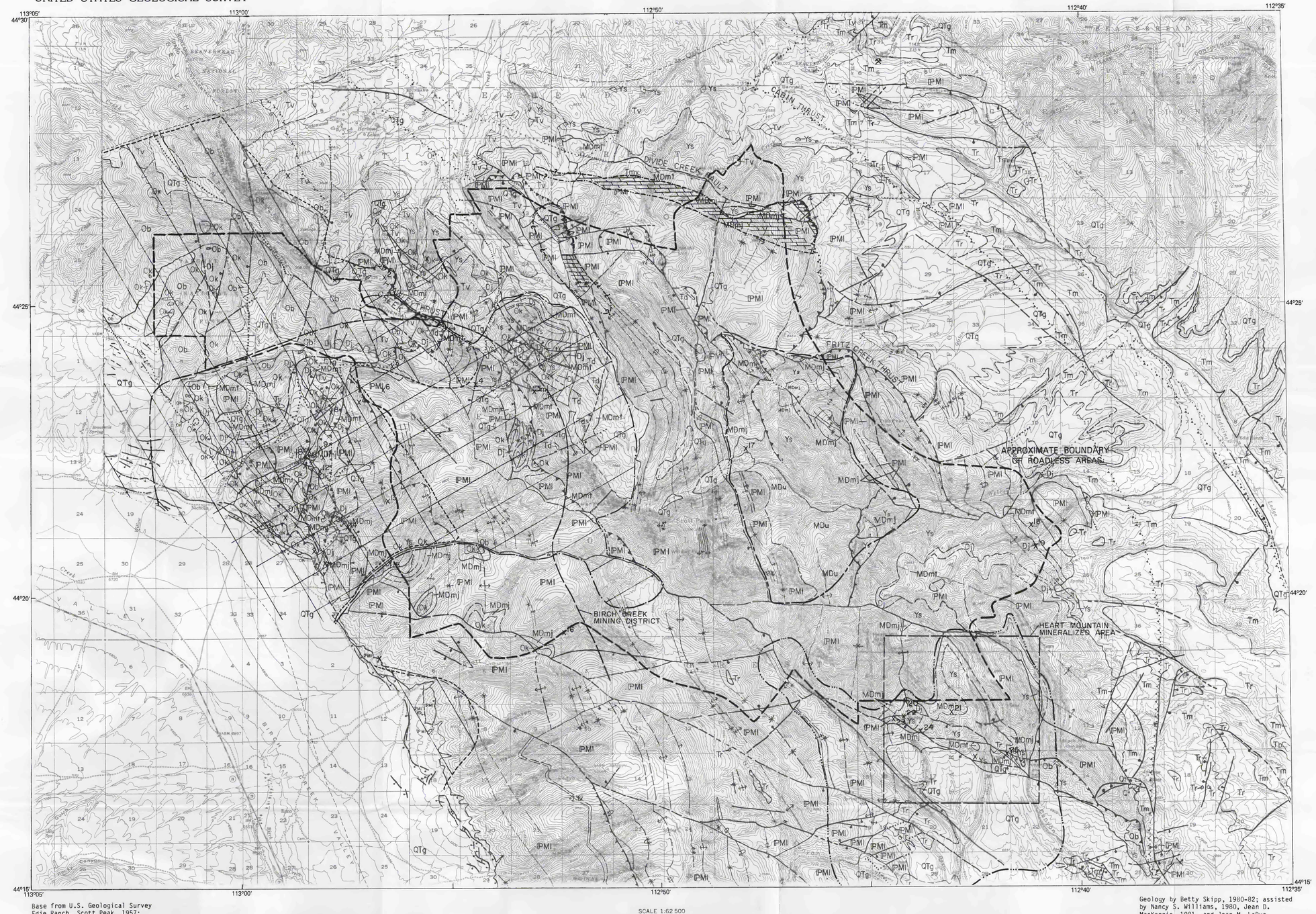
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1601-A
PAMPHLET ACCOMPANIES MAP



Base from U.S. Geological Survey
Edie Ranch, Scott Peak, 1957;
Nicholia, 1956

Geology by Betty Skipp, 1980-82; assisted by Nancy S. Williams, 1980, Jean D. MacKenzie, 1981, and Jean M. LaDue, 1982. Geology of Edie Ranch quadrangle modified from Skipp, Prostka, and Schleicher (1979). Geology of Eighteen-mile Peak area and Birch Creek mining district modified from Scholten and Ramspott (1968). Fault scarps along eastern margin of Birch Creek valley adapted from photogeologic interpretation by M. H. Hait, Jr. (unpub. data, 1983)

EXPLANATION OF RESOURCE POTENTIAL

Areas with high mineral resource potential are those having an excellent probability that mineral deposits exist. Areas with moderate mineral resource potential are those for which there is a reasonable chance for the existence of mineral deposits based on geologic, geochemical, and geophysical evidence. Areas with low mineral resource potential either lack strong evidence to support a favorable genetic model, lack significant indicators of mineralization, or have a less favorable combination of geologic, geochemical, and geophysical factors.

AREA A-1--Low potential for Ag, Mo, Pb, and Zn

AREA A-2--Moderate to low potential for Ag, Pb, and Zn

AREA A-3--Low to moderate potential for Ag, Pb, and Zn

AREA A-4--Pattern denotes dolomite and maynesian limestone in Scott Peak Formation; low potential for Ag, Pb, and Zn

AREA A-5--Low to moderate potential for U, V, Ag, Pb, and Zn

QUARRY

MINE

PROSPECT

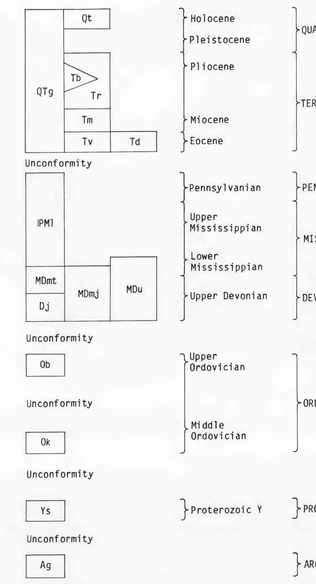
MINES AND PRUSPECTS EXAMINED BY THE U.S. BUREAU OF MINES

1. Harkness North
2. Harkness
3. Screen Creek
4. Park
5. Continental
6. Viola Gwen
7. Coons Canyon
8. Unnamed
9. Clark and Rossi
10. Viola
11. Clipper
12. Nicholia Fraction
13. Upper Eidelman
14. Eidelman Canyon
15. Lion
16. Scott Trail
17. First Discovery
18. Peacock
19. McheaRy
20. Upper Heart Canyon
21. Heart Meyers Area
22. Canyon West
23. Unnamed
24. Heart Canyon
25. Elkhorn Group

EXPLANATION OF GEOLOGIC BASE

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

CORRELATION OF MAP UNITS



LIST OF MAP UNITS

Qt	TRAVERTINE DEPOSITS (HOLOCENE)
QTg	GRAVEL, SAND, SILT, AND MUD DEPOSITS (HOLOCENE TO MIOCENE)--Includes locally cemented fan and terrace deposits, glacial deposits, colluvium, alluvium, talus, and landslide deposits
Tr	RHYOLITE ASH FLOW TUFFS (PLIOCENE AND MIOCENE)
Tb	BASALT FLOWS (PLIOCENE TO MIOCENE)
Tm	MEDICINE LODGE BEDS OF SCHOLTEN AND RAMSPOTT (1968) (MIOCENE)--Travertine limestone, tuffaceous lacustrine mudstone, tuff, and gravel
Tv	INTERMEDIATE VOLCANICS (EOCENE)
Td	ANDESITIC DIKES (EOCENE)
IPMI	LIMESTONE, DOLOMITE, SANDSTONE, SILTSTONE, AND SHALE (PENNSYLVANIAN TO LOWER MISSISSIPPIAN)--Includes, in descending order: Lower part of the Snaky Canyon Formation, Bluebird Mountain, Big Snowy, Surrett Canyon, South Creek, Scott Peak, and Middle Canyon Formations
MDmt	MCGOWAN CREEK FORMATION (LOWER MISSISSIPPIAN) AND SAPPINGTON MEMBER OF THREE FORKS FORMATION (UPPER DEVONIAN)--Shale, siltstone, and limestone
Dj	JEFFERSON FORMATION (UPPER DEVONIAN)--Dolomite, minor dolomitic limestone, limestone-dolomite breccia, and basal conglomeratic sandstone
MDmj	MCGOWAN CREEK FORMATION, SAPPINGTON MEMBER OF THREE FORKS FORMATION, AND JEFFERSON FORMATION UNDIVIDED (LOWER MISSISSIPPIAN TO UPPER DEVONIAN)
MDu	MIDDLE CANYON FORMATION, MCGOWAN CREEK FORMATION, SAPPINGTON MEMBER OF THREE FORKS FORMATION, AND JEFFERSON FORMATION UNDIVIDED (UPPER MISSISSIPPIAN TO UPPER DEVONIAN)
Qb	BEAVERHEAD MOUNTAINS PLUTON (FORMERLY BEAVERHEAD PLUTON OF SCHOLTEN AND RAMSPOTT, 1968) (UPPER TO MIDDLE ORDOVICIAN)--Granite, syenite and maladiorite
Ok	KINNIKINIC QUARTZITE (MIDDLE ORDOVICIAN)
Ys	SANDSTONE, SHALE, AND CONGLOMERATE (PROTEROZOIC Y)
Ag	GRANITE GNEISS (ARCHEAN?)

CONTACT--Dashed where approximately located

FAULT--Dashed where approximately located; dotted where concealed; arrows show direction of relative movement

Normal fault--Bar and ball on downthrown side

Thrust fault--Sawteeth on upper plate

Reverse fault--R on upthrown side

FOLD--Showing trace of axial plane; dashed where approximately located

Anticline

Overturned anticline--Showing direction of dip of limbs

Syncline

Overturned syncline--Showing direction of dip of limbs

Monocline--Showing direction of dip of steep limb

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 survey of the Italian Peak Roadless Area in the Beaverhead National Forest, Beaverhead County, Montana, and the Italian Peak Middle Roadless Area in the Targhee National Forest, Clark and Lemhi Counties, Idaho. The Italian Peak (I1945) and Italian Peak Middle (M6945) Roadless Areas were classified as further planning areas during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

MINERAL RESOURCE POTENTIAL SUMMARY STATEMENT

The Italian Peak Roadless Area (I1945) and the Italian Peak Middle Roadless Area (M6945), (together referred to as the study area (and also as the Italian Peak Roadless Areas), have been evaluated by a multidisciplinary team of geoscientists, and the potential for several types of undiscovered mineral resources has been classified. Five areas show low or moderate mineral resource potential for base metals, silver, uranium, and vanadium. In the northwestern part of the study area, low mineral resource potential for silver, molybdenum, lead, and zinc is present in granites and syenites of the Beaverhead Mountains pluton. In the west-central part of the study area, in the north part of the Birch Creek mining district, moderate to low resource potential for stratabound silver and base metals is present, primarily in dolomite of the Devonian Jefferson Formation. Low to moderate mineral resource potential for silver and base metals also is present in and around Tertiary faults in Mississippian limestones in the west-central part of the area. In the east-central part of the study area, low to moderate resource potential for stratabound and fault-controlled silver and base metals is present. In the northeastern part of the area, low mineral resource potential for silver and base metals stratabound in local diagenetic dolomite is identified. In the southern part of the study area, low to moderate mineral resource potential for stratabound uranium and vanadium, and possibly, silver and base metals occurs in metal-rich, sheared and brecciated siltstones and shales of the Devonian Three Forks Formation and the Mississippian McGowan Creek Formation.

The eastern part of the area has a low resource potential for gas at depth.

INTRODUCTION

The Italian Peak and Italian Peak Middle Roadless Areas comprise approximately 12,996 and 42,500 acres, respectively, in the Beaverhead National Forest, Beaverhead County, Mont., and the Targhee National Forest, Clark and Lemhi Counties, Idaho. The areas are contiguous along the Continental Divide which is also the Idaho-Montana State boundary, and are referred to collectively as the study area (and also as the Italian Peak Roadless Areas).

The study area is located in the southern Beaverhead Mountains about 17 mi southwest of Lima, Mont., and about 25 mi northwest of Dubois, Idaho (see index map). Access to the perimeter of the area is provided by Sheep Creek Road in Montana, and Medicine Lodge Creek Road and Idaho State Highway 28 in Idaho. No roads penetrate the area, but the border is accessible by gravel roads in most drainages.

GEOLOGY AND STRUCTURE

The Italian Peak Roadless Areas are part of the northern projection of the Idaho-Wyoming thrust belt across the Snake River Plain. All exposed Archean(?), Proterozoic, and Paleozoic rocks are allochthonous. The Paleozoic rocks present on thrust sheets in the area were deposited near the Paleozoic boundary between the continental shelf and cratonic platform. Marine sediments of Ordovician, Devonian, Mississippian, and Pennsylvanian age are present. Granite and syenite of the Beaverhead Mountains pluton intruded the sedimentary cover during Middle to Late Ordovician time (Skipp, in press; Scholten and Ramspott, 1968). Several thrust fault traces are present in the study area (Skipp, in press) including an extension of the Hawley Creek thrust, mapped by B. K. Lucchitta (1966) in the central Beaverhead Mountains to the north of the study area, and the Fritz Creek thrust (Scholten and Ramspott, 1968). Most of the mining activity adjacent to the study area on the west was in oxidized deposits in the Devonian Jefferson Formation on the hanging wall of the Hawley Creek thrust. Other rocks exposed on this thrust plate include unnamed Proterozoic Y sandstone, Ordovician Kinnikinic Quartzite, syenite and granite of the Ordovician Beaverhead Mountains pluton (Skipp, in press; Scholten and Ramspott, 1968), Devonian Sappington Member of the Three Forks Formation, and the Mississippian McGowan Creek Formation. The latter formation contains strata enriched in base and precious metals and radioactive elements. The Fritz Creek thrust plate, structurally below the Hawley Creek, makes up almost all of the remainder of the study area. Rocks exposed on the hanging wall of the Hawley Creek thrust differ from those of the Hawley Creek plate in that: (1) the Ordovician Kinnikinic Quartzite is thin or absent; (2) only small apophyses of the Beaverhead Mountains pluton are present; and (3) the entire Upper Mississippian and part of the Pennsylvanian carbonate bank sequences are present and comprise most of the outcrop area.

North-northwest-trending folds and overturned fault-bounded sequences on the hanging wall of the Hawley Creek thrust were formed during thrusting. Some northeast- and northwest-trending faults, particularly those cutting lower Paleozoic rocks, also formed during thrusting and are not mineralized.

Autochthonous Tertiary continental volcanic and sedimentary rocks unconformably overlie the allochthonous Proterozoic and Paleozoic rocks of the study area along the northern and southern boundaries. These rocks have no identified associated mineralization in the study area.

North-northwest- to northwest-trending Tertiary and younger normal faults cut all preexisting structures and most autochthonous Tertiary volcanics and interbedded basin-fill sediments and sedimentary rocks (Skipp, in press) and are mineralized in some places where they cut Upper Mississippian limestones.

Holocene to Pleistocene fault scarps in Birch Creek valley are very similar to those scarps west of Borah Peak, Idaho, that were reactivated by the earthquake of October 28, 1983.

GEOCHEMISTRY

A geochemical survey, utilizing stream-sediment, panned-concentrate, rock-chip, and water samples (Antweiler and others, in press), identified suites of elements present in anomalous concentrations that characterize mineralized rocks; the suites define four areas of mineral resource potential, A-1, A-2, A-3, and A-5.

The suite for area A-1 is comprised of Ba, Mo, Ag, Cu, Pb, Sn, and Nb, and is related to the Beaverhead Mountains pluton. The anomalies were generally weak, but values as high as 1,000 ppm Mo and 2,000 ppm Pb were obtained from the pluton. The greatest abundance of tin obtained in one panned concentrate reached 100 ppm, a relatively low concentration.

The suite for area A-2 is dominated by Zn and also includes Pb, Ag, Ba, Mo, and locally Cu and As. This suite seems to be associated both with stratabound and fault-controlled mineralization.

The suite for area A-3 is dominated by Zn and includes Ba, Mo, and, in places, Cu, Pb, Or V. This mineralized area is similar to that of area A-2, but anomalous peak values were lower.

One rock-chip sample of three from area A-4 was weakly anomalous in Ba, Cr, and Pb.

The metals with anomalous concentrations in area A-5 are V, Zn, Pb, Mo, Ag, and As. They are associated with outcrops of Devonian and Mississippian shales and siltstones and appear to be concentrated in zones of shearing, brecciation, and silicification within these units.

GEOPHYSICS

In the northwestern part of the region, low gravity anomalies and high magnetic anomalies (U.S. Geological Survey, 1981) commonly are associated with outcropping rocks of the Beaverhead Mountains pluton (Qb), which have low potential for silver and base metals. Relatively low gravity values are spatially correlated with high-magnetic values along the western edge of the study area and suggest that rocks of the pluton underlie the western part of the study area at shallow depth (Kulik, in press).

MINING DISTRICTS AND MINERALIZATION

The northwest corner of the Italian Peak Roadless Areas includes the north part of the Birch Creek mining district, a significant lead-silver district in Idaho. There has been no recorded mineral production from the study area, but up to $5 million in lead, silver, and zinc was produced primarily from the Viola mine and a few adjacent properties less than 2 mi west of the study area in the period from 1882 to 1890 (Anderson and Wagner, 1944, p. 14). Minor amounts of ore have been produced recently as fertilizer additives, and a drilling program was conducted in the district in 1977 (Ed Wilson, owner, written commun., 1979).

Mineral deposits in the Birch Creek mining district primarily were in oxidized dolomite of the Devonian Jefferson Formation. The mineral deposits may have been basin-margin, carbonate-hosted, lead-silver-zinc deposits stratabound in the Devonian sedimentary rocks, rather than oxidized replacement deposits derived from magmatic hydrothermal fluids as described previously (Shenon, 1928; Anderson and Wagner, 1944).

No production has occurred from the Heart Mountain mineralized area just south of the study area, though a total of 4,882 ft were drilled in 18 holes at the Elkhorn group uranium prospect in 1977 (Henry Childs, claimant, written commun., 1980). These deposits have been called syngenetic, black-shale-hosted types by Wodzicki and Krason (1981).

The total number of claims located in and near the study area could not be determined, but 250 claims currently are held. About 10 of these are within the study area.

All known mineral occurrences in and near the area were mapped and sampled by the U.S. Bureau of Mines, and these are described in table 1. No deposits were exposed well enough to permit resource calculation.

ASSESSMENT OF MINERAL RESOURCE POTENTIAL

The Italian Peak and the Italian Peak Middle Roadless Areas have been evaluated by a multidisciplinary team of geoscientists from the U.S. Geological Survey and the U.S. Bureau of Mines, and the potential for several types of undiscovered mineral resources has been classified as low to moderate. Five areas show largely low mineral resource potential for base metals silver, uranium, and vanadium. Area A-1 in the northwestern part of the study area includes both outcrops of the Ordovician Beaverhead Mountains pluton and a shallow subsurface extension of the pluton based on gravity and aeromagnetic studies. Low mineral resource potential for silver, molybdenum, lead, and zinc is associated with the allochthonous granites and syenites of this pluton. Area A-2 in the west-central part of the study area includes the northern part of the Birch Creek mining district. Moderate to low mineral resource potential for silver and base metals occurs primarily in dolomite of the Devonian Jefferson Formation adjacent to the mining district on the hanging wall of the Hawley Creek thrust (Hawley Creek thrust plate). The mineralization is suggested to be stratabound and of basin-margin, carbonate-hosted origins rather than of magmatic hydrothermal origins postulated previously (Shenon, 1928; Anderson and Wagner, 1944). Moderate to low mineral resource potential for silver and base metals also occurs in and around Tertiary faults in Mississippian limestones within and east of the mining district within area A-2. This mineralization may have resulted from remobilization and redeposition of metals derived from underlying stratabound deposits. Area A-2 overlaps area A-1. Area A-3 is in the east-central part of the study area. Low to moderate mineral resource potential for stratabound and fault-controlled silver and base-metal occurrences may be present, but geologic conditions are not favorable. The Kinnikinic Quartzite, a favorable conduit for metal-rich solutions, is thin or missing, and faults are not as numerous as in area A-2. Area A-4 in the northeastern part of the study area contains low mineral resource potential for silver and base metals in diagenetic dolomite or magnesian limestone developed locally in the lower part of the Upper Mississippian Scott Peak Formation. This potential resource needs further investigation. Area A-5, south of Heart Mountain, contains low to moderate mineral resource potential for stratabound uranium, and vanadium, and possibly silver and base metals. Metal-rich siltstones and shales of the Devonian Three Forks Formation and the Mississippian McGowan Creek Formation are enriched epigenetically in zones of shearing, brecciation, and silicification.

The entire study area contains low resource potential for gas at depth.

The potential for placer gold and geothermal resources was evaluated, but no resources were identified.

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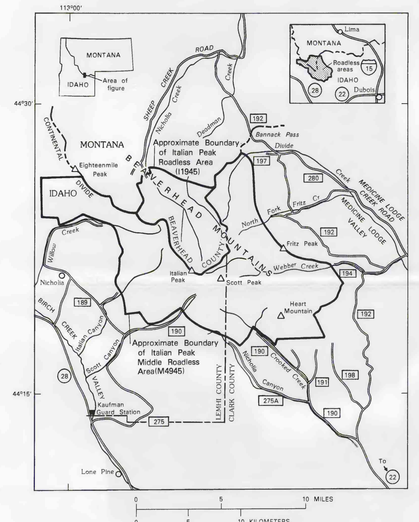

INDEX MAP OF THE ITALIAN PEAK AND ITALIAN PEAK MIDDLE ROADLESS AREAS, BEAVERHEAD COUNTY, MONT., AND CLARK AND LEMHI COUNTIES, IDAHO

Table 1.--Mines and prospects within and near the Italian Peak Roadless Areas

[Underlined names refer to properties inside the study area]

Map No.	Name	Summary	Workings	Sample data
1	Harkness North.	The prospect is dominantly in syenite float, but a northern trench is in limestone. The contact may be an east-west-trending thrust fault.	Seven trenches 100-1,200 ft long.	One chip sample of syenite and one select sample of syenite float contained 45 and 38 parts per million (ppm) U_3O_8; two other samples contained no significant mineral values.
2	Harkness-------	A west-northwest-striking, 38° SW.-dipping shear zone which exhibits weakly anomalous radioactivity. Country rock is epidotized syenite with manganese strain. Tertiary basalt and dacite(?) dikes occur in the prospect.	A 200-ft trench in the shear zone, a 100-ft trench, and small pit in syenite.	One 8-ft chip sample in the shear zone contained 13 ppm U_3O_8. Two grab samples of syenite were barren.
3	Screen Creek---	A screen and remains of a possible gold rocker were found on a small tributary of Willow Creek.	A pit in nearby limestone.	Six alluvium samples were taken along the small tributary for 1 mi to the northeast of screen. No gold detected.
4	Park----------	Interbedded layers of gossan and gossan-bearing gray shale from 6 in. to greater than 6 ft thick within gray cherty limestone. The strata strike north and dip 60° W. Gossan-bearing outcrops occur over an area 500 ft by 500 ft. Dump at adit contains 25 tons of slag, apparently from an old, crude smelter.	A northwest-trending caved adit probably 250 ft long, three pits, an 11-ft shaft, a bench 100 ft long, and 20-60 ft wide, a 150-ft trench as much as 15 ft deep, a shallow, 55-ft trench, 1,000 ft of road, and three abandoned cabins.	Twelve samples: two chip samples of gossan-bearing shale each contained 0.4 oz silver per ton; one grab sample of gossan contained 0.46 percent zinc; two alluvium samples from gullies on the south side of Willow Creek contained minor traces of chrysocolla as did two others taken 450 ft upstream and 300 ft downstream from the prospect.
5	Continental----	Weakly limonitic shale layer in dark-gray, sandy limestone.	A small pit----------	One grab sample contained 0.54 percent zinc.
6	Viola Gwen-----	A zone of gossan-bearing, shaly limestone and red-brown jasper strata exposed downdip for 300 ft on the 30° SW.-dipping limb of a northwest-trending anticline. Country rock is gray, sandy limestone.	A 10-ft trench and two pits.	Eleven grab samples: one from the north trench contained 0.19 percent zinc; one from a pit contained 0.67 percent zinc.
7	Coons Canyon---	Prospecting had been conducted in an easterly direction for 1,600 ft at the head of Coons Canyon. Country rock is gray, cherty limestone with sporadic oolitic layers.	Eleven prospect pits and two shafts about 6 ft deep.	Fourteen samples: no economically significant minerals.
8	Unnamed--------	Colluvium of gossan-bearing, sandy limestone and dolomite, abundant cherty dolomite, and some shale.	Twenty-one prospect pits, two 90-ft trenches, and two drill holes.	Twenty-three samples, including the drill cuttings: no economically significant minerals.
9	Clark and Rossi.	Tabular, stratiform deposit of iron and manganese oxide in the Jefferson Formation which consists of sandy dolomite with shale interbeds. Two mineralized pods separated by a fault are as much as 3 ft thick and 60 ft long. The dolomite strikes N. 15° E., dips 17° SE.	A 220-ft inclined shaft sunk downdip. The shaft contains a 43-ft drift and a short raise. There is also a 40-ft adit 150 ft west of the shaft and parallel to it, a 10-ft adit, and a shallow pit.	Twelve samples: a chip sample at the end of the shaft contained 0.45 percent zinc; a sample of the dump contained 0.33 percent zinc; the others contained no economically significant minerals.
10	Viola----------	According to Anderson and Wagner (1944), the ore bodies were 900 ft long and as much as 90 ft thick, contained lenses of limestone waste, and were very irregular. The ore was friable lead carbonate with 5-15 oz silver per ton, and 20-60 percent lead. Anderson and Wagner (1944) indicate the ore bodies are stratiform and connected by nonconformable fissures. The limestone strikes N. 35° E., dips 20°-40° SE. The lower pod reportedly terminates at a fault. Some mining was by opencut.	Total haulage workings are 2,500 ft long. Extent of raises and stopes are not known.	None.
11	Clipper--------	According to Shenon (1928), the ore body consisted of a 20-ft-wide pod of red- to yellow-brown material in blue magnesian limestone.	A shaft and two adits of unknown length.	The deposit was said to average 4 percent lead, but a sample by Shenon contained only low values of lead and zinc. Drill cuttings possibly from this pod were sampled during the RARE II study; they contained no significant metal values.
12	Nicholia Fraction.	Workings are along a limestone-quartzite fault contact (Shenon, 1928, p. 23).	A 124-ft two-compartment shaft, a 130-ft inclined shaft, and several drifts of unknown length.	One select dump sample contained 0.2 oz silver per ton, 0.1 percent lead, and 0.3 percent zinc.
13	Upper Eidelman.	Gossan-bearing shear zone at least 10 ft thick with abundant manganese oxide minerals cuts gray, cherty limestone. The zone is possibly related to the Eidelman Canyon fault. It is vertical and exhibits a local strike of N. 58° E.	A caved adit with an estimated 150 ft of workings. The adit probably intersects an approximately 90-ft-deep, partially caved shaft 100 ft to the east. There is a 90-ft-long by 60-ft-long by 15-ft-deep trench 200 ft east of of the shaft.	Five dump samples: no economically significant minerals.
14	Eidelman Canyon.	Limonite shale layers as much as 1 ft thick interbedded with gray-black dolomite with chert breccia. Strata strike north-east, dip 30° SE. A thrust fault and several shear zones filled with breccia and limonitic gouge as much as 2.5 ft thick cut bedding at angles of as much as 30°. Several small limonitic, gouge-filled faults cut shear zones at higher angles. Shears and faults strike N. 45°-N. 55° E. and dip 30°-80° NE. and NW. The rock unit is either McGowan Creek or Jefferson Formation. Southeast of the main workings are many other exploratory pits and adits--mostly in colluvium. Rock is limestone and shale. The few exposures strike north-east and have a dip of 45° SE. The easternmost pit contains oolitic phosphate rock.	Four adits with 622, 76, 18, and 15 ft of workings; a 23-ft shaft with caved incline at bottom; two dozer trenches, 90 and 165 ft long; two benches of 0.4 acre and 0.1 acre.	Twenty-seven samples from the main workings: one chip sample of limonitic shale layers in an adit contained 0.4 oz silver per ton, 0.14 percent lead, and 126 ppm U_3O_8. The two highest grade surface samples at the main workings contained 0.8 and 0.5 percent zinc.
15	Unnamed--------	Workings are in colluvium of gray, shaly limestone in the McGowan Creek or Jefferson Formation.	Seventeen sloughed pits and two short, caved adits. Only one pit excavated to bedrock.	A grab sample from a pit contained 6.3 percent phosphorous pentoxide (P_2O_5). Twenty other grab and select samples contained no economically significant minerals.
16	Scott Trail----	Workings are in a Carboniferous limonitic shale and sandy limestone striking N. 50° W., dipping 55° NE.	One churn drill hole of unknown depth and a timbered, caved shaft of unknown depth.	Two samples: no economically significant minerals.
17	First Discovery.	Traces of malachite and azurite on limonitic shale layers in sandy dolomite or limestone of the lower McGowan Creek or Jefferson Formation. Slump features and intraformational conglomerate are common. The beds strike northwest and dip 12° SW. The adits are in an east-striking, vertical, 4-ft-thick vein of massive calcite and travertine. The calcite is transected by a limonitic, northwest-striking, near-vertical, 6-ft shear zone.	A 70-ft trench, a short caved adit, and a prospect pit.	Nine samples: no economically significant minerals.
18	Peacock--------	Interbedded limonitic shale and sandy dolomite. The shaft is in a gossan pod. All workings are in the Jefferson Formation or the lowermost part of the McGowan Creek Formation. Strike is northwest; dip is northeast and variable.	A 150-ft adit, a probable 40-ft-long caved adit, one 20-ft trench in limestone, a small pit in quartzite to the west.	Nine chip and three select samples: one chip sample contained 0.17 percent copper and a select sample contained 0.15 percent copper. Two chip samples contained 2.0 percent lead and 1.5 percent zinc, and 0.9 percent lead, and 0.4 percent zinc, respectively. The other samples contained no economically significant minerals.
19	McHeary--------	The short adit is near the Precambrian rock-Jefferson Formation contact in iron-stained quartzite. The longer adit is in Precambrian rock.	A 7-ft shaft in bedrock, five short, caved adits, 50-ft-long trenches in colluvium, and three pits in colluvium.	Ten samples: a grab sample in the shaft contained 0.4 percent zinc. The other samples contained no economically significant minerals.
20	Upper Heart Canyon.	Exploratory pits in McGowan Creek Formation rocks; sandy limestone and interbedded limonitic gray shale with shrinkage cracks.	A 10-ft caved adit and a 50-ft caved adit.	Two samples: no economically significant minerals.
21	Heart-Meyers area.	A fault zone in McGowan Creek Formation and Precambrian rock.	Seven shallow pits, a 15-ft-long shallow trench, and a 20-ft adit.	Six samples: three grab samples of limonitic shale colluvium in the western pits contained up to 155 ppm U_3O_8, 5.4 percent P_2O_5, and 1.1 percent V_2O_5.
22	Heart Canyon West.	Exploration trenches in interbedded, gray, limonitic shale and sandy limestone of the McGowan Creek Formation containing a highly limonitic channel sanostone.	Ten trenches, the largest of which is 50 ft long and 10 ft deep. Three trenches as much as 100 ft long, and one 6-ft-deep pit.	Nine samples: one select sample in a coarse, limonitic sandstone contained 190 ppm U_3O_8. Four random samples: one in a sheared, limonitic sandstone contained 192 ppm U_3O_8, and 0.4 percent vanadium. Other samples were of shale and contained 84-155 ppm U_3O_8.
23	Unnamed--------	All workings are old and probably for lead-silver. They are excavated in interbedded, limonitic, sandy shale and gray limestone of the McGowan Creek Formation. The strata strike northwest and dip moderately northeast. Limonitic and manganiferous layers are as much as 5 ft thick in dark shaly strata.	One 40-ft adit, a 50-ft adit, a short caved adit, a possible 150-ft caved adit, and two pits.	Nine samples: a select sample contained 96 ppm U_3O_8, 1 percent lead, 0.3 oz silver per ton, and 0.4 percent copper. The other samples contained no economically significant minerals.
24	Heart Canyon---	All workings are near a fault contact of Carboniferous sediments with McGowan Creek Formation or Precambrian rocks. All rock in the adit is buff-weathering, shaly sandstone and shale cut by vertical east-striking shears. Strike of the McGowan Creek Formation is northeast and dip is 10°-20° SE. The uranium minerals appear to be in a channel sandstone in shale.	Three 100-ft-long, 10-ft-deep trenches and a north-bearing 150-ft adit with an 80-ft drift.	Three grab samples of sandstone in the pits contained 24-230 ppm U_3O_8. Four chip samples of the shear zones in the adit contained as much as 33 ppm U_3O_8, 1 percent lead, and 0.5 percent zinc.
25	Elkhorn Group.	Uranium minerals are concentrated in fine lenticular sandstone layers in the McGowan Creek Formation(?) and in shear zones which transect the formation. Mineralized intercepts were continuous between most drill holes.	Four 100-ft-long trenches, 18 drill holes with total footage of 4,882 ft and 2,700 ft of road.	A chip sample of gossan in a north-south-trending shear zone contained 120 ppm U_3O_8, 0.013 percent thorium, and 0.59 percent V_2O_5. Two grab samples from trenches contained slightly less. The best drill intercept was 23 ft with a grade of 0.10 percent U_3O_8.

MINERAL RESOURCE POTENTIAL MAP OF THE ITALIAN PEAK AND ITALIAN PEAK MIDDLE ROADLESS AREAS, BEAVERHEAD COUNTY, MONTANA, AND CLARK AND LEMHI COUNTIES, IDAHO

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