DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

TO ACCOMPANY MAP MF-1526-B

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

SUMMARY REPORT

By

Mary M. Donato[1], J. Mitchell Linne[2], Robert C. Jachens[1], and David B. Smith[1]

STUDIES RELATED TO WILDERNESS

Under the provisions of the Wilderness Act (Public Law 88-577, September 3, 1964) and related acts, the U.S. Geological Survey and the U.S. Bureau of Mines have been conducting mineral surveys of wilderness and primitive areas. Areas officially designated as "wilderness", "wild", or "canoe" when the act was passed were incorporated into the National Wilderness Preservation System, and some of them are presently being studied. The act provided that areas under consideration for wilderness designation should be studied for suitability for incorporation into the Wilderness System. The mineral surveys constitute one aspect of the suitability studies. The act directs that the results of such surveys are to be made available to the President and the Congress. This report discusses the results of a mineral survey of the Orleans Mountain Roadless Area (B5079), Humboldt and Siskiyou Counties, Klamath and Six Rivers National Forests, California. The Orleans Mountain 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.

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 have been located in the study area, primarily in the Orleans and Red Cap mining districts; many placer claims have been located in the Salmon River district. Four placer patents totaling 230 acres 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 between 1927 and 1940. 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.

INTRODUCTION

The U.S. Geological Survey and the U.S. Bureau of Mines conducted a mineral resource assessment of the Orleans Mountain Roadless Area, Humboldt and Siskiyou Counties, Calif. Geologic mapping, geophysical surveys, and geochemical sampling were carried out by the U.S. Geological Survey during 1980 and 1981. The U.S. Bureau of Mines gathered data concerning mines, prospects, and mineralized areas during 1980. Humboldt and Siskiyou County records, U.S. Bureau of Land Management master title plats, and U.S. Forest Service files were searched for identification of mining claims. U.S. Bureau of Mines library materials and production records were studied for further information on identified mines. Seventy-three lode samples, taken from mines, prospects, claims, and mineralized areas were analyzed by atomic-absorption and fire-assay methods. Several samples from each prospect were analyzed by semiquantitative spectrographic methods to determine the presence of unsuspected elements. One hundred thirteen placer samples were concentrated through a sluice in the field and analyzed at the U.S. Bureau of Mines placer lab in Spokane, Wash. Complete analyses are on file at the U.S. Bureau of Mines, Western Field Operations Center, Spokane, Wash.

The Orleans Mountain Roadless Area is located in the Salmon Mountains of northern California and comprises approximately 44,000 acres of land in the Klamath and Six Rivers National Forests (fig. 1). The area is bounded on the northeast by the Salmon River, on the northwest by the Klamath River, and adjoins the Salmon-Trinity Alps Wilderness to the south. It is an area of great relief and rugged terrain, ranging in elevation from approximately 500 ft near Somes Bar to nearly 6,200 ft above sea level at Orleans Mountain.

Access is provided by State Highway 96 (Klamath River Highway), the Salmon River road, and by numerous logging roads which skirt the boundaries of the study area. In addition, trails and fire breaks facilitate limited access by foot to many parts of the area.

GEOLOGY, GEOCHEMISTRY, AND GEOPHYSICS PERTAINING TO MINERAL RESOURCE ASSESSMENT

GEOLOGY

The Orleans Mountain Roadless Area is located in the Klamath Mountains geologic province of northern California. Previous geologic studies were carried out by Hershey (1906) and Cashman (1979). A geologic map has been prepared by

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

the U.S. Geological Survey as part of this assessment (Donato and others, 1983). A generalized geologic map of the study area is presented in figure 2.

The study area is underlain primarily by metamorphic and plutonic rocks of the western Paleozoic and Triassic belt (Irwin, 1966), but rocks belonging to the western Jurassic belt occur 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).

Western Jurassic belt (Galice Formation)

The structurally lowest unit in the map area, the Galice Formation, belongs to the western Jurassic belt. Although no fossils have been found in this area, the age of this unit elsewhere is known to be late Jurassic (Harper, 1980). 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.

Western Paleozoic and Triassic belt (Rattlesnake Creek terrane)

The structurally lowest member of the western Paleozoic and Triassic belt in the study area 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).

Western Paleozoic and Triassic belt (Hayfork terrane)

An eastward-dipping sequence of metasedimentary 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, as indicated by the presence of chlorite, epidote, actinolite, and albite. These rocks are lithologically identical to and continuous with rocks of the Hayfork terrane of the southern part of the western Paleozoic and Triassic belt (Donato and others, 1981), where they have been interpreted by Irwin (1972) as an island-arc terrane. No fossils have been found in Hayfork rocks in the map area; thus their age is unknown. The age of Hayfork rocks to the south is in question, but fossil and isotopic evidence favor a Jurassic age (Irwin, 1977; Irwin and others, 1978). 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 lat 40°15' and 40°45', the Hayfork terrane contains numerous small lode gold deposits (Albers, 1981).

Intrusive rocks

Plutonic rocks in the study area are mainly dioritic to granodioritic in composition and fall into two general categories: metamorphosed and unmetamorphosed. Several small plutons and one large pluton which intrude the Hayfork terrane fall into the first category. 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: "Nevadan" (that is, Jurassic) and Tertiary. The Wooley Creek batholith, which is 162±2 m.y. old (Allen and others, 1982), ranges in composition from gabbro to granodiorite. The part of the pluton exposed in the study area is an upper, more siliceous portion (Barnes, 1982) and is chiefly granodiorite and quartz diorite.

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 (less than 20 ft wide), and their large plagioclase and garnet phenocrysts generally allow them to be distinguished from dikes associated with the Jurassic plutons.

No evidence of potential mineral deposits associated with either group of intrusive rocks was observed.

Structural geology

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 (fig. 3).

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 (fig. 3). These occur near the thrust fault separating the Rattlesnake Creek from the Hayfork terrane, which suggests that mineral deposits are related to this structural feature. The majority of lode claims or prospects, however, occurs within the metasedimentary units of 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.

Stream sediments were chosen as the primary sample medium for this study because they represent a composite of rock and soil exposed in the drainage basin upstream from the sample site. One sample was sieved to minus-80 mesh, pulverized, and analyzed for 31 elements by a semiquantitative spectrographic method (Grimes and Marranzino, 1968). The second stream-sediment sample was panned to produce a heavy-mineral concentrate. After panning, the remaining light material was removed from the concentrate using bromoform (specific gravity, 2.86). Magnetite was then removed from the heavy concentrate using a hand magnet. The resulting heavy-mineral fraction was divided into two subfractions based on magnetic susceptibility. A split of the heavy nonmagnetic fraction was ground by hand using an agate mortar and pestle and then analyzed spectrographically.

Semiquantitative spectrographic analyses of the heavy nonmagnetic fraction of the panned concentrates from

stream sediments proved to be the most useful in evaluating the study area. This sample medium contains the common ore-forming sulfide and oxide minerals as well as other nonmagnetic minerals (for example, barite, zircon, rutile, etc.). The concentrate medium also gives a greatly enhanced anomaly pattern because all of the more common rock-forming minerals (quartz and feldspar) that tend to dilute the anomalies have been removed.

Scattered anomalies of gold, silver, tungsten, and tin were found in panned concentrates taken from streams draining the eastern slope of the Salmon Mountains. 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 values for gold, silver, and arsenic. The sample also contained visible cinnibar (HgS).

In summary, 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 most prominent feature of the residual gravity field in the vicinity of the study area is the consistent pattern of low gravity values over the Galice Formation to the west relative to higher gravity values over the western Paleozoic and Triassic belt to the east. 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 west margin of the study area east of, and parallel to, the trace of the Orleans fault. This magnetic anomaly has an amplitude of 300-400 nanoteslas along most of its length except for a 4-mi north-south section (fig. 2) where the Rattlesnake Creek terrane is not exposed at the surface. Along this section, the anomaly has an amplitude of about 100-150 nanoteslas. The magnetic high is caused by serpentinites contained within the Rattlesnake Creek terrane. These serpentinites are much more magnetic than either the rocks of the underlying Galice Formation or rocks of the structurally higher Hayfork terrane in this region. Quantitative modeling of the high-amplitude anomaly along an east-west profile that crosses the center of the Orleans Mountain Roadless Area 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.

A large, roughly circular magnetic high approximately 1.5 mi in diameter lies in the extreme northwestern part of the study area. Although this anomaly may be slightly modified by Hayfork terrane metaserpentinite exposed there, the primary source of the magnetic high probably is contained within the Rattlesnake Creek terrane, which in this area lies only about 1,000 ft or less beneath the land surface.

Three mineral prospects in the southeastern part of the study area (11, 12, and 13 on fig. 3) 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.

MINING DISTRICTS AND MINERALIZATION

Three mining districts overlap the study area: the Salmon River, Orleans, and Red Cap districts.

Salmon River district

The Salmon River district encompasses the entire drainage of the Salmon River, an area of about 800 mi^2 (Koschmann and Bergendahl, 1968). That portion of the district between Lewis Creek and Forks of Salmon overlaps the east boundary of the study area, but no development has occurred within the study area. The portion of this district within the study area falls entirely within the Hayfork terrane.

Gold was discovered on the Salmon River in 1849 (Clark, 1970). From 1932 to 1959 the district's production totaled 18,868 oz of gold and 15,981 oz of silver (Koschmann and Bergendahl, 1968). According to U.S. Bureau of Mines files, the Bloomer, Horn, and Potluck (Knudsen Bar) placer mines yielded over 12,000 oz of gold and 840 oz of silver before 1920. Small-scale placer mining continues.

In the portion of the district in the study area, three bench placers from 50 to 400 ft above the present river channel are found at both the Bloomer and Horn properties (fig. 3). One bench placer about 30 ft above the river channel is found at the Potluck property. These bench placers are often overlain by thick layers of slide material.

Bench placer deposits adjoin and extend into the study area along the west side of the Salmon River. As many as three bench placers have been mined adjacent to the study area at both the Bloomer and Horn mines. At several channel sample localities, gold values were found as much as 15 ft above bedrock, indicating that mineral deposition may have occurred as separate events without later reconcentration.

Bench placers on the Potluck, Horn, and Bloomer placer mines contain an estimated 294,000 yd^3 of indicated and inferred reserves averaging \$4.97 per yd^3, 871,000 yd^3 of indicated subeconomic resources, and 2.1 million yd^3 of inferred subeconomic resources with values ranging from \$0.51 to \$2.49 per yd^3. A gold value of \$400 per troy ounce was used in calculations.

Orleans district

The Orleans mining district is in the vicinity of the town of Orleans and covers approximately 100 mi^2. The district's northeast corner overlaps the northwestern part of the study area. The Orleans district includes the Rattlesnake Creek and Hayfork terranes of the western Paleozoic and Triassic belt, as well as the western Jurassic belt.

Placer mining began in the Orleans area in the 1870's and has been the primary mining activity. The Orleans bar deposit, outside the study area, has been essentially mined out. The Whitehorse, Chilton, and Whitmore Creek mines, all lode deposits, lie within the study area in the Orleans district (fig. 3). The only recorded mineral production from within the study area is 100 oz of gold and 30 oz of silver from the Chilton mine, located in metasedimentary rocks of the Hayfork terrane.

Lode gold in the Orleans district part of the study area is in quartz veins as "free gold" and is associated with pyrite. These veins strike northeast or northwest and occur in metavolcanic and metasedimentary rocks of the Hayfork terrane. Veins at the Whitehorse and Whitmore Creek mines are probably associated with the Orleans fault (fig. 2).

At the Whitehorse, Chilton, and Whitmore Creek mines, there are a total of 49,000 tons of indicated and inferred resources with grades ranging from 0.06 to 0.62 oz of gold per ton.

Red Cap district

The Red Cap mining district is centered around Red Cap Creek and covers approximately 50 mi^2. The southern part of the district overlaps a small part of the study area in the vicinity of the Middle Fork of Red Cap Creek, where the Hayfork terrane is present.

Placer mining in the Red Cap district began in the late 1870's along Red Cap Creek near its confluence with the Klamath River. Copper, chromium, gold, and silver lodes also occur in the district outside the study area. Within the study area, gold and silver occur in quartz veins at the Red Cap Central mine (fig. 3). Although underground exploration has been conducted at this property, located in the Hayfork terrane (fig. 3), no production was recorded. The property contains 13,000 tons of inferred marginal reserves with a weighted average gold value of 0.26 oz per ton.

ASSESSMENT OF MINERAL RESOURCE POTENTIAL

The Orleans Mountain Roadless Area has a low to high mineral resource potential for placer and lode gold. This conclusion is based on a 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 2 summarizes data regarding known mines, prospects, and mineralized areas with mineral resource potential.

Gold occurs in bench placer deposits along the Salmon River adjacent to the east boundary of the study area (fig. 3). Three placer mines are present, all of which are considered to have low mineral resource potential. Resource estimates are given in table 1.

Resources of lode gold are present at mines in the northwestern and southwestern parts of the study area (fig. 3). Gold occurs in quartz veins which crosscut metasedimentary and metavolcanic rocks. Limited amounts of silver also occur at two mines. Four mines are considered to have a high mineral resource potential for lode gold; table 1 lists resource estimates for these properties.

REFERENCES

Albers, J. P., 1981, A lithologic-tectonic framework for the metallogenic provinces of California: Economic Geology, v. 76, no. 4, p. 765-790.

Allen, C. M., Barnes, C. G., Kays, M. A., and Saleeby, J. B., 1982, Comagmatic nature of the Wooley Creek batholith and the Slinkard pluton and age constraints on tectonic and metamorphic events in the western Paleozoic and Triassic belt, Klamath Mountains, northern California (abs.): Geological Society of America Abstracts with Programs, v. 14, no. 4, p. 145.

Barnes, C. G., 1982, Geology and petrology of the Wooley Creek batholith, Klamath Mountains, northern California: Eugene, University of Oregon, Ph. D. thesis, 214 p.

Cashman, P. H., 1979, Geology of the Forks of Salmon area, Klamath Mountains, California: Los Angeles, University of Southern California, Ph. D. thesis, 240 p.

Clark, W. B., 1970, Gold districts of California: California Division of Mines and Geology Bulletin 193, 141 p.

Donato, M. M., Barnes, C. G., and Irwin, W. P., 1981, Northward continuation of the Hayfork terrane, north-central Klamath Mountains, California (abs.): Geological Society of America Abstracts with Programs, v. 13, no. 2, p. 52.

Donato, M. M., Barnes, C. G., and Gray, G. G., 1983, Geologic map of the Orleans Mountain Roadless Area, Humboldt and Siskiyou Counties, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1526-A, scale 1:48,000.

Gray, G. G., 1982, Northward continuation of the Rattlesnake Creek terrane, north-central Klamath Mountains, California (abs.): Geological Society of America Abstracts with Programs, v. 14, no. 4, p. 167.

Grimes, D. J., and Marranzino, A. P., 1968, Direct-current arc and alternating-current spark emission spectrographic field methods for the semiquantitative analysis of geologic materials: U.S. Geological Survey Circular 591, 6 p.

Harper, G. D., 1980, The Josephine ophiolite—remains of a late Jurassic marginal basin in northwestern California: Geology, v. 8, no. 7, p. 333-337.

Hershey, O. H., 1906, Some western Klamath Mountain stratigraphy: American Journal of Science, ser. 4, v. 21, p. 58-66.

___1911, Del Norte County California geology: Mineral and Science Press, v. 102, p. 468.

Irwin, W. P., 1966, Geology of the Klamath Mountains province, in Bailey, E. H., ed., Geology of northern California: California Division of Mines and Geology Bulletin 190, p. 19-38.

___1972, Terranes of the western Paleozoic and Triassic belt in the southern Klamath Mountains, California: U.S. Geological Survey Professional Paper 800-C, p. C103-C111.

___1977, Review of Paleozoic rocks of the Klamath Mountains, in Paleozoic paleogeography of the western United States: Stewart, J. H., Stevens, C. H., and Fritsche, A. E., eds., Society of Economic Paleontologists and Mineralogists, p. 441-454.

___1981, Tectonic accretion of the Klamath Mountains, in Ernst, W. G., ed., The geotectonic development of California: Prentice-Hall, Inc., p. 29-49.

Irwin, W. P., Jones, D. L., and Kaplan, T. A., 1978, Radiolarians from pre-Nevadan rocks of the Klamath Mountains, California and Oregon, in Howell, D. G., and McDougall, K. A., eds., Mesozoic paleogeography of the western United States: Society of Economic Paleontologists and Mineralogists, p. 303-310.

Koschmann, A. H., and Bergendahl, M. H., 1968, Principal gold-producing districts of the United States: U.S. Geological Survey Professional Paper 610, 81 p.

Linné, J. M., and Barnes, D. J., 1982, Mineral investigation of the Orleans Mountain RARE II area (No. B5079), Humboldt and Siskiyou Counties, California: U.S. Bureau of Mines Open-File Report MLA 67-82, 18 p.

Table 1.--Properties with mineral resource potential

[Indicated--material whose quality and quantity have been estimated partly from sample analyses and measurements and partly from reasonable geologic projections. Inferred--material in unexplored but identified deposits whose quality and size have been estimated on the basis of geologic evidence and projection. Subeconomic--known deposits not now economically minable. Marginal--the portion of subeconomic resources which would require a substantially higher price (more than 1.5 times the price at the time of determination) or a major cost-reducing advance in technology to become economic. Reserve--that portion of the identified resource from which a usable mineral or energy commodity can be economically and legally extracted at the time of determination.]

Map no. (fig.3)	Mine	Type of occurrence	Classification of resources	Volume or tonnage	Average grade 1/
3	Whitehorse	quartz vein	indicated subeconomic resources	26,000 ton	0.06 oz gold per ton
			inferred subeconomic resources	13,000 ton	
5	Whitmore Creek	fissure vein	inferred subeconomic resources	7,000 ton	0.05 oz gold per ton
6	Chilton	fissure vein	inferred marginal reserves	3,000 ton	0.62 oz gold per ton 0.2 oz silver per ton
10	Red Cap Central	quartz vein	inferred marginal reserves	13,000 ton	0.26 oz gold per ton 0.5 oz silver per ton
14	Bloomer placer	bench placer	indicated subeconomic resources	71,000 yd^3	\$1.00 per yd^3
			inferred subeconomic	642,000 yd^3 2/	
15	Potluck placer	bench placer	indicated subeconomic resources	500,000 yd^3	\$2.37 per yd^3
			inferred subeconomic resources	1,500,000 yd^3 3/	
16	Horn placer	bench placer	indicated reserves	200,000 yd^3 4/	\$4.97 per yd^3
			inferred reserves	94,000 yd^3 5/	\$4.97 per yd^3
			indicated subeconomic resources	300,000 yd^3 6/	\$0.93 per yd^3

1/ Placer gold valued at \$400 per troy ounce.
2/ 190,000 yd^3 inferred subeconomic resources valued at \$1.00 per yd^3 lie within study area.
3/ 700,000 yd^3 inferred subeconomic resources valued at \$2.37 per yd^3 lie within study area.
4/ 20,000 yd^3 indicated reserves valued at \$4.97 per yd^3 lie within study area.
5/ 20,000 yd^3 inferred reserves valued at \$4.97 per yd^3 lie within study area.
6/ 20,000 yd^3 indicated subeconomic resources valued at \$0.93 per yd^3 lie within study area.

Table 2.--Mines, prospects, and mineralized areas

[Indicated--material whose quality and quantity have been estimated partly from sample analyses and measurements and partly from reasonable geologic projections. Inferred--material in unexplored but identified deposits whose quality and size have been estimated on the basis of geologic evidence and projection. Subeconomic--known deposits not now economically minable. Marginal--the portion of subeconomic resources which would require a substantially higher price (more than 1.5 times the price at the time of determination) or a major cost-reducing advance in technology to become economic. Reserve--that portion of the identified resource from which a usable mineral or energy commodity can be economically and legally extracted at the time of determination. Names underlined are properties with mineral resources or potential; those not underlined have no potential or are poorly exposed and a determination cannot be made. A gold price of $400 per troy ounce was used in calculating the value of placer samples.]

Map no.	Name and commodity	Summary	Workings	Production	Assessment of resource potential
1	Ikes Creek claims (gold)	Quartz and epidote occur in metasedimentary rocks in contact with gabbro	None	None	No concentrations of metallic minerals were identified.
2	Acme and Crymer claims (gold)	Metasedimentary rock outcrop	None	None	No concentrations of metallic minerals were identified.
3	Whitehorse mine (gold, silver)	2.5-ft-thick quartz vein with strike N. 70° E. and dip 38-50° SE., in metamorphosed volcaniclastic rocks	Five adits partially caved. Longest was 486 ft, but now caved 85 ft from portal	One ton of ore reported. Processed 30 tons of dump material in 1970's yielding from 0.08 to 0.12 oz gold per ton or 3 oz gold	The property contains 26,000 tons of indicated and 13,000 tons of inferred subeconomic resources. High-grade pockets have values of about 0.33 oz gold per ton. Average grade for the deposit is approximately 0.06 oz gold per ton and 0.3 oz silver per ton. Highest value gold assay from eighteen samples of vein, country-rock, and dump material was 1.4 oz gold per ton and 0.8 oz silver per ton. Because the vein is persistent at a thickness of 2.5 ft for 500 ft downdip and for at least 250 ft along strike, the property has a high potential for additional resources.
4	Senate claim (gold)	Metasedimentary rock outcrop	None	None	No concentrations of metallic minerals were identified.
5	Whitmore Creek mine (gold)	Quartz stringers, veinlets, and veins strike N. to N. 30° E. and dip vertically in fractured metasedimentary rocks	Five adits from 10 to 85 ft long with several short crosscuts	Unknown	Six of 41 samples showed more than a trace of gold. The highest value was 0.135 oz per ton. These six samples represent an estimated 7,000 tons of inferred subeconomic resources with an average grade of about 0.05 oz gold per ton. The property has high potential for additional resources.

Table 2.--Mines, prospects, and mineralized areas--Continued

Map no.	Name and commodity	Summary	Workings	Production	Assessment of resource potential
6	Chilton mine (gold, silver)	Quartz-filled fissure vein strikes N. 50° W. and dips vertically in metasedimentary rocks	Adits, open cuts, stopes over a 50-ft by 200-ft area	100 oz gold, 30 oz silver between 1927 and 1940	Adits not found in field examination. Estimated 3,000 tons of inferred marginal reserves at grade 0.62 oz gold and 0.20 oz silver per ton. Potential for additional gold resources is high.
7	Red Gap mine (chromium)	Elongate body of serpentinite between metasedimentary rocks at a fault boundary.	Unknown	73 long tons chromite ore, 1943	Based on past production the mine has moderate potential for additional resources. No samples were collected.
8	Unnamed prospect (gold)	Quartz stringer and vein up to 4 in. thick in metasedimentary rocks	None	None	Two samples contained a trace of gold each. Because of the paucity of vein material the property has a low potential for gold resources.
9	Red Cap mine (copper) (outside study-area boundary)	Native copper and bornite in serpentinite	None	None	Occurrences of high-grade copper minerals indicate a moderate potential for copper resources. No samples were taken.
10	Red Cap Central mine (gold, silver)	3.5-ft-thick quartz vein and shear which strike N. 70° W. and dip 45°SW. in metasedimentary rocks	Three adits, one is caved. Total 75-ft workings	Unknown	Property contains 13,000 tons of inferred marginal reserves with a weighted average gold value of 0.26 oz per ton. Assays from eleven chip samples of vein, veinlets, and country rock ranged from a trace to 0.76 oz gold per ton, and from less than 0.2 to 2 oz silver per ton. The property has a high potential for additional resources.
11	Whiteys Peak claims (mercury)	Shear zone up to 6 ft thick with quartz stringer in lens of serpentinite and metasedimentary rocks	None	None	No concentrations of metallic minerals were identified.
12	Unnamed prospect (gold)	Quartz veinlets with sulfides in metasedimentary rocks	One caved adit less than 15 ft long	None	Three samples of vein quartz and surrounding rock assayed a trace of gold. The property has a low potential for mineral resources.
13	Unnamed prospect, (chromium)	Serpentinite block 10 ft by 50 ft in breccia zone	None	None	No concentrations of metallic minerals were identified.

Table 2.--Mines, prospects, and mineralized areas--Continued

Map no.	Name and commodity	Summary	Workings	Production	Assessment of resource potential
14	Bloomer placer mine (gold)	Three bench placers at 50, 200, and 400 ft above river. 15-ft-thick bench placer at 200 ft underlies 32 acres. Remnants of bench placers are at 50 and 400 ft but are not resources.	14 acres worked by hydraulic giants	10,000 oz gold; 6,000 oz silver 1872-1913	71,000 yd^3 of indicated subeconomic and 642,000 yd^3 of inferred subeconomic resources are estimated. Only 190,000 yd^3 of inferred subeconomic resources are within the study area. Highest assay gold value from eighteen samples at six sites was $2.49 per yd^3. Weighted average values for gold at each site range between $0.51 and $1.22 per yd^3 with an average of $1.00 per yd^3. Because of low gold values and thick overburden, this property has a moderate resource development potential. The property has a low potential for additional resources.
15	Potluck placer mine (gold)	From 10- to 20- ft-thick bench placer, 15 ft above river. Deposit occupies 71 acres.	5 acres worked in past Present operation is exploration and assessment work	700 oz gold, 100 oz silver, 1905-1908	500,000 yd^3 of indicated subeconomic resources and 1.5 million yd^3 of inferred subeconomic resources have been identified. Only 700,000 yd^3 of inferred subeconomic resources are within the study area. Weighted average value for gold at the deposit is $2.37 per yd^3. Highest assay gold value from eleven samples at three sites was $5.12 per yd^3.
16	Horn placer mine (gold)	Three bench placers: one 8 ft thick and 30 ft above the river; another bench which varies between 10 and 25 ft thick is 70 ft above the river; third 110 ft above the river is mined out. Gravel underlies 25 acres.	20 acres worked in past. No facilities or activity at present	125 oz gold, 100 oz silver, 1895-1898 1903-1907	An estimated 200,000 yd^3 of indicated reserves, 94,000 yd^3 of inferred reserves with average value $4.97 per yd^3, and 300,000 yd^3 of indicated subeconomic resources with average value $0.93 per yd^3 are on the property. 40,000 yd^3 of indicated reserves and 20,000 yd^3 of indicated subeconomic resources are within the study area. Twenty-one samples were taken from six sites. One gold nugget weighing 134 mg was found in a 1-ft channel sample. Weighted average values for gold at sample sites ranged from $0.27 to $10.59 per yd^3. Because of lack of overburden and localization of values this property has a very high potential. Potential is low for additional resources.

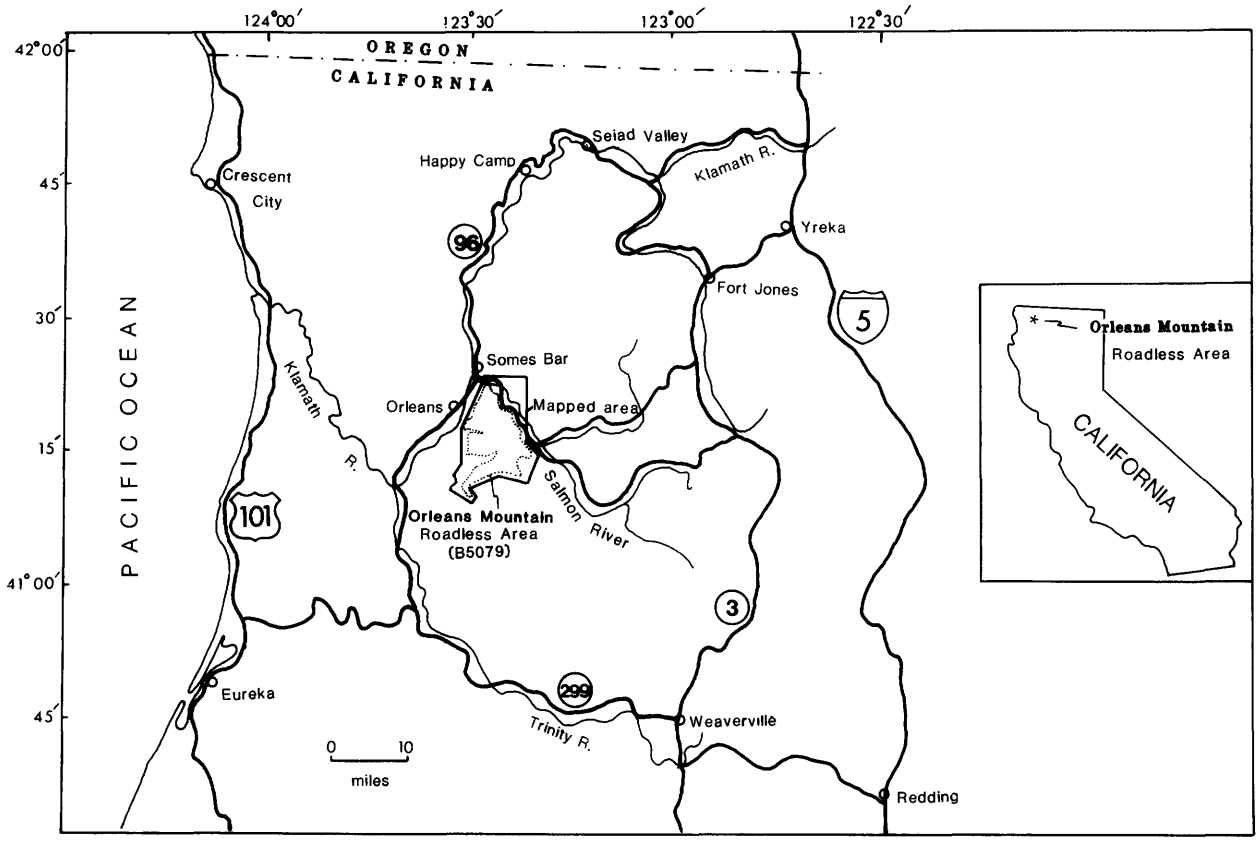

Figure 1.—Location of the Orleans Mountain Roadless Area, Siskiyou and Humboldt Counties, Calif.

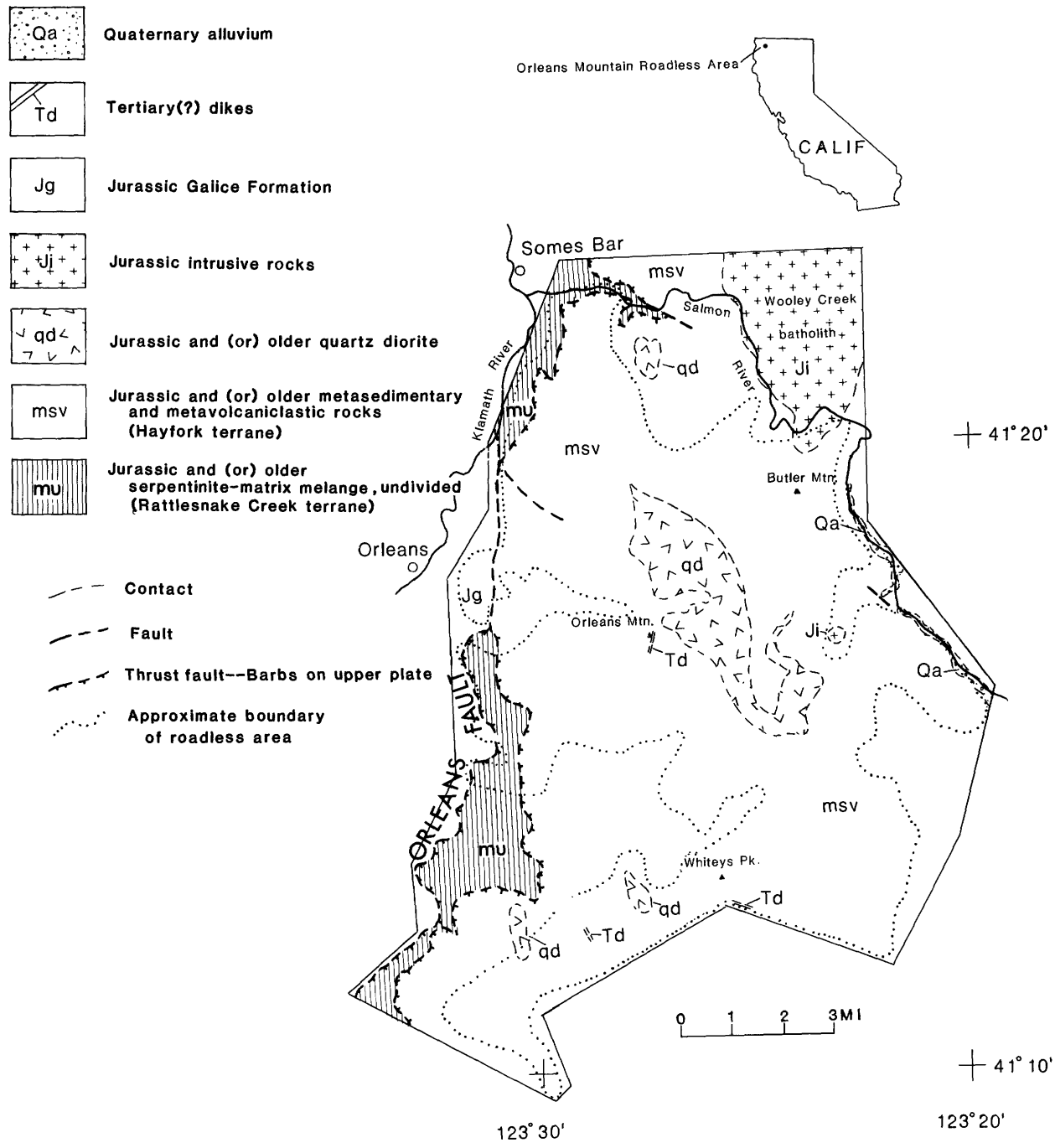

Figure 2.—Generalized geologic map of the Orleans Mountain Roadless Area and vicinity (after Donato and others, (1983).

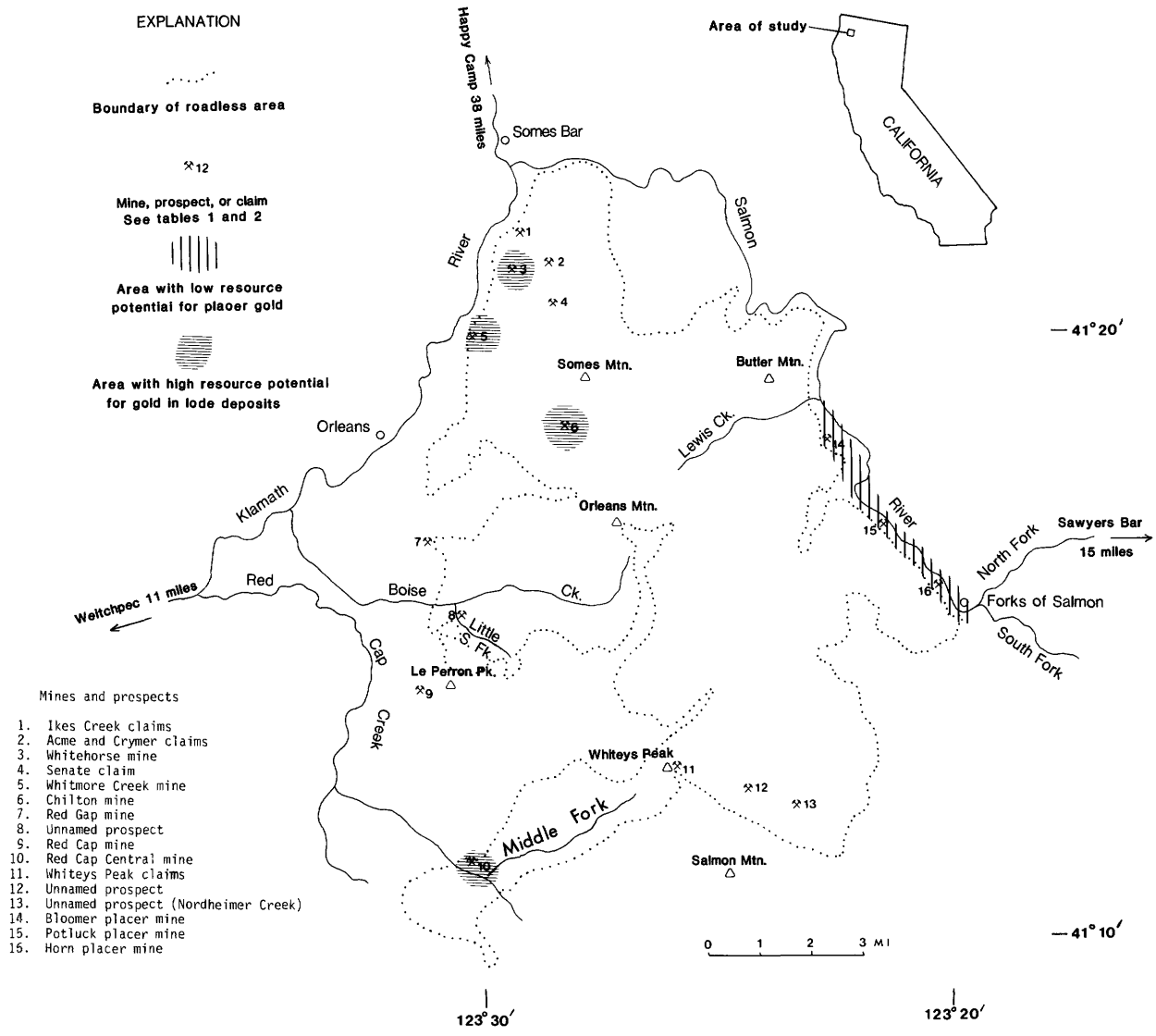

Figure 3.—Mineral resource potential and mines and prospects of the Orleans Mountain Roadless Area and vicinity.