Mines standards and nomenclature. Work on this study was conducted by personnel from Western Field Operations Center, East 360 Third Avenue, Spokane, Washington 99202

FOREWORD

Under the Wilderness Act (Public Law 88-577, Sept. 3, 1964) certain areas within the National forests previously classified as "wilderness," "wild," or "canoe" were incorporated into the National Wilderness Preservation System as wilderness areas. The act provides that the U.S. Geological Survey and the U.S. Bureau of Mines survey these wilderness areas to determine the mineral values, if any, that may be present. The act also directs the results of such surveys are to be made available to the public and submitted to the President and Congress. This report summarizes the results of the Bureau of Mines mineral survey of the Selway-Bitterroot Wilderness, Idaho County, Idaho, and Missoula and Ravalli Counties, Montana.

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SUMMARY STATEMENT

Mineral resource studies by the Bureau of Mines indicate three areas within the Selway Bitterroot Wilderness have mineral resource potential. Regional studies suggest that a granitic stock on the south side of the Wilderness has high potential for a Climax-type stockwork molybdenum deposit (pl. 1, no. 8); but detailed surface investigations failed to recognize a deposit. The Elk Summit area on the north side of the Wilderness contains subeconomic resources of columbium (niobium)-bearing ilmenite in placers (pl. 1, no. 19). Subeconomic silver-copper-lead resources occur in a vein on the northeast side of the Wilderness at the Cliff Mine (pl. 1, no. 25). The study area has no known deposits of oil and gas, coal, geothermal resources, or other energy-related commodities.

INTRODUCTION

A mineral survey of the Selway-Bitterroot Wilderness by the U.S. Bureau of Mines and the U.S. Geological Survey between 1976 and 1981 covered about 1.2 million acres (0.5 million ha) in the Bitterroot, Clearwater, Lolo and Nez Perce National Forests in Idaho and Montana. The study was done under the provisions of the Wilderness Act of 1964 (Public Law 88-577) with the Bureau responsible for determining the resource potential of mines, prospects, and mineralized areas and the Geological Survey responsible for geologic, geochemical, and geophysical investigations. The 105,000 acre (42,500 ha) Magruder Corridor area, added by Public law 96-312 in 1980, was not included in this study. The Wilderness lies across the Bitterroot Range, which forms the boundary between Idaho and Montana, and includes large portions of the drainage basins of the Selway, Lochsa, and Bitterroot Rivers (fig. 1). Elevations range from 1600 ft (488 m) on the Selway River

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Figure 1.--NEAR HERE

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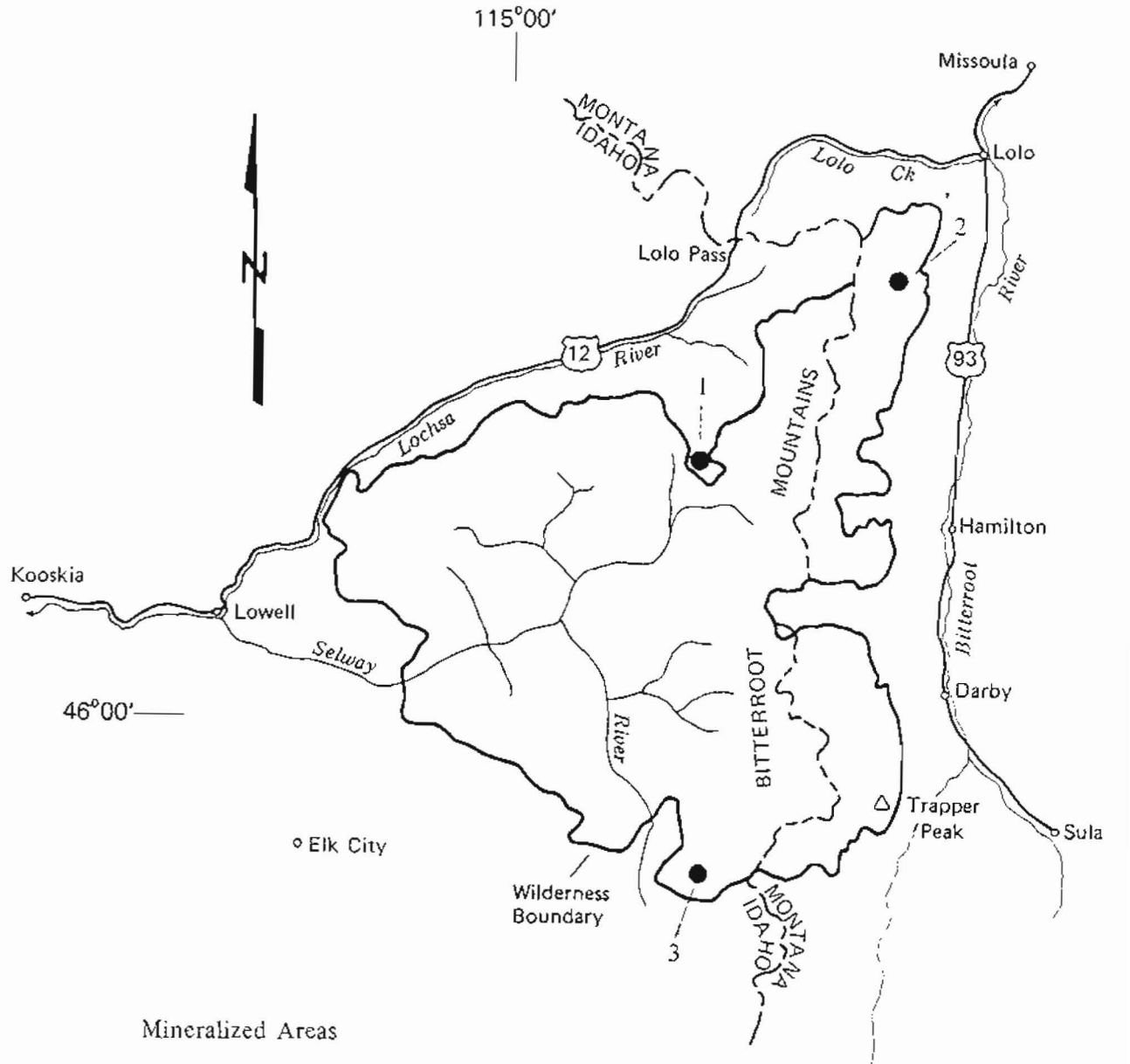
near Lowell to 10,157 ft (3,096 m) at Trapper Peak. Cities within 50 mi (80 km) of the Wilderness include Missoula, Hamilton, and Salmon on the east and Orofino and Grangeville on the west. Access to trailheads near the edge of the area is limited to dirt roads.

Geologic research in the region was first started in 1898 (Leiberg). Since then there have been several reports on the geology and mineral deposits, including ones by Shenon and Reed (1934), Lorain (1938), and Sahinen (1957).



Mineralized Areas

1. Columbium and titanium in ilmenite-bearing sand.
2. Silver, copper, lead, and zinc bearing breccia zones in a fault.
3. Tertiary granitic pluton with favorable characteristics for molybdenum deposits

Figure 1. Location of Selway-Bitterroot Wilderness and associated mineralized areas

Field investigations were done by the U.S. Bureau of Mines in 1976, 1978, and 1981. The authors were assisted at various times by Dennis D. Finn, M. C. McCarthy, and Michael Longinotti. Analytical work was done at the Bureau of Mines Reno, Nevada laboratory under the direction of H. H. Heady. The location of claims and mineral deposits was determined by a search of Ravalli and Idaho County courthouse records and a literature search. Claim owners were contacted when possible. Attempts were made to find all known mines, prospects, and claims in the field. All claims were sampled and all workings were mapped. Samples were also taken of any mineralized material found in the study area.

MINES, PROSPECTS, AND MINERALIZED AREAS

History and Production

Mining activity in the region began in the 1860's. Most was outside the Wilderness boundary.

Greatest activity occurred west of the Wilderness in the Elk City mining district on the upper tributaries of the South Fork Clearwater River about 10 mi (16 km) west of the study area. Some production was derived from fissure veins but most came from the associated placers. The higher grade and more accessible deposits were worked out in the mid-1860's (Lorain and Metzger, 1938). The development of mining methods suited to high-volume, low-grade placers resulted in the resumption of large scale mining in 1892. Most of the remaining gravels were subsequently worked. Lode production was in the early 1900's. Published estimates of total production range from $5 million to $18.5 million (Shenon and Reed, 1934) (Gold at $20.67/troy oz or $0.67/g).

Encouraged by mining successes along the South Fork Clearwater River, numerous placer claims and operations were located along the lower portions of the Selway and Lochsa Rivers. Production was not recorded.

On the north side of the Wilderness, along Lolo Creek, base-metal bearing quartz veins intrude metasediments. Prospecting and mining started in that district during the 1890's (Sahinen, 1957), but the veins proved to be small and the total value of production was only a few thousand dollars (USBM production records). A mine is currently being developed on 215 claims by Ward Development Inc. at the head of Dick Creek, 4 mi (6.4 km) northwest of the wilderness boundary. An open pit exposes a large north-northwest trending fault zone containing lead, zinc, and silver minerals. A several thousand foot adit has been driven under the pit. Future plans include construction of a mill at the mine site. Negotiations involving legal and environmental considerations have currently halted work.

Several lode mines and prospects are just east of the Wilderness in the Curlew (Deep Canyon) and Pleasant View (Sweathouse) mining districts. Mining activity began in 1865 on placers along the Bitterroot River and its tributaries, but in 1871, the activity shifted to lodes. Most of the production came from the Curlew Mine which started operation in 1887 (Sahinen, 1957). It was developed by a 500-ft (152-m) shaft connected to a multilevel network of drifts and crosscuts. Lead, zinc, and silver production prior to 1949 was approximately 1.4 million dollars. In recent years the mine, converted to an open pit operation, has been intermittently active.

Ten mi (16 km) south of the Wilderness, the West Fork Bitterroot River drainage basin contains placer mines of the Overwich-Hughes Creek mining district and lode mines of the Mineral Point mining district. Placer mining started in 1870; production totalled more than $250,000 (Sahinen, 1957). Lode mines were on copper-silver bearing fissure veins in metasediments. Recently there has been exploration for large-tonnage deposits of disseminated copper-silver minerals.

Mineral Deposits

Courthouse records for Ravalli County, Montana and Idaho County, Idaho indicate 93 lode and 5 placer mining claims have been located within the study area, the first in 1884. Several are relocations of previous claims. None have been patented.

In the Wilderness, one unclaimed area has mineral resource potential and two of 19 prospects are significantly mineralized (pl. 1). Details, summarized here, are in a Bureau of Mines File Report.

Several Tertiary, multiphased granitic plutons underlie the southern part of the Wilderness. The Painted Rocks pluton (pl. 1, no. 8), which is primarily outside the Wilderness, consists of rocks ranging from muscovite granite to biotite hornblende quartz monzonite. The general geochemical, petrologic, and tectonic characteristics of the more silicic units, especially those intruded by comagmatic rhyolite bodies, match those commonly associated with Climax-type stockwork molybdenum deposits. Detailed surface investigations, however, did not produce evidence for the existence of such a deposit within the Wilderness.

The Cliff Mine (pl. 1, no. 25) on St. Joseph Peak in the northeast part of the area has been held almost continuously since 1889 but has had little production. Two adits and a shaft are on the property. Detailed geophysical surveys and surface and underground sampling indicate that a northwest-trending fault contains at least 100,000 tons (90,700 t) of material with a few small, randomly-distributed breccia zones. Only the breccia zones are significantly mineralized. Galena, chalcopyrite, sphalerite, bornite, and tetrahedrite occur in the zones and samples contained as much as 7.3 oz silver per ton (250 g/t), 3.4 percent lead, 1.0 percent copper, and 0.5 percent zinc. Because only the breccia zones within the fault are well mineralized, and they are quite localized, the deposit is considered subeconomic.

About 5 million cubic yards (3.8 million m^3) of alluvium containing 37.2 pounds of columbium-bearing ilmenite per cubic yard (22.0 kg/m^3) are in the meadows around Elk Summit (pl. 1, no. 19). The deposits have been claimed several times but not mined. Because the titanium oxide content (46%) does not meet market specifications (54%) and the columbium currently cannot be recovered, the deposits are a subeconomic titanium and columbium resource until there are closer markets, higher prices, and improved metallurgical techniques.

Surface workings at the Windyridge Prospect (pl. 1, no. 10) near Watchtower Pass in the southeast part of the area expose sulfide-bearing veinlets along fractures in a microgranular intrusive in gneiss. Mineralization appears to have been localized.

Uranium, gold, and molybdenum occur in minor amounts at other prospects (table 1). Kyanite and sillimanite are contained in schist and gneiss in

Table 1.--NEAR HERE

a large area on the west side of the Wilderness (pl. 1, no. 2), but not in economic concentrations. Granite suitable for building stone is along both sides of Blodgett Canyon (pl. 1, no. 17); however, it is doubtful that future demand will be sufficient for it to be quarried.

CONCLUSIONS

Although major mining activity has occurred on the periphery of the Selway-Bitterroot Wilderness, none is known within the boundary. The Bureaus' investigation indicates that three areas have a limited mineral resource potential.

Regional geochemical, tectonic, and petrologic studies suggest that a Tertiary granitic pluton on the south side of the Wilderness has high potential for a Climax-type stockwork molybdenum deposit. Detailed surface investigations, however, found no definitive evidence for a deposit within the Wilderness. Subsurface data is needed to confirm the presence or absence of a deposit. Subeconomic resources of columbium-bearing ilmenite occur in 5 million cubic yards (3.8 million m^3) of alluvium in the Elk Summit area on the north edge of the Wilderness. Major market and/or technological changes are needed before these resources can be profitably mined. About 100,000 (90,700 t) of subeconomic silver-lead-copper resources are estimated for the vein at the Cliff Mine on the northeast side of the Wilderness. There is no known geological evidence for oil and gas, coal, geothermal resources, or other energy-related commodities.

Table 1.--Mines, prospects, and mineralized areas

Map No.	Name	Workings	Resource Data
1	Falls Point	None	Fault zone. Sample had 0.04 oz gold per ton (1.4 g/t).
2	Kyanite occurrence	None	Kyanite in schist. Generally less than 1 percent.
3	Rhoda Creek Placer	Several pits	Alluvium. No anomalous sample values.
4	Sunrise 1-4 placer	None	Alluvium. No anomalous sample values.
5	Sinora	None	Pyrite in granodiorite. No anomalous sample values.
6	Big Foot	1 pit	Granite. No anomalous sample values.
7	Chicho placer	None	Alluvium. Trace gold.
8	Painted Rocks Pluton	None	Favorable characteristics for molybdenum deposit, but none discovered.
9	Fourth of July	None	Quartz veins with minor gold
10	Windyridge	1 pit	Sulfides in quartz veinlets. Samples averaged 0.4 percent lead and 1.7 percent zinc.
11	Watchtower 1-9, COEK	Adit, several pits and trenches	Fault zones with trace silver, copper and zinc.
12	Nellie	None	Quartz veinlets. No anomalous sample values.
13	Mary Alice placer	None	Alluvium. No gold detected.
14	Trapper Creek claim groups	Several trenches	Autunite along fractures.

Table 1.--Mines, prospects, and mineralized areas

Map No.	Name	Workings	Resource Data
15	Golden Slipper placer	None	Alluvium. No gold detected.
16	Paragon	None	Limonite in fractures. No anomalous sample values.
17	Granite occurrence	None	No apparent potential.
18	Glacier Falls	None	No anomalous sample values.
19	Elk Summit claim groups	Several pits	Columbium-bearing ilmenite in alluvium. 5 million cubic yards (3.8 million m^3) of subeconomic resources.
20	Big Sand Creek	None	Ilmenite in alluvium. Low potential.
21	Kooskooskia 1-4 placer	None	Alluvium. No anomalous sample values.
22	George Clarke	None	Fracture zones contain minor gold.
23	Starr	1 adit, 1 trench	Schist-granodiorite contact. Trace gold.
24	Great Eastern-Clear Lake	None	Fault zones with minor sulfides.
25	Cliff Mine	2 adits, 1 shaft	Fault with sulfide bearing breccia zones. Subeconomic silver-lead-copper resources - 100,000 tons (90,700 t).
26	One Horse	2 adits several pits	Shear zones with sulfides. Samples contained minor gold and silver, 0.99 percent lead and 8.1 percent zinc.
27	Carlton Lake	None	Quartz veins. Samples had trace gold, silver, copper, zinc, and molybdenum.

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EXPLANATION

Tv — Tertiary volcanic rocks
Tg — Tertiary granite
Tm — Tertiary monzonite
Cretaceous granodiorite
Kqd — Cretaceous quartz diorite
mt — Schist, gneiss, quartzite
Contact
Wilderness boundary

Geology adapted from U.S. Geological Survey unpublished maps

Prospect or mineral occurrence 8

1. Falls Point
2. Kyanite occurrence
3. Rhoda Ck. placer
4. Sunrise 1–4 placer
5. Sinora
6. Bigfoot
7. Chicho placer
8. Painted Rocks pluton
9. Fourth of July
10. Windy ridge
11. Watchtower 1–9 COEK
12. Nellie
13. Mary Alice placer
14. Trapper Ck. claim groups
15. Golden Slipper placer
16. Paragon
17. Granite occurrence
18. Glacier Falls
19. Elk Summit claim groups
20. Big Sand Ck.
21. Kooskooskia 1–4 placer
22. George Clarke
23. Starr
24. Great Eastern–Clear Lake
25. Cliff mine
26. One Horse
27. Carlton Lake

MONTANA / IDAHO
Missoula Co
Ravalli Co
Idaho Co
Sky Pilot
Blodgett Mtn
Bailey Mtn
Greenside Butte
Copper Butte
Wylies Pk
Archer Mtn
Trapper Peak
Moose Ck. RS
Painted Rocks pluton northern contact
Hoodoo Creek
Big Sand Creek
Fred Burr Ck
Mill Ck
N. Fk. Moose Ck
East Fork Moose Creek
Selway River
Running Ck
Bad Luck Ck
Bear Creek
White Cap Creek
Tin Cup Ck
Indian Ck
Sheepherder Ck

0 5 10 MILES
0 5 10 15 KILOMETERS

Plate 1. General geology and locations of mines, prospects,