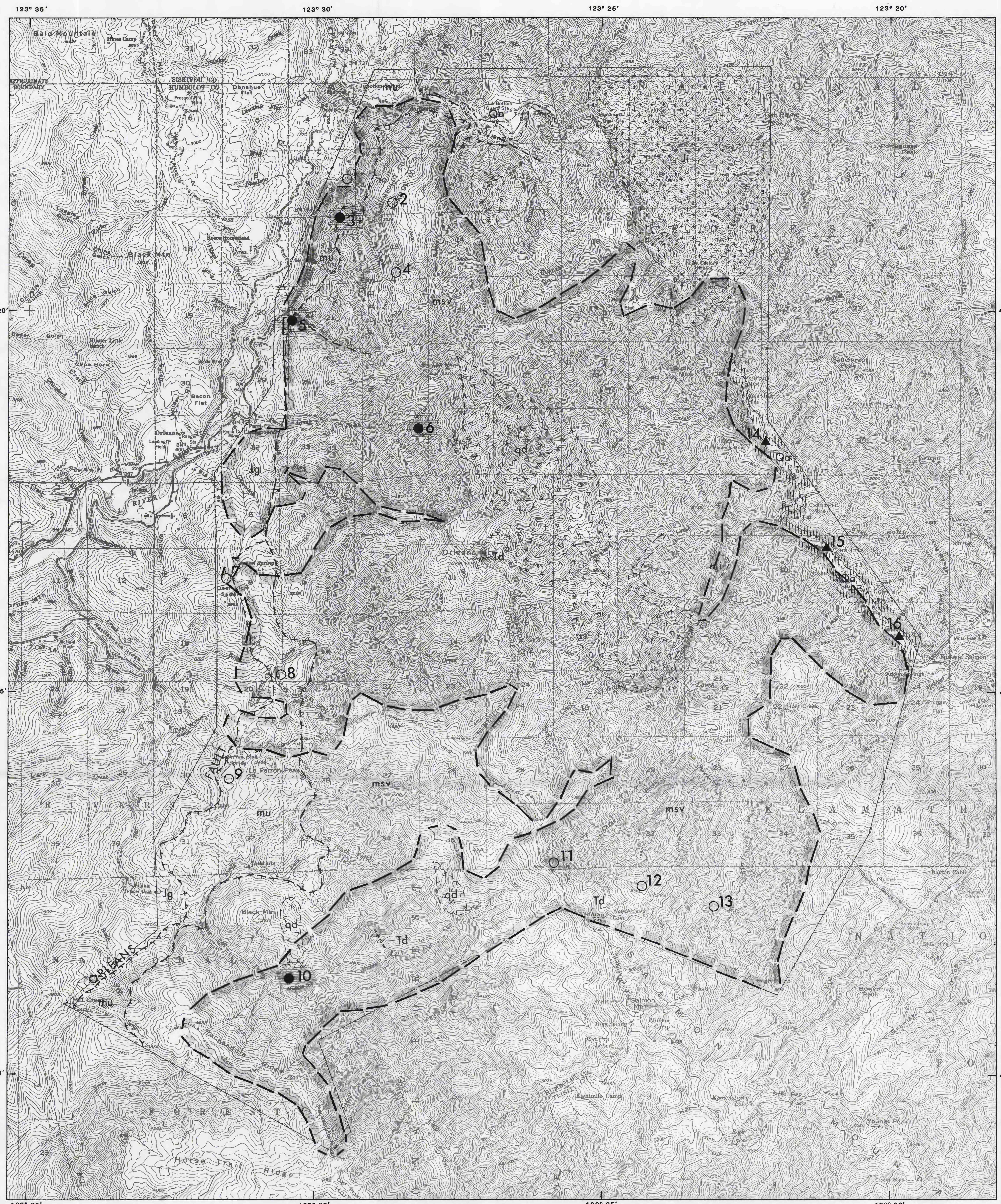
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1526-B



Base from U.S. Geological Survey, 1:62 500
Hoopa, Orleans, 1952; Forks of Salmon,
Salmon Mountain, 1955

SCALE 1:48 000

CONTOUR INTERVAL 80 AND 100 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

APPROXIMATE MEAN DECLINATION, 1983

Geology generalized from Donato and others (1983)

MINERAL RESOURCE POTENTIAL MAP OF THE ORLEANS MOUNTAIN ROADLESS AREA, HUMBOLDT AND SISKIYOU COUNTIES, CALIFORNIA

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EXPLANATION

AREA WITH MINERAL RESOURCE POTENTIAL FOR GOLD

- Lode deposits
- Placer deposits

MINE OR PROSPECT--Number refers to list below and tables 1 and 2 in accompanying pamphlet

- ● 5 Lode with mineral resource potential
- ○ 2 Lode with no mineral resource potential
- ▲ 14 Placer with mineral resource potential

1. Ikes Creek claims
2. Acme and Crymer claims
3. Whitehorse mine
4. Senate claim
5. Whitmore Creek mine
6. Chilton mine
7. Red Gap mine
8. Unnamed prospect
9. Red Cap mine
10. Red Cap Central mine
11. Whiteys Peak claim
12. Unnamed prospect
13. Unnamed prospect (Nordheimer Creek)
14. Bloomer placer mine
15. Potluck placer mine
16. Horn placer mine

CORRELATION OF MAP UNITS

SURFICIAL DEPOSITS

Qa — QUATERNARY

IGNEOUS ROCKS

Td — TERTIARY(?)

METAMORPHIC ROCKS

Western Jurassic belt

Ji; Jg (Upper Jurassic) — JURASSIC

qd — JURASSIC OR OLDER

Western Paleozoic and Triassic belt

msv — Hayfork terrane

Thrust fault

mu — Rattlesnake Creek terrane

JURASSIC AND (OR) OLDER

Fault

DESCRIPTION OF MAP UNITS

SURFICIAL DEPOSITS

Qa ALLUVIUM (QUATERNARY)-- Fluvial sand, gravel, and silt deposits in present stream and river valleys

IGNEOUS ROCKS

Td PORPHYRITIC DIKES (TERTIARY?)--Gray plagioclase-phyric dikes ranging from 3 to 60 ft in width, many of which are too small to be shown on the map. Large (1/2 to 1 in. long) euhedral visibly zoned plagioclase phenocrysts compose as much as 25 percent of the rock and occur in a gray fine-grained to aphanitic groundmass. In some cases, hornblende and euhedral red garnet phenocrysts ranging from 1/16 to 1/2 in. in diameter accompany plagioclase phenocrysts

Ji INTRUSIVE ROCKS (JURASSIC)--Medium- to coarse-grained, foliated to nonfoliated plutonic rocks ranging in composition from pyroxene gabbro to hornblende granodiorite (IUGS classification: Streckeisen, 1973). Largest exposure is Wooley Creek batholith, the southern tip of which occurs in the northeastern part of the mapped area, where its composition is hornblende quartz diorite and hornblende-biotite granodiorite

qd QUARTZ DIORITE (JURASSIC OR OLDER)--Medium- to coarse-grained foliated hornblende quartz diorite. Plagioclase is strongly altered and chalky in appearance due to replacement by albite, sericite, and epidote-clinozoisite. Hornblende is weakly lineated in the foliation plane, shows evidence of crushing and granulation, and is partially replaced by chlorite. A weak cataclastic texture is evident in thin section. Deformation and secondary minerals suggest intrusion prior to the main greenschist-facies regional metamorphism

METAMORPHIC ROCKS

Jg GALICE FORMATION (UPPER JURASSIC)-- Dark-gray to tan interbedded metagraywacke and slate. Metagraywacke: beds 1 to 8 in. thick, graded to uniform, moderately well sorted, very fine to medium grained. Slate: laminated to thinly bedded, with a few coarse silt-to-clay graded sequences; sporadic fine sand-sized grains of quartz are common; porphyroblasts of pyrite 1/16 to 1/2 in. in size are ubiquitous and are slightly more common in graywacke than in slate. A well-developed chlorite+epidote+actinolite metamorphic assemblage in the greenstone and rarely in the metagraywacke is evidence for a mid-greenschist facies regional metamorphism

msv METASEDIMENTARY AND METAVOLCANICLASTIC ROCKS (JURASSIC AND (OR) OLDER)-- Purplish-gray to black siliceous slate, sandy slate, and phyllite, locally rich in graphite and pyrite. Contains quartz+biotite+opaque±colorless (actinolitic?) amphibole ± sericite. Interbedded with pale-greenish-gray metamorphosed volcaniclastic rocks and rare lava flows of andesitic to basaltic composition. Fine-grained pale-green ash deposits, rare lava flows, and polymict conglomerate deposits also occur. Metamorphic actinolite has partially replaced hornblende and pyroxene in many cases, but relict clinopyroxene phenocrysts are present in some rocks. Volcaniclastic sedimentary rocks are correlative with the Hayfork Bally Meta-andesite of Irwin (1977). Unit also includes metasedimentary breccia containing angular to subrounded chert and limestone clasts in a foliated quartz- and biotite-rich matrix. Breccia depositionally overlies the metamorphosed volcaniclastic and sedimentary rocks unit in the eastern part of the map area

mu SERPENTINITE-MATRIX MELANGE, UNDIVIDED (JURASSIC AND (OR) OLDER)--Highly sheared serpentinite melange containing blocks of massive serpentinized peridotite (lizardite+antigorite) with rare locally preserved 1/16- to 1/4-in. enstatite crystals. Other blocks include pyroxene and hornblende gabbro, white well-bedded recrystallized chert, red hematitic chert, minor limestone, pyritiferous greenstone, vesicular metabasalt, and flattened lapilli tuff. Correlative with the Rattlesnake Creek terrane

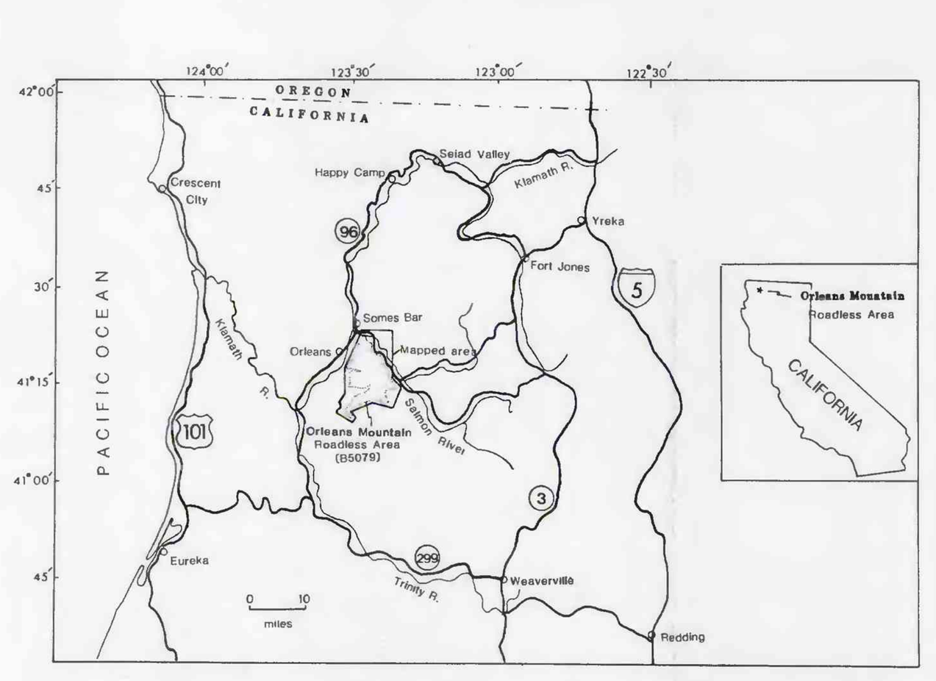
CONTACT-Dashed where approximately located

FAULT-Dashed where approximately located; dotted where concealed or inferred; bar and ball on downthrown side

THRUST FAULT-Dashed where approximately located; barbs on upper plate

APPROXIMATE BOUNDARY OF ROADLESS AREA

BOUNDARY OF GEOLOGIC MAPPING



INDEX MAP SHOWING LOCATION OF STUDY 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 mineral survey of the Orleans Mountain Roadless Area in the Klamath and Six Rivers National Forests, Humboldt and Siskiyou Counties, California. The Orleans Mountain Roadless Area (B5079) 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

The principal mineral resource in the Orleans Mountain Roadless Area (B5079) is gold. Gravel deposits along the Salmon River contain placer gold. Lode gold and associated silver are contained in quartz veins.

Since the middle 1800's over 200 lode claims and many placer claims have been located in the study area. Four patents were issued for claims on the Salmon River adjacent to the study area. Incomplete production records indicate 100 oz of gold and 30 oz of silver were produced from the Chilton mine.

Within the study area, the Potluck, Horn, and Bloomer placer mines contain 950,000 yd^3 of gold resources with range in values from \$0.51 to \$4.97 per yd^3, with gold valued at \$400 per troy oz. These three deposits extend outside the study area to include a total resource of approximately 3.3 million yd^3.

Resources of lode gold exist at mines in the northwestern and southwestern parts of the study area. The Red Cap Central and Chilton mines contain an estimated 16,000 tons of inferred marginal reserves with values between 0.26 and 0.62 oz gold per ton. Silver values range between 0.2 and 2 oz per ton. The Whitehorse and Whitmore Creek mines contain an estimated 46,000 tons of indicated and inferred subeconomic resources with values averaging 0.06 oz gold per ton.

Mineral resource potential of individual properties is summarized in tables 1 and 2 of the accompanying pamphlet.

GEOLOGY

The study area is underlain primarily by metamorphic and plutonic rocks of the western Paleozoic and Triassic belt (Irwin, 1966), but the western Jurassic belt occurs along the west margin. Two of the three subdivisions of the western Paleozoic and Triassic belt recognized by Irwin (1972), the Rattlesnake Creek and Hayfork terranes, are also recognized within the western Paleozoic and Triassic belt in this region (Donato and others, 1981).

The structurally lowest unit in the map area, the Galice Formation, belongs to the western Jurassic belt. The Galice Formation in this region consists mainly of interlayered slate and metagraywacke, although greenstone is abundant locally. The Galice is separated from the overlying rocks by an eastward-dipping regional thrust fault called the Orleans fault (Hershey, 1911), which forms the basal contact of the western Paleozoic and Triassic belt.

The structurally lowest member of the western Paleozoic and Triassic belt in this region consists of a serpentinite-matrix melange containing blocks of greenstone, chert, gabbro, and minor limestone, and overlies the Galice Formation along the Orleans fault. Blocks within the melange range in size from a few yards to several hundred yards in diameter. These rocks are correlative with the Rattlesnake Creek terrane (Gray, 1982) and are believed to represent fragments of upper Paleozoic(?) and Triassic oceanic crust (Irwin, 1972; 1981). In the southern Klamath Mountains, near lat 40°15', the Rattlesnake Creek terrane is characterized by abundant small chromite and chert-associated manganese deposits (Albers, 1981).

An eastward-dipping sequence of metasedimentary and metavolcanic rocks overlies the serpentinite-matrix melange along a shallowly dipping thrust fault. These rocks are predominantly volcanogenic sedimentary rocks, including feldspathic sandstone, crystal tuff, and volcanic conglomerate with interbedded siltstone, chert, and siliceous argillite. Eastward (up section) the volcanogenic rocks decrease in abundance, giving way to argillite, chert, and distinctive chert-limestone-argillite breccia. This unit has been moderately recrystallized and deformed under greenschist-facies conditions. These rocks are lithologically identical to and continuous with the Hayfork terrane of the southern part of the western Paleozoic and Triassic belt (Donato and others, 1981). Hayfork rocks in the map area can be no younger than Middle Jurassic, based on intrusive relations with the Wooley Creek batholith.

In the southern Klamath Mountains, between approximately lats 40°15' and 40°45', the Hayfork terrane contains numerous small lode gold deposits (Albers, 1981).

Plutonic rocks in the study area are mainly dioritic to granodioritic in composition and fall into two general categories: metamorphosed and unmetamorphosed. No evidence of mineralization associated with either group of intrusive rocks was observed. Several small plutons and one large pluton which intrude the Hayfork terrane fall into the first category (unit qd). These plutons show mineralogical and textural evidence for recrystallization under the same greenschist-facies metamorphic conditions as their host rock and are mildly cataclastic. The exact age of these plutons is unknown and can be determined only as younger than the depositional age of the intruded rocks, and older than the greenschist-facies metamorphic event.

Unmetamorphosed plutonic rocks include the Wooley Creek batholith, which crops out in the northeastern part of the study area, as well as numerous small dikes and plutons, many of which are too small to be shown on this map. These lack evidence for significant post-intrusive recrystallization. The unmetamorphosed intrusive rocks are presumed to be generally of two ages: Jurassic and Tertiary. The Wooley Creek batholith ranges in composition from gabbro to granodiorite. The part of the pluton exposed in the study area is chiefly granodiorite and quartz diorite (Barnes, 1982).

Unmetamorphosed porphyry dikes thought to be Tertiary in age, based on their unmetamorphosed character, are common though volumetrically minor in the Hayfork terrane in the study area. These dikes are generally small, and their large plagioclase (and in many cases, garnet) phenocrysts generally allow them to be distinguished from dikes associated with the Jurassic plutons.

The general structural aspect of the study area is one of eastward-dipping thrust plates. A major belt-bounding thrust fault, the Orleans fault, is present in the westernmost part of the map area and is locally modified by later high-angle, north-trending faults. Thrust faults are also present within the western Paleozoic and Triassic belt, forming the boundary between the Rattlesnake Creek terrane and the overlying Hayfork terrane. Two of the four lode gold mines with resource potential (Whitehorse and Whitmore Creek mines) are located near thrust faults.

It is interesting to note that, although lode gold deposits are more characteristic of the Hayfork than the Rattlesnake Creek terrane (Albers, 1981), two lode prospects occur in the Rattlesnake Creek terrane near the study area: Red Gap mine and Red Cap mine. These occur near the thrust fault separating the Rattlesnake Creek from the Hayfork terrane, which suggests that mineralization is related to this structural feature. The majority of lode claims or prospects, however, occurs within the Hayfork terrane.

GEOCHEMISTRY

A geochemical study of the Orleans Mountain Roadless Area was undertaken by the U.S. Geological Survey to aid in the evaluation of the area's mineral resource potential. Eighteen stream-sediment samples and 18 panned concentrates from stream sediments were taken throughout the area (D. Smith, unpub. data, 1982). This reconnaissance sampling confirmed previously known potential for lode and placer gold.

Semiquantitative spectrographic analyses of the heavy, nonmagnetic fraction of the panned concentrates of stream sediments from streams draining the eastern slope of the Salmon Mountains revealed scattered anomalies of gold, silver, tungsten, and tin. All of these streams flow into the Salmon River, which has been a major producer of placer gold (Koschmann and Bergendahl, 1968). One sample from just within the study-area boundary, taken from Boise Creek just below the confluence with the Little South Fork of Boise Creek, contained anomalous gold, silver, and arsenic. The sample also contained visible cinnibar (HgS).

The reconnaissance geochemical sampling of the study area revealed scattered anomalies based on the concentration of gold, tungsten, tin, arsenic, and mercury in the concentrates. This suite of elements is believed to be characteristic of lode and placer gold deposits.

GEOPHYSICS

Gravity and aeromagnetic surveys were conducted over the Orleans Mountain Roadless Area and surrounding areas to supplement the geologic mapping and to aid in the assessment of the mineral resource potential of the area. The gravity data reflect density contrasts in the rocks underlying the area and the magnetic data reflect the distribution of magnetic minerals, mainly magnetite, in the subsurface. Because the major rock units present in this area possess characteristic densities and magnetic properties, the geophysical data have been used to infer the distribution of rock units and the attitudes of boundaries between them.

The gravity field is qualitatively consistent with geologic data, which indicate that the high-density rocks of the western Paleozoic and Triassic belt are in contact with lower density rocks of the Galice Formation along the Orleans fault. Quantitative modeling of the gravity anomaly associated with this thrust indicates that the fault dips eastward at approximately 25° near the surface and less steeply at depth. Beneath the study area, the western Paleozoic and Triassic belt reaches a maximum thickness of 2-3 mi.

The magnetic field over the Orleans Mountain Roadless Area is dominated by a large, linear, north-trending magnetic high that lies continuously along the western margin of the study area east of, and parallel to, the trace of the Orleans fault. The magnetic high is caused by serpentinite bodies within the Rattlesnake Creek terrane, which are much more magnetic than either the underlying Galice Formation or the structurally higher Hayfork terrane in this region. Quantitative modeling of this anomaly suggests that the serpentinite forms a thin sheet that dips eastward at approximately 25° and is concordant with the attitude of the Orleans fault as inferred from gravity data. Along the section where exposures of the Rattlesnake Creek terrane are lacking, the magnetic data suggest that the serpentinite sheet lies 2,000-3,000 ft below the land surface.

Three mineral prospects in the southeastern part of the study area (11, 12, and 13) lie on the north flank of a magnetic low centered 1 to 1.5 mi north of Salmon Mountain. However, the association between these prospects and the magnetic anomaly probably is accidental because the magnetic low lies north of a strong magnetic high associated with an ultramafic body to the south and the low most likely represents a polarization effect of the anomaly over this body.

ASSESSMENT OF MINERAL RESOURCE POTENTIAL

The Orleans Mountain Roadless Area has mineral resource potential for placer and lode gold. This conclusion is based on study of known mines, prospects, and mineralized areas, (Linné and Barnes, 1982) and is supported by results of geochemical sampling (D. Smith, unpub. data, 1982). Table 1 of the accompanying pamphlet lists resource estimates for properties with mineral resource potential. Additional data for all mines, prospects, and mineralized areas in the study area are given in table 2 of the accompanying pamphlet.

Gold occurs in bench placer deposits along the Salmon River adjacent to the east boundary of the study area. Three placer mines are present, the Bloomer (14), Potluck (15), and Horn (16) placer mines, all of which are considered to have a low mineral resource potential.

Resources of lode gold are present at mines in the northwestern part of the study area: the Whitehorse mine (3), Whitmore Creek mine (5), and the Chilton mine (6). Gold occurs in quartz veins which crosscut metasedimentary and metavolcanic rocks. Limited amounts of silver also occur at the Chilton and Whitehorse mines. The Red Cap Central mine (10) in the southwestern part of the study area has lode gold mineral resource potential and limited amounts of silver.

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Explanatory pamphlet accompanies map

[1]U.S. Geological Survey
[2]U.S. Bureau of Mines

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For sale by Branch of Distribution, U.S. Geological Survey, Box 25286, Federal Center, Denver, CO 80225