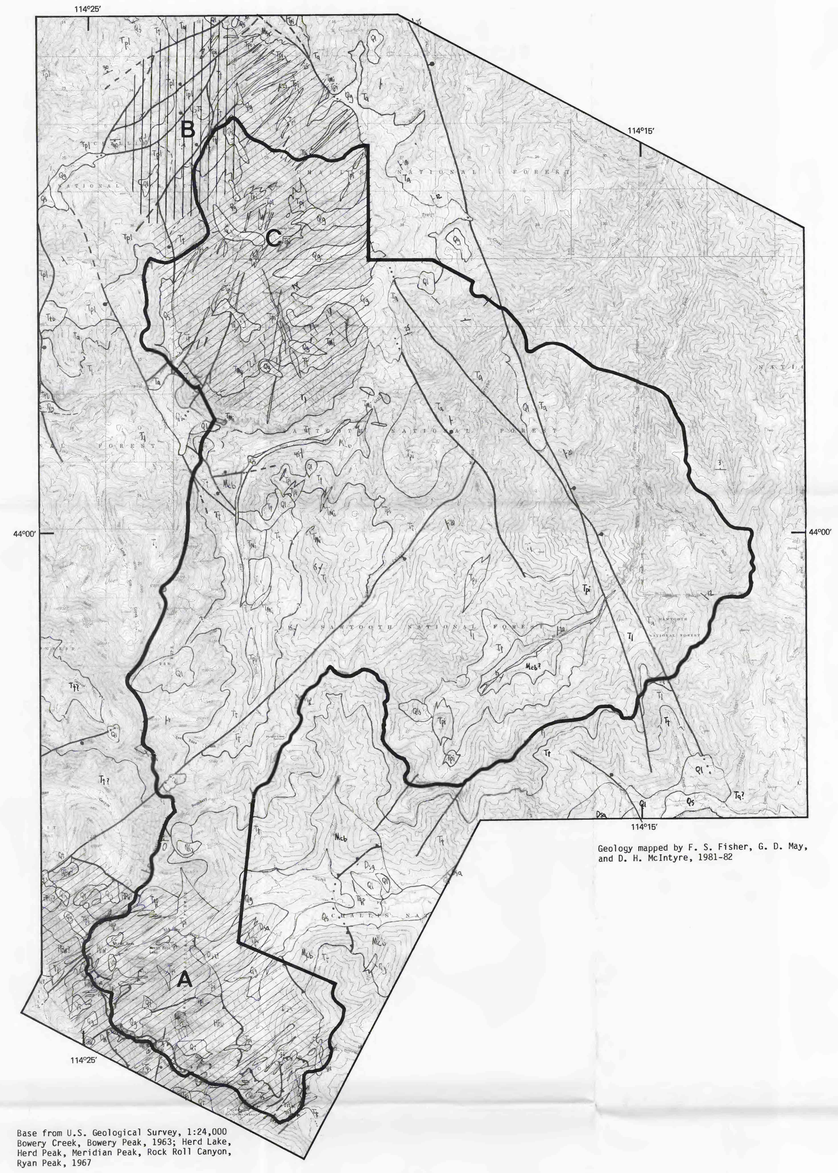
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1580
PAMPHLET ACCOMPANIES MAP




Geology mapped by F. S. Fisher, G. D. May, and D. H. McIntyre, 1981-82

Base from U.S. Geological Survey, 1:24,000
Bowery Creek, Bowery Peak, 1963; Herd Lake, Herd Peak, Meridian Peak, Rock Roll Canyon, Ryan Peak, 1967

SCALE 1:62 500

1 ½ 0 1 2 3 4 MILES

1 .5 0 1 2 3 4 KILOMETERS

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

## MAP A.–MINERAL RESOURCE POTENTIAL AND GEOLOGIC MAP OF THE WHITE CLOUD-BOULDER ROADLESS AREA

### 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 geologic, geochemical, and mineral survey of the White Cloud-Boulder Roadless Area, in the Challis National Forest, Custer County, Idaho. The White Cloud-Boulder Roadless Area 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.

### MINERAL RESOURCE POTENTIAL SUMMARY STATEMENT

Geological and geochemical investigations were conducted to evaluate the mineral resource potential of the White Cloud-Boulder Roadless Area, Custer County, Idaho. The area is on the eastern and southern sides of the White Cloud-Boulder Mountains and is within the Sawtooth and Challis National Forests. Complexly folded and faulted Paleozoic sedimentary rocks underlie the area. These rocks were uplifted and eroded to form a rugged terrain and then were buried by a thick sequence of Tertiary volcanic rocks. Both the sedimentary and volcanic rocks have been intruded by plutons of intermediate and felsic composition. Hydrothermal activity and contact metamorphism associated with the emplacement of the intrusive bodies formed vein and skarn deposits in the area.

A moderate resource potential for tungsten is assigned to the southern part of the area where metalliferous calc-silicate skarns have formed in carbonate-rich sedimentary rocks adjacent to intrusive rocks. A moderate resource potential for gold is assigned to an area northwest of Sheep Mountain in the northern part of the study area where anomalous concentrations of gold occur in quartz-carbonate veins. A moderate resource potential for arsenic, copper, gold, lead, molybdenum, silver, tin, and zinc is assigned to the Sheep Mountain–Bowery Peak area because of the widespread geochemical anomalies in that area and the inferred presence of a large buried intrusive body. The entire study area has a low resource potential for sand, gravel, stone, oil, and gas.

### INTRODUCTION

The White Cloud-Boulder Roadless area is located approximately 32 mi south of Challis, Idaho (fig. 1). Access is via U.S. Highway 93 and by county roads along the East Fork of the Salmon River. The study area comprises 50,324 acres in the Sawtooth and Challis National Forests, Custer County, Idaho. The study area is on the eastern and southern sides of the White Cloud-Boulder Mountains and is characterized by very rugged topography with relief in excess of 4,000 ft. Major drainages are the Big Lost River, the East Fork of the Salmon River, East Pass Creek, and West Pass Creek.

### GEOLOGY

Two principal groups of rocks crop out in the White Cloud-Boulder Roadless Area: sedimentary rocks of Paleozoic age and volcanic rocks, together with associated intrusive rocks, of Eocene age. The Paleozoic sedimentary rocks were faulted, chiefly along low-angle thrust faults, complexly folded, and eroded to form a rugged terrain prior to deposition of the volcanic rocks. Locally, especially in the southern part of the roadless area, the sedimentary rocks were metamorphosed near the contacts of intrusive masses that were emplaced during volcanism; skarns were produced where carbonate rocks were intruded. The volcanic rocks include silicic pyroclastic rocks, intermediate-composition lavas and breccias that crop out on and around

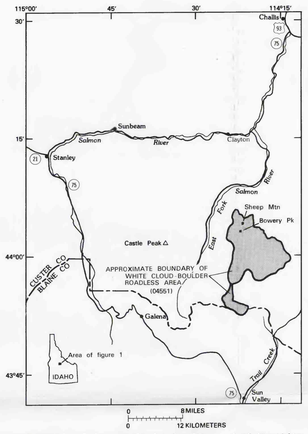



Figure 1.--Index map showing location part of the White Cloud-Boulder Roadless Area, Custer County, Idaho.

Sheep Mountain. Near Sheep Mountain a swarm of dikes, pervasive alteration, and a strong positive aeromagnetic anomaly all suggest that an intrusive body is present at depth. These rocks are overlain by a younger volcanic sequence made up chiefly of potassium-rich andesite and latite lavas. All these rocks are cut by northwest- and northeast-trending high-angle faults.

### GEOCHEMISTRY

Map B shows sample localities, types of samples (rock, stream sediment, panned concentrate), and the size and type of geochemical anomalies present in the vein zone and the zone of pervasive alteration are shown in figures 2 and 3, respectively. Examination of these data reveal two broad regions of geochemical anomalies, the southern area of paleozoic rocks and the region around Sheep Mountain and Bowery Peak (including the vein zone; see map A). In the southern area, the anomalies are mainly in panned concentrates from streams draining the Paleozoic terrane. Tungsten, molybdenum, and lead all are enriched in the concentrates. These elements are characteristic of calc-silicate skarns and have been produced from mines adjacent to the study area. These anomalies strongly suggest the presence of metal-bearing skarn deposits in the Paleozoic rocks, probably adjacent to Tertiary intrusive bodies.

Anomalous concentrations of a wide variety of metals are present in the rocks and stream sediments from the Sheep Mountain and Bowery Peak area (map B). The source material from which the metals are derived may be indicated by different combinations of metals. For example, the

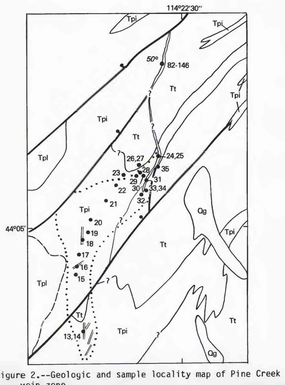



Figure 2.--Geologic and sample locality map of Pine Creek vein zone.

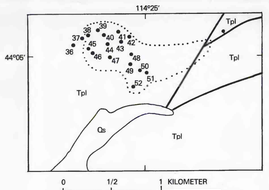



Figure 3.--Geologic and sample locality map of zone of pervasive alteration.

combination of silver and antimony could be an indication of ruby-silver veins, and the association of silver-lead-tin is typical of tin-bearing silver veins in Paleozoic rocks (Tschanz and others, 1974). The presence of molybdenum by itself, or in combination with tungsten, could suggest either porphyry molybdenum deposits or skarn-type deposits. Vein deposits elsewhere in Idaho (Tschanz and others, 1974) often have geochemical halos of arsenic-gold and (or) silver-gold-lead. All of the above mentioned ore deposit types occur to the west and south of the study area, and all have produced ore in the recent past (Tchanz and others, 1974; Simons, 1981). With the exception of the slightly auriferous quartz-carbonate veins described earlier, no ore occurrences were recognized in the Sheep

EXPLANATION OF RESOURCE POTENTIAL

A — ZONE A--Area of moderate potential for tungsten-bearing skarn deposits

B — ZONE B--Area of moderate potential for precious-metal vein deposits

C — ZONE C--Area of moderate potential for porphyry, vein, or replacement deposits of copper, gold, lead, molybdenum, silver, tin, and zinc

EXPLANATION FOR GEOLOGIC BASE

(Note: The following correlation and description are for the geologic base map shown in gray)

CORRELATION OF MAP UNITS

| | | | | |
|---|---|---|---|---|
| Qs | Qt | Ql | Holocene and Pleistocene | QUATERNARY |
| | Qg | | Pleistocene | |
| Unconformity | | | | |
| | Ta | Tmi | Eocene | TERTIARY |
| | Ttb | | | |
| Unconformity | | | | |
| Tqp | Tpl | Tpi | | |
| | Tt | | | |
| Unconformity | | | | |
| | PPw | | Permian and Pennsylvanian | PALEOZOIC |
| | Msr | | Mississippian | |
| | Mcb | | | |
| | Dm | | Devonian | |
| | DSa | | Devonian and Silurian | |

DESCRIPTION OF MAP UNITS

Qs — SURFICIAL DEPOSITS, UNDIVIDED (HOLOCENE AND PLEISTOCENE)--Chiefly floodplain and terrace deposits of gravel, sand, silt, and clay along principal streams, but locally includes some alluvial fan deposits. Many small occurrences not shown

Qt — TALUS (HOLOCENE AND PLEISTOCENE)--Mapped separately only in southwest part of map area

Ql — LANDSLIDE AND RELATED DEPOSITS (HOLOCENE AND PLEISTOCENE)--Unconsolidated debris that has been moved downslope by gravity

Qg — GLACIAL DEPOSITS (PLEISTOCENE)--Chiefly moraines deposited by small valley glaciers, but locally also includes landslide deposits and debris flows deposited on the moraines after ice withdrawal

Ta — POTASSIUM-RICH ANDESITE AND LATITE (EOCENE)--Brown- and reddish-brown-weathering greenish-gray, gray, and black lavas, and intercalated reddish-brown and red pyroclastic deposits that contain sparse phenocrysts of clinopyroxene. Phenocrysts of orthopyroxene, olivine, or plagioclase also present in many samples. Locally includes gray to pale-brown, bedded pyroclastic rocks. Reversed magnetic polarity

Ttb — VOLCANICLASTIC ROCKS (EOCENE)--Massive pyroclastic flows and associated bedded, sorted deposits that are greenish gray and contain as much as 35 percent crystals as large as 3 mm of plagioclase, biotite, and amphibole. Quartz locally present

Tmi — MAFIC INTRUSIVE ROCKS (EOCENE)--Dikes of brown-weathering, nearly nonporphyritic rocks that contain phenocrysts less than 1 mm in size of clinopyroxene in a fine-grained matrix that contains plagioclase, clinopyroxene, biotite, apatite(?), and opaque oxide minerals. Carbonate occurs as interstitial patches in some samples and pervasively replaces matrices and phenocrysts in others. The dike on the spur 1.8 mi southwest of Bowery Peak contains abundant matrix sanidine and well-crystallized biotite in addition to the other minerals. Lack of propylitic alteration of these dike rocks suggests they postdate the alteration. Also included are a few dikes that have olivine phenocrysts as large as 5 mm

Tpi — PORPHYRITIC INTRUSIVE ROCKS (EOCENE)--Dark-gray and dark-greenish-gray dikes and irregular intrusive masses that contain conspicuous phenocrysts of plagioclase and biotite as large as 1 cm. Less conspicuous are phenocrysts of clinopyroxene or chlorite pseudomorphs after clinopyroxene. Rarely, amphibole is present instead of clinopyroxene. Minor quartz also is present in a few outcrops in the northern part of the area. Most outcrops are altered to chlorite, albite, and carbonate. Biotite from an unaltered dike immediately north of the roadless area boundary, in E1/4 sec. 7, T. 9 N., R. 18 E. has a potassium-argon age of 50.0±1.8 m.y. (R. F. Marvin, written commun., 1982)

Tqp — INTRUSIVE QUARTZ PORPHYRY (EOCENE)--Green and gray, crystal-rich, porphyritic rocks that contain phenocrysts as much as 3 mm in size of plagioclase, quartz, sanidine, and biotite in a granophyric matrix. Occurs as dikes and plugs that intrude Paleozoic sedimentary rocks near southern boundary of roadless area

Tpl — PORPHYRITIC INTERMEDIATE LAVA AND BRECCIA (EOCENE)--Crystal-rich, massive lavas and associated breccia that contain crystals of plagioclase, biotite, and amphibole as large as 1 cm. Reversed magnetic polarity

Tt — PYROCLASTIC ROCKS (EOCENE)--In exposures on and south of Bowery Peak, unit is chiefly brownish-gray-weathering, light-greenish-gray, massive, crystal-poor pyroclastic rocks that contain conspicuous dark-green, altered, uncollapsed pumice fragments several centimeters in size and variable amounts of lithic fragments. The pyroclastic rocks contain less than 10 percent crystals less than 1 mm in size of plagioclase and sanidine. Carbonate pseudomorphs after mafic minerals commonly present. Lithic fragments include porphyritic volcanic rocks, quartzite, limestone, and granitic rocks. Volcanic lithic fragments contain plagioclase and altered clinopyroxene(?). Granitic rocks contain quartz, pink alkali feldspar, and gray plagioclase. Toward the north, especially near Sheep Mountain, blocks of porphyritic lava containing plagioclase and biotite phenocrysts predominate. A few thin, altered lava flows that have amygdaloidal borders also are present on and near Sheep Mountain. Bombs as much as 5 ft in diameter are present on the ridge 2 mi north of Sheep Mountain. Minor amounts of plant debris locally present

Tl — INTERMEDIATE LAVA AND BRECCIA (EOCENE)--Brown- and reddish-brown-weathering brownish-gray lavas and interbedded pyroclastic rocks that are crystal poor, containing phenocrysts smaller than 1 mm of clinopyroxene, biotite, orthopyroxene, and plagioclase. Some tuff layers also contain a few crystals of sanidine

PPw — WOOD RIVER FORMATION (LOWER PERMIAN TO PENNSYLVANIAN)--Chiefly limy sandstone, sandy limestone, and quartzite

Msr — SALMON RIVER SEQUENCE (MISSISSIPPIAN)--Interbedded black carbonaceous siltite, argillite, fine-grained quartzite, and dark-gray silty limestone

Mcb — COPPER BASIN FORMATION (MISSISSIPPIAN)--Chiefly dark, impure quartzite, grit, argillite, and granule to pebble conglomerate

Mcq — Quartzite unit--Quartzite and subordinate chert-pebble conglomerate

Dm — MILLIGEN FORMATION (DEVONIAN)--Chiefly dark-colored argillite and black carbonaceous, cherty argillite with subordinate interbeds of fine-grained quartzite, dolomitic siltstone, limestone, and granule to pebble conglomerate

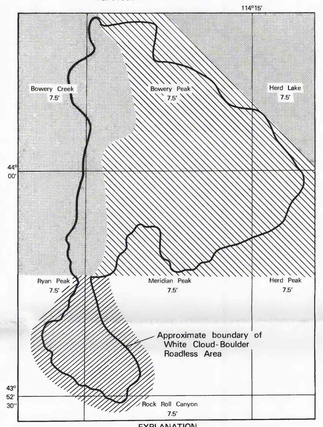
DSa — ARGILLITE (DEVONIAN AND SILURIAN?)--Black, carbonaceous to siliceous argillite with interbeds of impure quartzite and conglomerate containing granules and pebbles of chert and quartzite, and rare beds of limestone

CONTACT--Dashed where approximately located, queried where doubtful

FAULT--Bar and ball on downthrown side; dashed where approximately located; dotted where concealed

THRUST FAULT--Sawteeth on upper plate; dotted where concealed

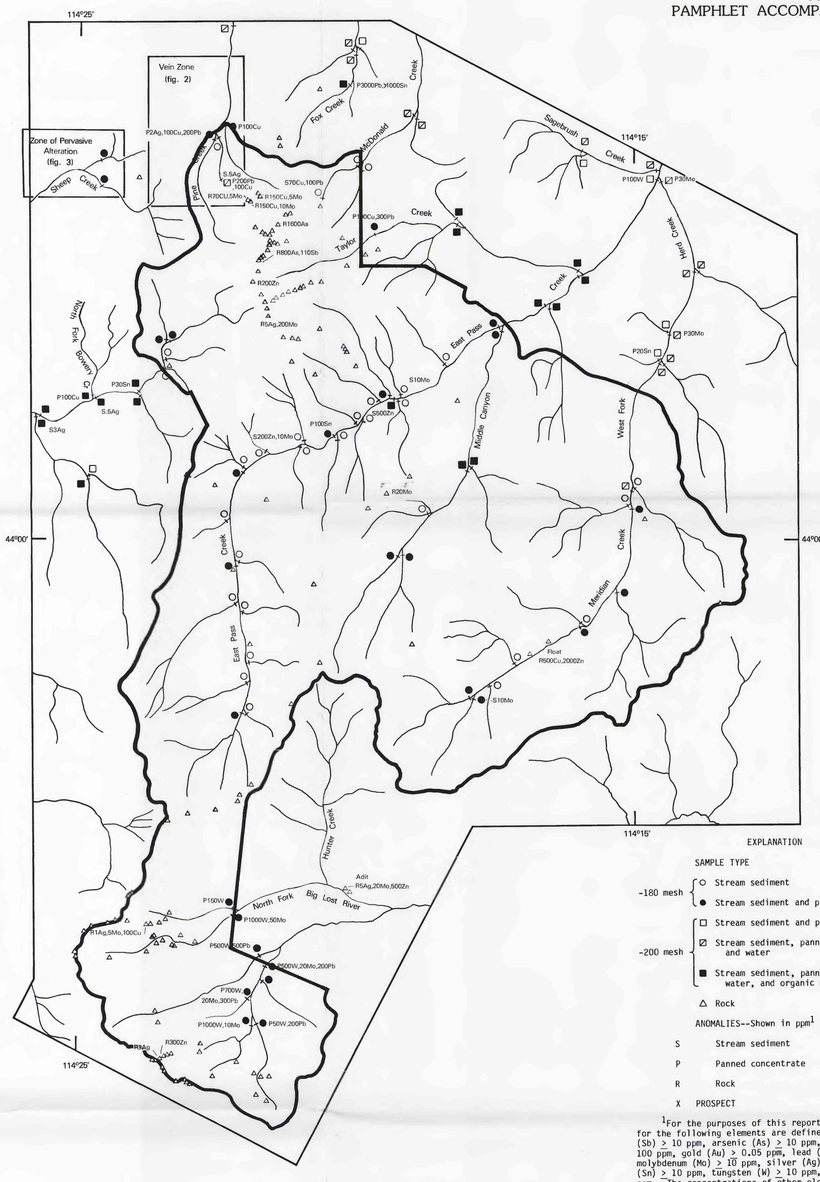
STRIKE AND DIP OF SEDIMENTARY BEDS, FLOW LAYERING AND LAVA FLOWS
50 Inclined
Horizontal
Vertical




EXPLANATION

D. McIntyre, 1981-2
G. May, 1981-2
F. Fisher, G. May, and E. Bennett, 1981-2

INDEX TO GEOLOGIC MAPPING




EXPLANATION

SAMPLE TYPE

-180 mesh
- ○ Stream sediment
- ● Stream sediment and panned concentrate

-200 mesh
- □ Stream sediment and panned concentrate
- ⊠ Stream sediment, panned concentrate, and water
- ■ Stream sediment, panned concentrate, water, and organic material

△ Rock

ANOMALIES--Shown in ppm[1]

S Stream sediment
P Panned concentrate
R Rock
X PROSPECT

[1]For the purposes of this report anomalous values for the following elements are defined as: antimony (Sb) > 10 ppm, arsenic (As) > 10 ppm, copper (Cu) > 100 ppm, gold (Au) > 0.05 ppm, lead (Pb) > 100 ppm, molybdenum (Mo) > 10 ppm, silver (Ag) > 1.0 ppm, tin (Sn) > 10 ppm, tungsten (W) > 10 ppm, Zinc (Zn) > 100 ppm. The concentrations of other elements that were analyzed are within the normal range for the various rocks, stream sediments, and panned concentrates collected from the roadless area.

SCALE 1:62 500

1 ½ 0 1 2 3 4 MILES

1 .5 0 1 2 3 4 KILOMETERS

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

## MAP B.–SAMPLE LOCALITY AND GEOCHEMICAL ANOMALY MAP OF THE WHITE CLOUD-BOULDER ROADLESS AREA

EXPLANATION
(FOR FIGURES 2 AND 3)

Qs — SURFICIAL DEPOSITS (QUATERNARY) --Chiefly floodplain and terrace deposits of gravel, sand, and silt

Qg — GLACIAL DEPOSITS (QUATERNARY)-- Chiefly moraines deposited by valley glaciers; locally includes some landslide deposits

Tpi — PORPHYRITIC INTRUSIVE ROCKS (TERTIARY)--Mostly porphyritic latite, andesite, and dacite. Phenocrysts of plagioclase and biotite

Tpl — PORPHYRITIC INTERMEDIATE LAVA AND BRECCIA (TERTIARY)-- Porphyritic lava and breccia of intermediate composition. Phenocrysts of plagioclase, biotite and amphibole

Tt — PYROCLASTIC ROCKS (TERTIARY)-- Crystal-poor pyroclastic rocks with abundant uncollapsed punice and lithic fragments. Brownish gray to dark green

CONTACT--Dashed where approximate, queried where uncertain

AREA OF ALTERED ROCK

VEIN--Queried where uncertain

FAULT--Bar and ball on downthrown side

•24 SAMPLE LOCALITY--Numbers refer to table 1

Mountain-Bowery Peak area. The best explanation for the widespread geochemical anomalies in this region is the presence of a buried intrusive mass as suggested above. All of the above mentioned ore deposit types could be associated with such an intrusive, and the geochemical anomalies would be caused by the hydrothermal events associated with the emplacement of the intrusive. If this is the case, then several types of ore deposits may be present, but not exposed, in the Sheep Mountain-Bowery Peak region.

### MINING DISTRICTS AND MINERALIZED AREAS

#### Types of mineral deposits

In the northern part of the study area, ore minerals and metals occur in quartz-carbonate fissure veins and in an poorly defined area of hydrothermally altered volcanic rocks. In the southern part of the area, the Paleozoic sedimentary rocks are extensively altered and iron-stained adjacent to their contacts with the Tertiary plutons; these skarn zones locally are metalliferous.

A series of quartz-carbonate veins with predominant northeast trends cut intrusive rocks, pyroclastic rocks, and lava flows in the northern part of the study area. Most of the veins are narrow (less than a foot wide) and are exposed along strike for only a few tens to a few hundred feet. One vein, however, has a strike length of at least 1 mi and locally ranges up to 300 ft in width. The vein rocks are mostly breccias consisting mainly of subangular, altered rock fragments about 1-2 in. in diameter in a matrix of dense, white, fine-grained silica. Matrix material commonly is crustiform, vuggy, and banded. Some clay, chiefly kaolinite, occurs in small (less than an inch) pods, and carbonates are present both in thin veinlets and as vug fillings. Rock samples collected from the veins and adjacent areas contain anomalous concentrations of zinc, arsenic, antimony, gold, molybdenum, and silver.

The skarns commonly are developed in carbonate-rich rocks adjacent to Tertiary plutons in the southern part of the study area. Scheelite has been observed in some of these skarns and panned concentrates collected from streams draining these areas contain anomalous concentrations of tungsten (map B). The skarn zones commonly are iron stained and contain garnet, epidote, and locally, pyrrhotite. Although no skarn deposits have been mined in the study area, similar types of ore bodies have been mined near the western and southern boundaries of the White Cloud-Boulder Roadless Area (Tschanz and others, 1974; Simons, 1981; Tuchek and Ridenour, 1981).

#### Mines and prospects

Only a few mining claims have been located, and only one mine working was found within the roadless area (Johnson, 1983). Numerous claims, workings, and mines are present within a few miles of the southwestern part of the roadless area in the headwaters of Summit Creek and also west of Ryan Peak in the headwaters of West Pass Creek.

The one working within the roadless area (map B) consists of a 7-ft-long trench on an unnamed prospect in which a 2-ft-wide shear zone in argillite is exposed. The argillite contains traces of pyrite, but a chip sample across the shear zone contained no significant concentrations of metallic minerals.

The deposits outside of the roadless area west of Ryan Peak and in the headwaters of Summit Creek, are mostly vein and replacement deposits containing lead, zinc, silver, and tungsten (Simons, 1981; Tschanz and others, 1974).

### ASSESSMENT OF MINERAL RESOURCE POTENTIAL

#### Areas of moderate resource potential

A moderate potential for tungsten resources is assigned to the southern part of the White Cloud-Boulder Roadless Area where Paleozoic sedimentary rocks have been intruded by Tertiary plutons (map A, zone A) because:

1. Highly anomalous concentrations of tungsten were found in panned concentrates from all of the streams draining the area.
2. Sheelite has been observed both in the panned concentrates and within skarn zones.
3. Geological relationships favorable for the formation of skarn deposits occur in the area.

A moderate potential for gold resources is assigned to the vein zone northwest of Sheep Mountain (map A, zone B) because:

1. Metalliferous quartz-carbonate veins are quite common in the area.
2. Gold was detected in approximately 25 percent of the rock samples from the area.
3. Fifty percent of the rocks collected from the area contained anomalous concentrations of one or more metals (table 1).

A moderate potential is assigned to the Sheep Mountain-Bowery Peak area (map A, zone C) for arsenic, copper, gold, lead, molybdenum, silver, tin, and zinc because:

1. Occurrences of these elements are of widespread in all types of samples from the area.
2. A variety of ore deposit types containing these elements could be associated with the intrusive mass that probably lies buried beneath the area.

#### Areas of low resource potential

Sand, gravel, and stone could be produced from numerous localities within the study area. However, a low resource potential is assigned to these commodities because of the lack of good transportation and routes and the distance to markets. Marine sedimentary rocks are present in the study area, but have been severely folded, faulted, metamorphosed, and intruded by igneous plutons. Thus, the resource potential for oil and gas is low in the study area.

### REFERENCES


Johnson, F. L., 1983, Mineral investigation of the White Cloud-Boulder RARE II Area (No. 4551), Custer and Blaine Counties, Idaho: U.S. Bureau of Mines Open-File Report 59-83, 15 p.

Simons, F. S., 1981, A geological and geochemical evaluation of the mineral resources of the Boulder-Pioneer Wilderness Study Area, Blaine and Custer Counties, Idaho: U.S. Geological Survey Bulletin 1497-C, p. 85-180.

Tschanz, C. M., Kiilsgaard, T. H., and Seeland, D. A., 1974, Mineral resources of the eastern part of the Sawtooth National Recreation Area, Custer and Blaine Counties, Idaho: U.S. Geological Survey Open-File Report 74-1100, 314 p.

Tucheck, E. T., and Ridenour, J., 1981, Economic appraisal of the Boulder-Pioneer Wilderness Study Area, Blaine and Custer Counties, Idaho: U.S. Geological Survey Bulletin 1497-D, p. 181-292.


Table 1.--Geochemistry of selected rock samples from vein zone northwest of Sheep Mountain
[Values in parts per million. Analyses by semiquantitative spectrographic methods except where indicated by an asterisk which were analyzed by atomic absorption methods; < indicates less than the lower limit of detection; L indicates limit of detection; leaders (--) indicate no data. Sample localities identified in figure 3. All analyses done by the U.S. Geological Survey laboratories]

| Sample No. | Description | Zn | As | Sb | Au | Ag | Mo | Cu | Pb |
|---|---|---|---|---|---|---|---|---|---|
| 13 | Quartz-kaolinite vein------- | 15 | 40 | 11 | 0.1 | 20 | 5 | 10 | 20 |
| 14 | Quartz-biotite porphyry (Qb) argillically altered. | -- | -- | -- | -- | <0.5 | <5 | 30 | 50 |
| 15 | Breccia; abundant carbonate | 25 | 400 | 13 | <.05 | 1.5 | <5 | 20 | 20 |
| 16 | Silicified breccia; 1 percent disseminated pyrite. | 30 | 140 | 5 | .05 | 1.5 | 5 | 30 | 20 |
| 17 | Silicified breccia---------- | 60 | 20 | 6 | <.05 | 1.5 | 5 | 30 | 20 |
| 18 | Qb porphyry; bleached numerous quartz veins. | -- | -- | -- | -- | <.5 | <5 | 20 | 30 |
| 19 | Do. | -- | -- | -- | -- | <.5 | <5 | 20 | 30 |
| 20 | Qb porphyry; argillically altered; limonite casts; 2 percent disseminated pyrite. | -- | -- | -- | -- | <.5 | <5 | 20 | 50 |
| 21 | Do. | 40 | 15 | <.1 | <.05 | .5 | <5 | 20 | 100 |
| 22 | Breccia; bleached; quartz veinlets. | -- | -- | -- | -- | <.5 | <5 | 10 | 50 |
| 23 | Qb porphyry; propylitized--- | -- | -- | -- | -- | <.5 | <5 | 20 | 50 |
| 24 | Breccia; silicified--------- | 15 | 20 | 1 | .1 | 2 | 10 | 15 | 10 |
| 25 | Do. | 15 | 20 | 2 | .15 | .5 | <5 | 5 | 10 |
| 26 | Volcanic breccia; quartz veins. | -- | -- | -- | -- | <.5 | <5 | 30 | 50 |
| 27 | Volcanic breccia; quartz veins; limonite stain. | -- | -- | -- | -- | <.5 | <5 | 10 | 20 |
| 28 | Qb porphyry; bleached------- | 10 | 30 | 3 | <.05 | 1 | <5 | 20 | 50 |
| 29 | Do. | 50 | 40 | <.1 | <.05 | 1 | <5 | 30 | 20 |
| 30 | Qb porphyry; bleached; quartz veinlets. | 35 | 80 | 3 | .05 | 3 | 50 | 10 | 20 |
| 31 | Breccia; silicified; vugs with sulfide boxworks. | 420 | 20 | 3 | L(.05) | 3 | 50 | 10 | 10 |
| 32 | Breccia; silicified--------- | 5 | 10 | 2 | L(.05) | 1.5 | <5 | <5 | <10 |
| 33 | Volcanic breccia; porphyritized; quartz veins. | -- | -- | -- | -- | <.5 | <5 | 10 | 70 |
| 34 | Qb porphyry; porphyritized; quartz veins. | -- | -- | -- | -- | <.5 | <5 | 10 | 50 |
| 35 | Do. | -- | -- | -- | -- | <.5 | <5 | 20 | 50 |
| 82-146 | Quartz vein; 2 percent disseminated pyrite; limonite stained. | 10 | 150 | 2 | .10 | 5 | 10 | 15 | 10 |

# MINERAL RESOURCE POTENTIAL, GEOLOGIC, AND GEOCHEMICAL MAPS OF PART OF THE WHITE CLOUD-BOULDER ROADLESS AREA, CUSTER COUNTY, IDAHO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and

Fredrick L. Johnson, U.S. Bureau of Mines


1983


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