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MINERAL RESOURCE POTENTIAL OF THE TUOLUMNE RIVER ROADLESS AREA TUOLUMNE COUNTY, CALIFORNIA

SUMMARY REPORT

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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 public and be submitted to the President and the Congress. This report discusses the results of a mineral survey of the Tuolumne River Roadless Area (5258), Stanislaus National Forest, Tuolumne County, California. The Tuolumne River 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

Geological and geophysical studies conducted by the U.S. Geological Survey (USGS) and mine and prospect examinations and a geochemical study performed by the U.S. Bureau of Mines (USBM) indicate that a high resource potential exists for gold in the Tuolumne River Roadless Area. Four lode and three placer properties in and adjacent to the roadless area have identified subeconomic resources for gold. One marble prospect adjacent to the roadless area has marginal reserves. Twelve lode properties in and adjacent to the roadless area have occurrences of gold-rich zones with low to moderate resource potential. Seven lode and nine placer properties in and adjacent to the roadless area have low to high potential for gold resources, based on production records and assay values.

Areas of the roadless area designated as having mineral resource potential were determined on the basis of gathered information on the geology and mineral occurrences. The results of the geochemical and geophysical studies were not conclusive for areas of specific mineral resource potential in this study.

INTRODUCTION

The Tuolumne River Roadless Area is located in the western Sierra Nevada, southern Tuolumne County, California. The roadless area is approximately 13 mi long, 5 mi wide, and encompasses 28.4 mi^2 in Stanislaus National Forest. It lies along the Tuolumne River downstream from Hetch Hetchy Reservoir, between Corral Creek and the North Fork of the Tuolumne River. The nearest town is Groveland, 3 mi to the south, and Yosemite National Park is about 10 mi to the west (fig. 1). Two roads provide access into the Tuolumne River canyon, both from California State Highway 120. An unpaved U.S. Forest Service road to Lumsden Bridge Campground follows the roadless area boundary to Lumsden Bridge, crosses the Tuolumne River and provides access to points above the river on the north side of the roadless area to as far west as Paper Cabin Ridge. The paved road to Wards Ferry crosses the Tuolumne River 3 mi downstream from the western edge of the roadless area. Two other unimproved roads enter the roadless area: Ponderosa Way Road leads to mines near the North Fork of the Tuolumne River, and a road out of Corcoran Flat leads to the mouth of Indian Creek near a former water power site. The Tuolumne River is also navigable through the roadless area by raft and kayak.

Elevation ranges from 800 to 3,890 ft above sea level. The Clavey River is the largest tributary, and flows into the Tuolumne River from the north. The geography of the area includes steep river canyons as deep as 2,000 ft, and gently rolling uplands. Vegetation is composed of evergreens, deciduous oaks, manzanita, and grasses at lower elevations, with digger pine and other conifers above 2,000 ft.

The city of San Francisco and two irrigation districts in the San Joaquin Valley are presently exploring the feasibility of building three dams, two power houses, and a tunnel on a 25-mi stretch of the Tuolumne River that includes the roadless area. The stretch of the Tuolumne River under consideration has been a popular recreation area for trout fishermen, deer hunters, and white-water rafters, and contains Indian petroglyphs and other archeological sites along the river and canyon rim.

From 1980 to 1982 the USGS and the USBM conducted field investigations to evaluate the mineral resource potential of the Tuolumne River Roadless Area. Field studies by the USGS included geologic mapping, field checking previous work, and geophysical surveys. The USBM conducted a survey of mines, prospects and mineralized zones. Previous studies, including a geochemical survey, were done by the USBM in a 1975 mineral resource appraisal for the Wild and Scenic Rivers Act (unpublished).

GEOLOGY

The geology of the Tuolumne River Roadless Area and vicinity was first mapped between 1885 and 1890 by Turner and Ransome (Turner, 1893a, 1893b, 1896; Turner and

Ransome, 1897), and subsequently by Clark (1954), and Eric and others (1955). Other reports include cross sections and geologic traverses along the Tuolumne River by Clark (1964), a study of the Calaveras Complex by Schweickert and others (1977), and other studies of the Calaveras and Shoo Fly Complexes and the Calaveras-Shoo Fly thrust by Schweickert (1981), Merguerian (1982), and Schweickert and Bogen (1983).

The Tuolumne River Roadless Area is in the metamorphic belt that flanks the west side of the Sierra Nevada batholith. The roadless area is crossed by the East belt, a mineralized zone that parallels the famed Mother Lode belt about 10 mi to the west. The East belt lode system, in Tuolumne County, extends from the Stanislaus River southeastward across the Tuolumne River valley to approximately the southern boundary of the roadless area. The system continues northwestward into Calaveras County and southeastward into Mariposa County. Two other subparallel vein systems trend east-west in the roadless area.

Rocks of the roadless area include Paleozoic metasedimentary rocks of the Calaveras Complex of Schweickert and others (1977), Mesozoic diorite and other granitic intrusive rocks, numerous dikes and veins of probable Mesozoic age, and Tertiary volcanic rocks.

Many previous workers have used the name Calaveras Formation to include all Paleozoic metamorphic rocks in the western Sierra Nevada. The name Calaveras Complex was introduced by Schweickert and others (1977) and restricted to the northwest-trending belt of metamorphic rocks bounded by latitudes 36°N and 38°45'N on the north and south, by the Melones fault zone and the Kings-Kaweah suture on the west, and by the Sierra Nevada batholith on the east.

The Calaveras Complex is a northwest-trending, northeast-dipping assemblage of upper Paleozoic (Carboniferous and Permian) marine metasedimentary and metavolcanic rocks (Schweickert and Bogen, 1983). The Calaveras has been divided by Schweickert and others (1977) into four lithostratigraphic units, a basal metavolcanic rocks unit with associated argillite and slate, an argillite, a chert, and a quartzite. Each of the units had probable original thickness on the order of several thousands of feet (Schweickert, 1981). The argillite, chert, and quartzite units occur in the roadless area and the metavolcanic rocks unit crops out about 20 miles northwest of the roadless area.

The argillite unit is the most extensive of the units in the Calaveras Complex. In the roadless area it is composed predominantly of argillaceous schist and phyllite, with interbedded chert, siltstone, clay, and local shallow-water limestone beds. The limestone occurs in fingers and detached masses in the roadless area, and is an extension of elongate bodies that lie to the west, where they are as large as 2,000 ft wide and more than 2 mi long (Hart, 1959). The limestone crops out in distinct beds that are up to 150 ft thick in the roadless area. In the area of Paper Cabin Ridge (fig. 1), the limestone is interbedded with metavolcanic rocks that include metamorphosed pillow basalt exposed along the north side of the Tuolumne River. A chaotic brecciated section of the limestone, presumably the tectonic breccia unit of Hart (1959), occurs along the Tuolumne River near Big Creek. A limestone bed within the argillite unit near the confluence of the Clavey and the Tuolumne River yielded horn corals, tentatively identified as Caninia sp., that indicate a Carboniferous and Permian age for the limestone (Schweickert and others, 1977).

The chert unit is approximately three miles thick in the roadless area, and thins slightly to the north. The contact between the argillite and the chert units interfingers and is highly irregular. The chert unit is composed predominantly of bedded chert with lesser amounts of argillite and micaceous quartzite. The metamorphic grade in the chert appears to increase towards the north (Clark, 1964).

The quartzite unit is the highest unit stratigraphically within the Calaveras Complex. In and adjacent to the roadless area it is composed predominantly of quartzite, quartz sandstone, shale, and lesser amounts of mica-quartz schist, chert in elongate bands, and phyllite. Local grading in the quartzite consistently shows that the tops of the beds face eastward (Schweickert and others, 1977). Mylonitic rocks occur in the quartzite unit and in the chert unit just north of the roadless area boundary along and near the Clavey River. The contact between the chert and quarztite units was placed where the chert beds significantly decrease and the mylonite appears in rocks that are more predominantly quartzitic. The mylonitic rocks are not continuous, but are contained within sheared quartzite and interspersed with a spotty-weathered granodiorite. They have ptygmatic folds, swirled and planar foliations, and are more massive in places with large felsic zones and small biotite-rich patches.

Subsequent work by Schweickert (1981), Merguerian (1982), Sharp and others (1982), and Schweickert and Bogen (1983) has indicated through structural analysis, correlation, and age dating of orthogneisses in the quartzite unit itself that the quartzite unit may be early Paleozoic in age. This suggests that the quartzite unit may actually be the lowest unit of the Shoo Fly Complex, separated from the Calaveras Complex by the Calaveras-Shoo Fly thrust. Merguerian (1982) mapped the Calaveras-Shoo Fly thrust through the roadless area, describing it as an east-dipping mylonitic thrust zone that extends for almost 110 mi in the western Sierra Nevada foothills. Geologic mapping by the USGS in the vicinity of the roadless area for this report did not reveal sufficient information for dating the quartzite unit or for including the Calaveras-Shoo Fly thrust on the geologic map.

Plutonic rocks (granodiorite) of the Standard pluton, occur 2.5 mi northwest of the roadless area. These rocks were emplaced during the Inyo Mountains intrusive epoch, Early and Middle Jurassic in age, one of the five major intrusions of granitic magma that occurred from the Middle Triassic to the Late Cretaceous, and created the Sierra Nevada batholith (Evernden and Kistler, 1970). The limestone in the argillite unit of the Calaveras Complex is folded around the southern side of the Standard pluton.

Plutonic rocks that range in composition from diorite to granodiorite occur in the eastern end of the roadless area. The plutonic rocks are Late Jurassic in age and were emplaced during the Yosemite intrusive epoch (Evernden and Kistler, 1970). The Inyo and Yosemite intrusions created superimposed metamorphism on the Calaveras and Shoo Fly Complexes. The rocks are fine to medium grained, equigranular, and foliated near the contacts with the metamorphic rocks. A zone of mixed rocks occurs near the contacts where diorite encloses quartzite blocks. In the roadless area the plutonic rocks, where observed, are predominantly diorite. However, geophysical data indicate an anomalous absence of magnetite in the plutonic rocks, suggesting that there is more granodiorite than diorite.

Dikes and veins of pegmatite, aplite, quartz, and basalt occur throughout the roadless area. The dikes represent several ages of emplacement and exhibit complex cross-cutting relationships. Some dikes were apparently metamorphosed with the sedimentary rocks; some are tightly folded and foliated. The different types of deformation of the dikes are indications of more than one deformational pulse acted on the Calaveras Complex.

The volcanic rocks in the roadless area are the remnants of Tertiary eruptive flows that once covered much of the area near the present Tuolumne River. The flows commonly cap gold-bearing Tertiary stream gravel deposits. Tertiary volcanic rocks occur outside the roadless area in the area of Corcoran Flat and Jawbone Lava Flat (fig. 1).

GEOCHEMISTRY

Geochemical sampling of part of what is now the Tuolumne River Roadless Area was conducted in 1975 by the U.S. Bureau of Mines during their mineral appraisal for the Wild and Scenic Rivers Act (A. M. Leszcykowski and E. L. McHugh, unpublished administrative report to U.S. Forest Service). The results supplement data collected by the Bureau of Mines in their present study of the roadless area (Hyndman and others, 1983).

Sediments were sampled in each of the significant tributaries of the Tuolumne River. Intermittent dry streams were not sampled in most cases. Sediment samples were taken from the Tuolumne River, at intervals of generally less than 1 mi, in order to determine background elemental concentrations and to discern anomalous values of elements.

The results of the geochemical study show small amounts of gold and silver in all samples. One sample location contained anomalous concentrations of gold, and four sample locations contained anomalous concentrations of silver. Lead was anomalous in one sample, and zinc was anomalous in another. Anomalous values of chromium and titanium were detected in four samples; zirconium was anomalous in two samples.

GEOPHYSICS

Maps compiled from gravity and aeromagnetic surveys were used to aid geologic mapping and mineral resource appraisal. Plouff (1982) established 18 gravity stations to supplement previous gravity observations in the area by Robbins and others (1974). An unpublished Bouguer gravity anomaly map that was prepared from a compilation of these data is dominated by closely spaced, north-northwest-trending contours. The prominent gravity gradient, averaging 3.8 mgal/mi with smaller values to the east, reflects major crustal changes associated with the Sierra Nevada batholith.

An unpublished isostatic residual gravity map prepared from the same data has one fairly well defined anomaly on an otherwise featureless map. The anomaly is a gravity low of low amplitude with an axis that extends eastward from Grapevine Point to Drew Meadow near the east edge of the map (fig.2). The anomaly may possibly indicate a northwestward subsurface extension of the diorite pluton exposed near Lumsden Bridge. The underlying plutonic rocks presumably would be reflected as a gravity low, because the plutonic rocks are less dense than the surrounding metamorphic rocks.

The magnetic relief shown on an unpublished aeromagnetic map of the region is smaller than in most of the surrounding area. Few local anomalies exceed 40 nanoteslas in amplitude. Although the topographic relief in the Tuolumne River canyon exceeds 2,500 ft, no distinct magnetic low follows the course of the river, indicating that the rocks in the canyon walls are essentially nonmagnetic. The overall low relief of the aeromagnetic map in this area indicates that rocks of low magnetization in the Calaveras Complex extend to depths that probably exceed 1 mi beneath the surface.

A few small highs on the magnetic map reflect underlying small bodies with low to moderate magnetization. Narrow magnetic highs extending nearly 2 mi southeast from the Kanaka mine (No. 48, fig. 2 and table 1) may reflect magnetite-bearing veins or dikes that follow a regional geologic trend parallel to the strike of the Sierra Nevada. A narrow magnetic high extends nearly 5 mi southeast from Grapevine Point.

MINES AND MINERALIZATION

Gold in the Tuolumne River Roadless Area occurs in both lode and placer deposits. The lode deposits have gold as discrete particles (free milling) and as auriferous pyrite in quartz veins and silicified parts of shear zones in the Calaveras Complex and in plutonic rocks. Lead, silver, copper, and zinc minerals are occasionally associated with the higher concentrations of gold. The deposits are characterized by thin quartz veins, often with ribbon structure, containing small, high grade shoots. Highest concentrations of gold occur where the quartz veins abruptly deviate in strike, or where vein thickness increases. Gold-bearing shoots range in length from 10 to 60 ft along strike and to several hundred ft down-dip; shoots at the Buchanan mine (No. 34, fig. 2 and table 1) are reported to be up to 200 ft in length along strike (Preston, 1892).

Most of the lode gold deposits occur in the northwest-trending East belt. The properties on the East belt in the roadless area include the Garner mine (43), part of the Chaparral mine (36), and the Garfield-Virginia (37), O.K. (39), and Duplex (50) prospects. Between the roadless area and the town of Tuolumne are 17 mines and 4 prospects that are also on the East belt. In addition, west of the East belt, two east-trending vein systems with subsidiary fissure zones, the Mary Ellen and Florida vein systems, are suggested by the distribution of the lode deposits and orientations of individual veins. The Mary Ellen system includes the San Francisco (18), Mary Ellen (21), Alpine (24), La Preciosa (27), Eagle Bluff (28), Winslow (31), Ellen Winton (32) and River Bend (33) mines, and the Mascot (22), Manel (26), and Old 49er (25) prospects in the roadless area, and the Freelance (O) Telegraph (16), and Rotten Rail (13) mines outside the roadless area. This zone may continue eastward from the River Bend mine through the Chaparral (36), Buchanan (34), and Modoc (38) mines. The Florida system includes the Ultima Chansa (9) mine and the Florida (10), Rough and Ready (7), and Josiah (11) prospects in the roadless area, and the Sunnyside (5) and Pine Nut (3) mines, and Balmoral (6) prospect outside the roadless area. A subsidiary linear zone, the Mohican cross-vein system, that intersects the two east-trending vein systems, is also suggested in the vicinity of the Mohican (19) mine and the Golden Slipper (20) prospect (See table 1 and fig. 2 for mine and prospect data and locations).

Mineralization in the roadless area may be related to the intrusion of the plutonic rocks. This relationship is suggested elsewhere in the East belt where mineralization is most intense in the Calaveras Complex near the contact with an igneous body. The mineralized quartz veins are more extensive in the Calaveras Complex than in the plutonic rocks, where fractures and shear zones in the metasedimentary rocks provided ready channels for the mineral-bearing solutions. Many of the mines and prospects in the western part of the roadless area are associated with limestone bodies.

Placer deposits occur in Holocene gravel deposits in the Tuolumne River channel and associated gravel bars, and in Tertiary gravel deposits on the canyon slopes and canyon rim adjacent to the south boundary of the roadless area, where they are partly covered by lava flows. The placer gold is derived in part from gold-bearing veins of the East belt, and is in part reworked from erosion of older placer deposits. The gold concentrations are generally low in the Holocene gravel bar deposits within the roadless area, but are substantially higher in gravel deposits adjacent to the bedrock and in the active Tuolumne River channel in the western part of the roadless area. Gold particle size is generally fine (minus 20-mesh) in both the Tertiary and Holocene gravel deposits, although nuggets have been recovered occasionally along the Tuolumne River in the western part of the roadless area.

The East belt mining districts that are partly in the Tuolumne River Roadless Area are the Tuolumne (Carters, Summerville), Buchanan, and Groveland. More than 1,500 lode and 300 placer claims have been recorded in the vicinity of the roadless area since the 1870's. Considerable mining and claim locating also occurred between 1850 and 1870, although there are no accurate records of this activity. Patented mining properties within the roadless area total 391 acres, and include one placer and six lode properties There are also one placer and six lode patented properties that are adjacent to the roadless area. The unpatented Kanaka mine (no. 48, fig. 2 and table 1), adjacent to the roadless area boundary, is currently producing gold on a small scale.

Total production from lode mines in the East belt has amounted to over one million oz of gold (Julihn and Horton, 1940). Approximately 60,530 oz of gold has been produced from lode mines within and adjacent to the roadless area. Recorded lode production from six mines in the roadless area, the Mohican (19), Mary Ellen (21), La Preciosa (27), Del Monte (30), Ellen Winton (32), and Chaparral (36), has been 11,930 oz gold, most of which came from the Mohican mine. There is unreported production indicated by stopes at five properties within the roadless area, at the Ultima Chansa (9), Florida (10), San Francisco (18), Alpine (24), and Winslow (31). Recorded lode production from eight mines adjacent to the roadless area, the Buchanan (34), Sunnyside (5), Telegraph (16), Duleek (40), Hull (44), Kanaka (48), and the Hard Tack, and Hunter (north of the roadless area), has been 48,600 oz of gold, most of which came from the Buchanan mine. Placer production from Holocene gravel deposits within the roadless area has been 1,700 oz gold. Tertiary placer deposits yielded 51,300 oz gold from four placer mines adjacent to the roadless area, the Marlow (2), Goldship-Mayflower (41),

Bonanza (54), and Little Gap (57), a fair amount of which came from the Marlow placer mine (See table 1 and fig. 2 for mine and prospect data and locations). Total placer production from Holocene gravel deposits in the Groveland-Big Oak Flat area a few miles south of the roadless area has been 1.2 million oz of gold.

ASSESSMENT OF MINERAL RESOURCE POTENTIAL

The geological and mineral surveys indicate that identified resources and high potential for additional resources exist for gold in the Tuolumne River Roadless Area. To be classified as a resource by the USBM, the value of a deposit must be equal to or greater than 20 percent of the anticipated production cost. The locations of the anomalous geochemical samples do not coincide with areas of the mineral resource potential indicated by the geology and mineral ocurrences; they are probably due to erosion of Tertiary auriferous gravel deposits on the canyon rim.

Two placer prospects in Holocene gravels, the Indian Creek (42) and the Bossy Bar (55), and one lode mine, the Eagle Bluff (28), inside the roadless area have identified subeconomic resources for gold. Eight lode mines, the Ultima Chansa (9), San Francisco (18), Mohican (19), Mary Ellen (21), Winslow (31), Ellen Winton (32), River Bend (33), and Chapparal (36), and one lode prospect, the Rough and Ready, inside the roadless area have low to moderate potential for gold, based on the occurrences of gold-rich zones or shoots. These nine properties have 18- to 2,200-tons of ore with average grades of 0.09 to 0.97 oz gold per ton. Most of these deposits are of low tonnage, but if some of them are considered together as a unit, they become an identified resource. One placer prospect, the Clavey Falls (51), and one placer mine, the Big Creek (29), inside the roadless area have high resource potential for gold. One placer mine, the Mary Ellen (21), and one lode mine, the Buchanan (34), inside the roadless area have moderate resource potential for gold. Two lode mines, Alpine (24) and Garner (43), and four lode prospects, the Mascot (22), Garfield-Virginia (37), O.K. (39), and Grapevine (46), inside the roadless area have low resource potential for gold. The resource potential of the latter ten properties is based on production records and assay values; the deposits have grades of 0.001 to 1.072 oz gold per ton.

Adjacent to the roadless area there are three lode mines, the Sunnyside (5), Hull (44), and Kanaka (48), and one placer mine in Tertiary gravels, the Kings Road (52), with identified subeconomic resources for gold. Two lode mines, the Modoc (38) and Duleek (40), and one lode prospect, Balmoral (6), adjacent to the roadless area have low to moderate potential for gold, based on the occurrences of gold-rich zones or shoots. These three properties have 150- to 660-tons of ore with average grades of 0.10 to 0.97 oz gold per ton. One placer mine, the Little Gap (57), adjacent to the roadless area has high resource potential for gold. Two placer mines, the Marlow (2) and Golden Grain (47), adjacent to the roadless area have moderate resource potential for gold. Three placer mines, the Goldship-Mayflower (41), Bonanza (54), and Cave Diggins (8), adjacent to the roadless area have low resource potential for gold. The resource potential of the latter six properties is based on production records and assay values.

In the roadless area there is an estimated 770,000 yd^3 of Holocene auriferous gravel in the Tuolumne River channel and associated bars, primarily the South Fork bar, plus a small amount of Tertiary auriferous gravel on the canyon slopes. Because of the steep gradient and narrow width of the canyon, accumulation of large deposits of gravel has been prevented and mining of the Holocene gravel deposits would be limited to small-scale mining operations. Small-scale suction dredging and recreational panning, however, could be expected to occur on a regular basis. There is an estimated 40 million yd^3 of Tertiary gravel deposits on the canyon rim adjacent to the south boundary of the roadless area, some of which is covered by lava flows. These gravels could potentially be considered a substantial resource, but one that is unlikely to be mined because of the restrictions on hydraulic mining.

The marble, limestone, and dolomite deposits adjacent to the roadless area at the Jacobsen (Sudall) Ranch (4) and Marlow (1) prospects could be used for Portland cement, chemical uses, or for lime in gold milling operations. The Jacobsen (Sudall) Ranch prospect contains about 11 million tons of marginal reserves of marble; samples averaged 97 percent calcium carbonate. The marble unit containing the resource extends into the roadless area for about 3 mi (See table 1 and fig. 2 for mine and prospect data and locations).

There are no indications for the existence of coal, oil and gas, or geothermal resources in the roadless area.

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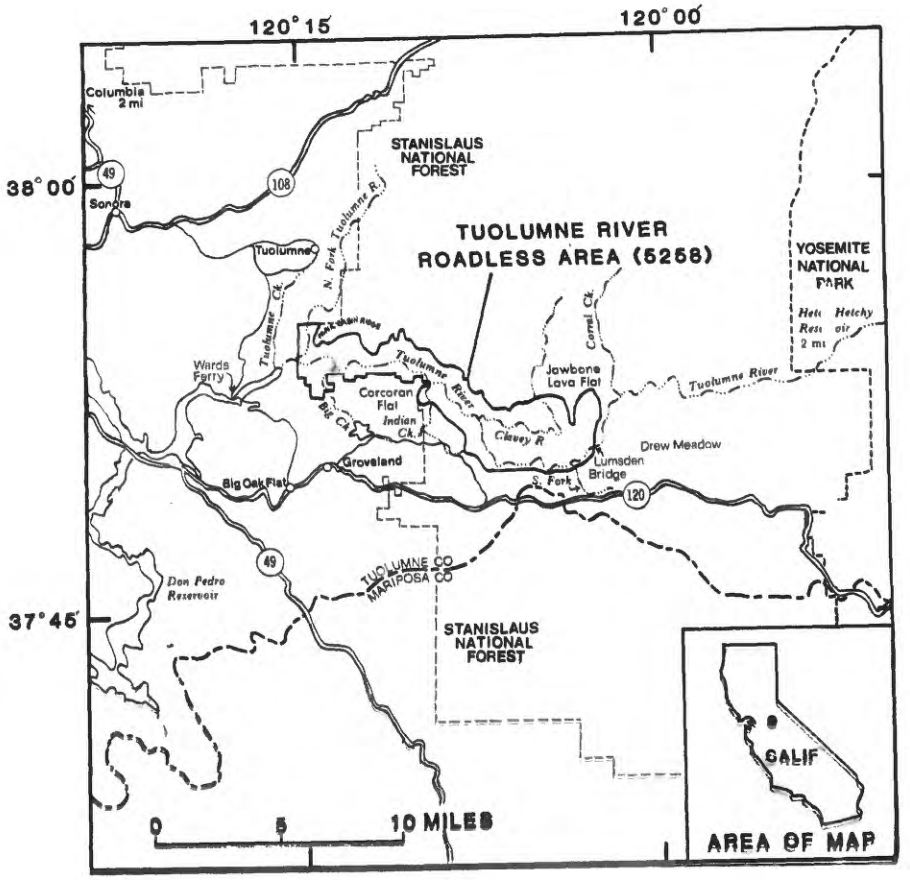
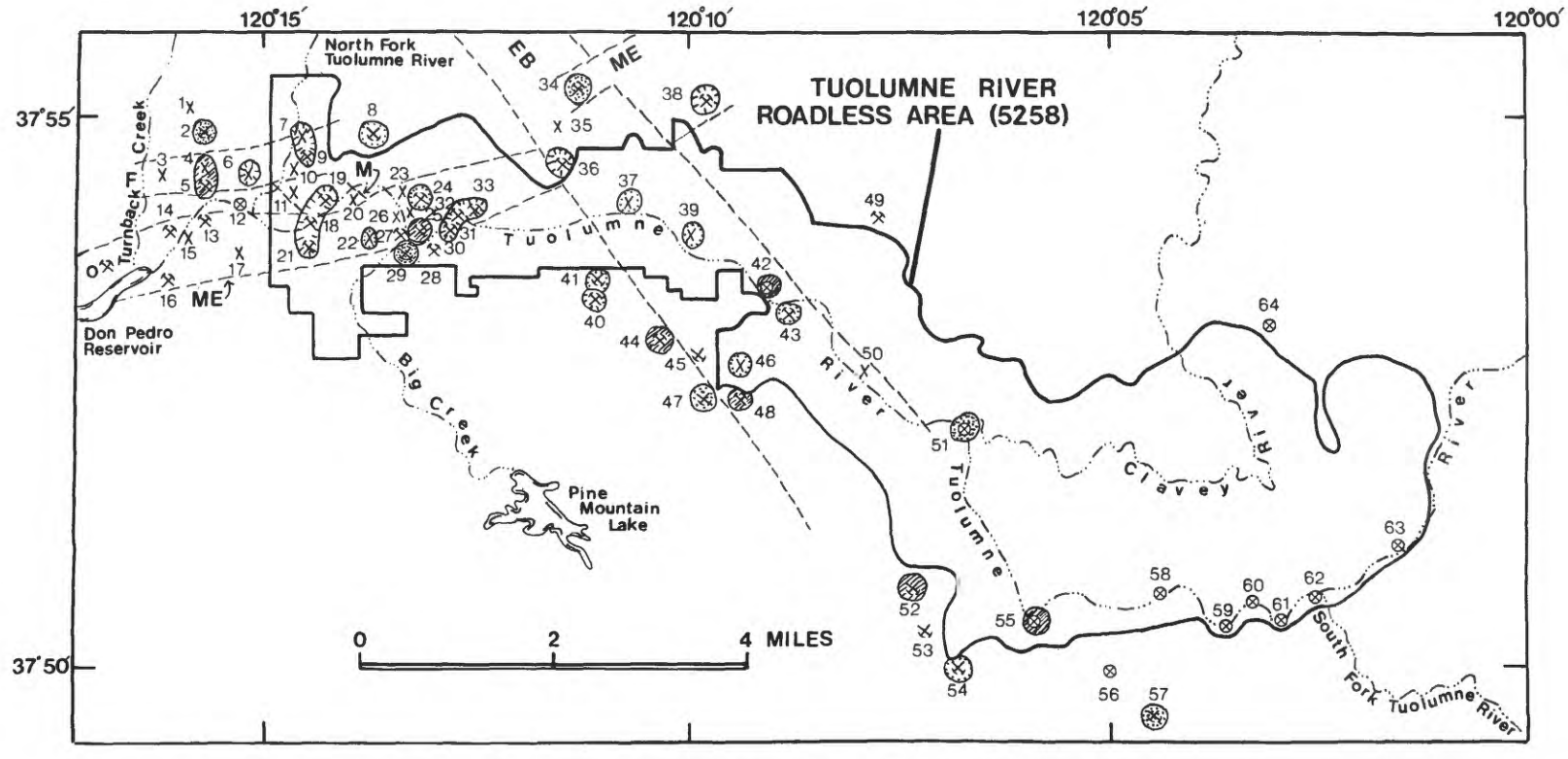


Figure 1.-- Index map showing location of the Tuolumne River Roadless Area, western Sierra Nevada, California



EXPLANATION

- IDENTIFIED LOW POTENTIAL FOR GOLD RESOURCES
- LOW TO MODERATE POTENTIAL FOR GOLD RESOURCES-- Based on occurrences of gold-bearing shoots
- MODERATE TO HIGH POTENTIAL FOR GOLD RESOURCES*
- LOW POTENTIAL FOR GOLD RESOURCES*
- *Based on production records and assay values
- APPROXIMATE ROADLESS AREA BOUNDARY

- LODE MINE
- PLACER MINE
- LODE PROSPECT
- PLACER PROSPECT
- VEIN SYSTEMS
- EB East belt
- ME Mary Ellen
- F Florida
- M Mohican

Figure 2.--Map showing areas of mineral resources and resource potential, Tuolumne River Roadless Area, California (Numbers correspond to property names in Table 1 and text)

Table 1.--Mines and prospects in the Tuolumne River Roadless Area and vicinity
[Underlined properties have identified mineral resources or potential, or gold bearing shoots]

Map no. (fig. 2)	Name (commodity)	Summary	Workings and production	Sample and resource data
1	Marlow prospect (marble)	High quality dolomitic marble exposure up to 250 ft wide, length unknown.	No workings or production.	Two samples averaged 57 percent $CaCO_3$, 44 percent $MgCO_3$, 1 percent SiO_2 (Hart, 1959). Low potential for dolomitic marble resources.
2	Marlow mine (placer gold)	Tertiary age Tuolumne River channel gravels.	Pit, approximately 50 to 75 ft deep, 200 ft wide (Hart, 1959), and 500-ft long. Production reported to be about 48,000 oz of gold prior to 1901 (Progressive Assn., 1901).	Presently being explored (1982). Moderate potential for placer gold resources based on production records.
3	Pine Nut prospect (patented) (gold)	Vein strikes N. 75° W., dip vertical, in phyllite, as indicated by patent plat and field notes. Free gold and large masses of sulfide minerals occur in the quartz. Vein up to 8 ft thick and traceable for 460 ft.	35-ft adit and 15- and 35-ft-long cuts.	No data. Location important in delineating the Florida vein system.
4	Jacobsen (Sudall) Ranch prospect (marble)	Marble deposit is 300 ft wide, at least 1,000 ft long, and at least 500 ft thick.	No workings or production.	Eight samples suggest a deposit containing an estimated 11 million tons of high-calcium marble, marginal reserves (Hart, 1959). Samples from the northern half of the deposit averaged 97 percent $CaCO_3$; deposit as a whole averaged 95 percent.
5	Sunnyside mine (gold)	Quartz vein, generally strikes N. 80° E., dips 75-88° SE., averages 4 ft thick, vertical extent of at least 300 ft. Vein in phyllite, marble often forms the footwall.	Three crosscut adits 100, 170, and 460 ft long have over 670 ft of drifts. 500 tons of ore produced in 1930 yielded about 620 oz of gold (ref?).	Total of 3,700 tons of subeconomic resources averaging 0.50 oz gold per ton. About 2,100 tons in one shoot averages 0.79 oz gold per ton; 1,600 tons in another averages 0.13 oz gold per ton. Of 16 samples, 12 had 0.006 to 1.148 oz gold per ton.
6	Balmoral prospect (gold)	Quartz vein strikes N. 62-72° E., dips 77° SE., averages 0.5 ft thick; cuts through phyllite.	Two adits, 51 and 142 ft long are connected by a 50 ft raise; three pits.	One shoot has about 150 tons of quartz averaging 0.10 oz gold per ton. Seven of 12 samples assayed 0.014 to 0.132 oz gold per ton. Low potential in gold-bearing shoot for gold resources.
7	Rough and Ready prospect (gold)	Two parallel quartz veins about 250 ft apart strike N. 72° E., dip 61-74° SE.; in pyritic marble.	Two adits, 124 and 15 ft long.	One shoot with 120 tons of quartz averages 0.09 oz gold per ton. Of 12 samples, five assayed from 0.006 to 0.174 oz gold per ton. Low potential for gold resources.
8	Cave Diggins mine (patented) (placer gold)	Tertiary gravel deposits overlying marble. About one half of the patented area lies in the roadless area. Lack of water prevents adequate exploration.	Two areas of worked gravel. No production recorded. Nuggets to 1.5 oz reported (Progressive Association, 1901)	Two pan samples of stream sand contained no gold. Low potential for gold resources based on size of reported nuggets.
9	Ultima Chansa mine (gold)	Quartz vein, strikes N. 55° E., dips 80° SE. to vertical, in marble. Vein averages 1.4 ft thick in main workings, locally swells to 3.5 ft.	150-ft crosscut adit with a 225-ft drift and 20-ft-deep underhand stope; two inclined shafts (one rock filled); a 40-ft-long trench; an ore bin. Production of about 30 tons or ore probably assaying 0.50 oz gold per ton.	One shoot with 390 tons of quartz averages 0.26 oz gold per ton. Eight of 16 samples assayed from 0.012 to 0.51 oz gold per ton. Low potential for resources.
10	Florida prospect (gold)	Two quartz veins trend N. 70-85° E., dip 55° NW. to 75° SE.; part of the Florida vein system. Northern vein is up to 6 ft thick in pyritic phyllite.	Five adits range from 14 to 142 ft long, with a 6-ft-deep underhand stope in one.	Each adit has about 30 tons of quartz assaying a few hundredths oz gold per ton.
11	Josiah prospect (patented) (gold)	Quartz vein trends N. 80° E., dips 65-84° SE.; averages 2.5 ft thick, is up to 5 ft thick; in pyritic phyllite.	Two adits, 180 ft and 35 ft long, and small cut	A shoot 20 ft wide may occur near the portal. One of 12 samples assayed 0.116 oz gold per ton. Seven other samples assayed from 0.006 to 0.020 oz gold per ton.
12	Aqua Regia prospect (placer gold)	Recent gravel deposit at the confluence of the Tuolumne and North Fork of the Tuolumne Rivers.	No workings seen although suction dredges had been in the river a few years ago. No recorded production.	One pan sample in 1975 yielded 0.00066 oz gold per yd^3
13	Rotten Rail mine (gold)	A quartz vein strikes from east to N. 84° E., dips 45-63° NW., averages 3.7 ft thick in pyritic phyllite.	Four adits, one 118 ft long, others are caved, stamp mill ruins and cabin remain	Two samples of mill concentrates assayed 0.090 and 1.86 oz gold per ton; one assayed 7.9 oz silver per ton. Four of five samples from the open adit assayed from 0.012 to 0.032 oz gold per ton.

Table 1.—Mines and prospects in the Tuolumne River Roadless Area and vicinity--continued

Map no. (fig. 2)	Name (commodity)	Summary	Workings and production	Sample and resource data
14	Boston mine (formerly patented) (gold)	Vein trends N. 80° E., dips vertical.	Three adits, 110, 270, and 382 ft long.	No sample data, mine not examined.
15	Bailey prospect (gold)	Prospect is just above high-water level of the Tuolumne River. Quartz vein 0.3 ft thick trends N. 85° W., dips 63° NE., in pyritic phyllite.	One 158 ft adit and a flooded winze explore the vein.	Nine samples, six assayed from 0.025 to 0.072 oz gold per ton.
16	Telegraph mine (gold)	Shear zone, 0.5 to 6.5 ft thick, contains a quartz vein that strikes N. 40° E., dips about 30° SE., in phyllite.	One 440-ft adit, an inclined shaft, 10 caved crosscut adits, three caved shafts or stopes, and an almost complete 5-stamp mill. Recorded production: 909 tons of ore yielded 223 oz gold and 106 oz silver in 1928-1942.	Four samples taken by USBM personnel in 1975 assayed several hundredths oz gold per ton.
17	Apperson prospect (gold)	Prospect is 0.25 mi west of the roadless area. Vein in phyllite(?).	30 ft shaft with drifts.	One select sample of vein quartz from the shaft collar assayed 2.948 oz gold and 0.5 oz silver per ton.
18	San Francisco mine (gold)	One quartz vein 1.3 ft thick strikes N. 75° E., dips 66° SE.; a vein below is 3.7 ft thick, strikes N. 64° W., dips 82° SW.; both in pyritic phyllite.	Three adits, one caved, others 25 and 38 ft long; 25 ft adit has a rock-filled winze	Four samples from the lower adit contained no gold. Four of the six samples from the upper workings assayed from 0.010 to 0.594 oz gold per ton. About 18 tons in a shoot averaging 0.39 oz gold per ton occurs near the winze. Moderate potential for gold resources based on occurrence of gold-bearing shoot.
19	Mohican mine (patented) (gold)	Subparallel quartz veins cross the Tuolumne River canyon, strike northwest, dip 20-50° NE., in phyllite. Two veins average 1 and 2 ft thick, strike about N. 30° E, dip 30-48° SE. One vein appears to have a dip length of 1,100 ft and a strike length of at least 400 ft on the south side of the river. This system may be the Mohican cross-vein system.	23 adits, some with stopes, raises, and winzes. Adits ranged from 10 to 500 ft long. Longer adits caved. Production: about 11,000 oz gold, 800 oz silver from 25,000 tons of ore, with average mill recovered grade of 0.44 oz gold and 0.03 oz silver per ton, 1901-1915. Mining operations ceased in 1915 due to fire.	Of 75 samples, 41 assayed from 0.010 to 0.606 oz gold per tone, with eight samples containing more than 0.10 oz gold per ton. About 770 tons of vein quartz are in four shoots from 20- to 60-ft wide. Grades range from 0.15 to 0.40 oz gold per ton. About 30 tons of the largest shoot may average 0.61 oz gold per ton. Moderate potential for gold resources based on assays, gold distribution, and geologic structure.
20	Golden Slipper prospect	Formerly the Dawson City claim. Two quartz veins up to 0.6 ft thick strike N. 80° W., dip 80° SW. and 53° NE., occur in shear zones cutting phyllite and limestone.	Two adits, 29 and 60 ft-long.	Eight samples yielded no gold.
21	Mary Ellen mine (placer gold)	River bed gravel and flood gravel deposits of the Tuolumne River next to the Mary Ellen lode mine and mill site.	Workings obliterated. Recorded production, 1889-1891, totalled 181 oz of gold and 30 oz of silver from an unknown volume of gravel. Production attributed to the Big Bend placer claim in 1963 near the Mary Ellen mine consists of 12 oz of gold and 2 oz of silver recovered from 500 yd^3 of gravel.	Periodic high water constantly reconcentrated gold in the bars and river bed; therefore, moderate potential exists for placer gold resources.
21	Mary Ellen mine (patented) (gold)	The Mary Ellen vein system, possibly 17,000 ft long, trends east, dips 72° N. to vertical, and is 164 ft thick in phyllite at this mine.	Four adits, one shaft, and stamp mill ruins are on the property; 96 tons of ore averaging 1.7 oz gold and 0.27 oz silver per ton was milled in 1889-1890 according to incomplete records.	A bulk sample of 1,100 lb reportedly assayed 6.2 oz gold and 3.8 oz silver per ton (J. M. Powers, 1890, unpublished report). Of 71 samples taken by the USBM, 27 assayed 1.04 and 3.06 oz gold per ton. Mine is reported to contain three east-plunging ore shoots, 13 to 50 ft across (J. M. Powers, 1890, unpublished report), but only two were verified. About 550 tons of vein quartz inferred in one shoot by sample results from information in an unpublished 1889 report by William Sharwood averages 0.97 oz gold per ton. Samples from a second shoot averated 0.09 oz gold per ton. Moderate potential for gold resources.
22	Mascot (Golden Annie) prospect (gold)	Two quartz veins, 1.5 and 0.1 to 3 ft thick, strike east and N. 72° W., dip vertical to 51° N. and 16° NE., in phyllite.	Three adits, 22, 54, and 78 ft long; a 60 ft shaft; and a 30-ft trench.	A 60-ft-long shoot cropped out at the surface (Preston, 1892). Of 11 samples taken, one select sample from the shaft collar, where the shoot was reported, assayed 1.072 oz gold per ton ahd three other samples assayed from 0.005 to 0.040 oz gold per ton. Low potential for gold resources.
23	Broken Pick prospect (gold)	Quartz vein, 1 ft thick, trends N. 80° E., dips 80° SE., in phyllite.	Two caved adits are possible 50 ft long.	One sample of the vein in the lower portal assayed 0.028 oz gold per ton. The upper portal sample was barren.

Table 1.--Mines and prospects in the Tuolumne River Roadless Area and vicinity--continued

Map no. (fig. 2)	Name (commodity)	Summary	Workings and production	Sample and resource data
24	Alpine mine (gold)	Quartz vein strikes N. 80° E., dips 55° SE. to vertical, in phyllite and marble. Vein is 3 ft thick in the underhand, partly water-filled stopes.	Three adits, 217, 53, and 10 ft long; three underhand stopes; one cut. Estimated production of over 300 tons based on stope dimensions.	Two samples from the brow of the stopes in the longest adit assayed 0.284 and 0.068 oz gold per ton; one select sample from the cut and one chip sample from the 53 ft adit asayed 0.10 oz gold per ton each. Low potential for gold resources.
25	Old 49er prospect (gold)	Quartz vein, 3 in. thick, strikes N. 86° E., dips 86° SE., in phyllite. Vein showed heavy iron-oxide stain and some oxidized pyrite.	One adit 21 ft long; camp ruins are about 150 ft down river from the adit.	Two samples from the adit yielded no gold.
26	Manel prospect (gold)	Quartz vein, up to 1.5 ft thick, in an adit, trends N. 80° W. to west, dips 85° SW. Vein in a pit above the adit strikes the same but dips 25° SW.	47-ft adit, two pits above the adit.	One sample from the lower pit assayed 0.142 oz gold per ton.
27	La Preciosa mine (patented) (gold)	Parallel veins strike N. 80° E., probably dip north, in pyritic phyllite. Dump rocks indicate the veins may be up to 2 ft thick.	According the the 1912 patent survey, there were five adits, 49 to 553 ft long and three cuts; only the 91 ft adit is open. Recorded production, 1932, is 50 tons of ore that yielded 6.49 oz of gold and 2.0 oz of silver.	Of 11 samples, four select dump samples contained measurable gold, from 0.02 to 0.19 oz per ton; five samples from the open adit contained no gold.
28	Eagle Bluff mine (gold)	Quartz vein, 2 to 4.5 ft-thick, trends east, dips 60° N. in pyritic phllite. Visible gold occurred in one trench on a parallel vein.	Pre-mining development work is nearly complete. Main workings include a 233-ft haulage adit connected to an ore chute; four inclined shafts, 75, 56, and two at least 30 ft deep; a 10-ft-long trench; and three small pits. Two of the shafts are connected by a drift level, and one of these is connected to the ore chute. The eastern workings include 30- and 231-ft adits and one caved, short adit. Anchoring bolts indicate a cableway crossed the Tuolumne River near these portals.	Two shoots totalling 2,500 tons of measured, subeconomic resources grading 0.47 oz gold per ton. Classification as an identified resource assumes the mine would be worked in conjunction with the Winslow and River Bend mines, or other deposits.
29	Big Creek mine (placer gold)	Gravel bar was partially worked in the middle 1900's by diverting part of the river over the gravel to expose the phyllite bedrock and wash the gravel. About 3,000 yd^2 of the bedrock remains covered with 4,000 yd^3 of gravel to a depth of 4 ft.	One channel sluiced to bedrock. Recorded production, 1935-1937, was 95 oz of gold from an estimated 20,000 yd^3; average recovery grade about 0.00475 oz per yd^3. In 1942, 200 yd^3 of gravel yielded 2 oz of gold.	One an sample taken in 1975 had a value of 0.0081 oz gold per yd^3. One bedrock sample in 1980, covering 1 yd^2, yielded 0.0012 oz of gold. Sampling with a suction dredge in 1981 in the Tuolumne River just below Big Creek recovered 0.071 oz gold per yd^3 in one sample. Based on past production, the 4,000 yd^3 of gravel may average 0.004 oz gold or more per yd^3. High potential for placer gold resources.
30	Del Monte mine (gold)	Two quartz veins, 1.3 to 1.5 ft thick, strike N. 75° W. and probably dip southwest, in pyritic phyllite.	Two adits, 4 and 15 ft long, and an arrastra. Production, 1905, of 50 tons ore yielding 24.18 oz gold, may actually have come from the Winslow workings.	Three samples from the adits contained no gold. Arrastra tailings assayed 0.22 oz gold and 0.3 oz silver per ton.
31	Winslow mine (gold)	Quartz vein, 0.5 to 1.5 ft thick, trends east, dips 70-80° S., in pyritic phyllite. Visible gold occurred at two sample sites.	Three adits, 50, 62, and 87 ft long; stopes extend to the surface in two adits; mill ruins were found. No production recorded, may have been worked in conjunction with the Ellen Winton and Del Monte mines.	About 300 tons of quartz in one shoot averages 0.50 oz gold per ton. Of nine samples, three assayed 4.130, 6.114, and 1.582 oz gold per ton and two had 6.4 and 2.8 oz silver per ton; five assayed from 0.032 to 0.850 oz gold per ton; one sample contained no gold. Within the shoot is a zone of about 8 tons of ore grading 4.1 oz gold per ton. Moderate potential for gold resources.
32	Ellen Winton mine (gold)	Vein, strikes N. 85° E., dips 81° SE. to 66° NW., up to 1.1 ft thick in pyritic phyllite.	Two open adits, 77 ft and 294 ft long, and a caved adit; mill foundation. Caved adit may be 100 ft long with a 40 ft winze. 68 tons of development ore averaging 0.67 oz gold per ton was milled in 1901 (Progressive Assn., 1901). Recorded production, 1907-1909, 728 oz gold and 49 oz silver from 2,000 tons, a portion of which may have come from the Winslow mine.	Of 20 samples, seven assayed from 0.003 to 0.160 oz gold per ton. There is a shoot with about 50 tons of quartz averaging 0.13 oz gold per ton. Moderate potential for gold resources.
33	River Bend mine (gold)	Shear zone trends east-west, dips 85° N. to 85° S., and is up to 2.5 ft thick. Upermost adit is in marble, and lower ones are in phyllite.	One caved adit, three open adits 10 to 25 ft-long, remains of 5-stamp mill and river crossing cable fittings are at the mine. Recorded production, 1926, totalled 9.37 oz gold from 20 tons ore.	Five of 11 samples assayed from 0.010 to 0.306 oz gold per ton. A shoot with about 650 tons of vein quartz averages 0.23 oz gold per ton. Moderate potential fo gold resources.

Table 1.--Mines and prospects in the Tuolumne River Roadless Area and vicinity--continued

Map no. (fig. 2)	Name (commodity)	Summary	Workings and production	Sample and resource data
34	Buchanan mine (patented) (gold)	Two parallel veins strike N. 60-70° E., dip 56° SE. near the surface, 45° SE. in the lower levels; grade 0.25 and 0.75 oz gold per ton in the foot and hanging walls respectively; three ore shoot pitch to the northeast, range in strike length from 50- to 200-ft, and are up to 300 ft high and 20 ft thick (Preston, 1892). Wallrock is phyllite.	About one mile of underground workings on seven levels, accessed in part by two inclined shafts. Production has been estimated to be over 30,000 oz of gold between 1881 and 1947.	Property was active as late as 1970. It was not examined for this report. Moderate potential for gold resources based on past production.
35	Elk and Wedge prospect (gold)	Two claims enclose 25.945 acres between the Buchanan and Chaparral mines. Adit and presumably the vein strike N. 12° W., dip unknown.	100-ft-long adit , 10-ft shaft, and a 3-ft cut, from patent map and notes (1911).	Property not examined for this report.
36	Chaparral mine (patented) (gold)	Major workings are in the roadless area and on the Tuolumne canyon rim. Shoots may occur in quartz veins, up to 2.5 ft thick, which strike north and dip 32-50° E. in fractured argillite. Additional veins trend east and dip 40-70° S.	Six adits and several cuts total about 1,140 ft. 300 tons of ore milled prior to 1892 yielded about 300 oz of gold.	Of 78 samples, 40 assayed from 0.005 to 2.020 oz gold per ton. Two shoots contain a total of 160 tons of vein quartz averaging 0.63 oz gold per ton. Low potential for gold resources.
37	Garfield-Virginia prospect (patented) (gold)	Vein up to 5 ft thick, strikes N. 20° W., dips 60-85° NE., in shear zone 1 to 6 ft thick, in phyllite.	Four adits 10 to 300 ft long, inclined shaft 30 ft deep, remains of a 5 stamp mill, large campsite across the river, aerial tram ruins, and a river cable-crossing site.	Sixteen samples, 12 contained 0.010 to 0.092 oz gold per ton. Low potential for gold resources.
38	Modoc mine (gold)	Two parallel quartz veins, one of which averages 1.5 ft thick, trend northerly and dip 30-48° E., in pyritic phyllite. These veins are .25 mi north of, and trend into the roadless area.	Four adits, one is 248 ft long, three are caved (one may be 500 ft long).	Of 28 samples, 10 ranged from 0.010 to 3.316 oz gold per ton. About 660 tons of vein quartz averaging 0.97 oz gold per ton occur in the west vein. One select sample from the east vein on a dump contained 0.308 oz gold per ton. Moderate potential for gold resources.
39	OK prospect (gold)	Shear zone strikes north, dips 45° E. in phyllite. A quartz vein in a short inclined shaft strikes N. 80° W. and dips 65° NE. Two quartz veins totalling 6 ft in thickness, striking northwest, dipping northeast, and containing free gold and sulfide minerals reported by McLaughlin (1903).	A 10-ft adit, a 15-ft inclined shaft, and ruins of a flume cut into rock. A second adit reported to be 186 ft long (McLaughlin, 1903).	Five samples, one chip sample contained 0.02 oz gold per ton and 1.0 oz silver per ton. A grab sample contained 0.14 oz gold per ton. Low potential for gold resources based on the report by McLaughlin (1903).
40	Duleek mine (patented) (gold)	An underground map made in 1934 suggests that the vein strikes east and dips 83° N. and the surface to 65° S. at depth; vein is 5 ft thick at the surface and 1.3 ft thick at depth. Wallrock is phyllite. Vein appears to trend eastward toward the Grapevine prospect in the roadless area.	A company map (1934) indicated two shafts, one 300 ft deep, with four levels. Three additional shafts and a cut were found during this investigation. All shafts are caved. Ancilliary workings are remains of hoist house and 10-stamp mill. Several hundred tons, milled in 1896, yielded 58 oz of gold, 41 oz of silver, and 22 lbs of copper.	11 of 19 select and dump samples contained from 0.012 to 1.872 oz gold per ton. One shoot may contain 300 tons of quartz averaging 0.11 oz gold per ton. An old map indicates another shoot. Low potential for gold resources.
41	Goldship-Mayflower mine (patented) (placer gold)	Four patented placer claims adjacent to the roadless area, completely surround the patented Duleek mine. Tertiary gravels were capped by younger Tertiary andesite lava flows; gravel was exposed locally by erosion. Property was subdivided for housing in 1982.	The 1910 patent map shows five cuts, 15 to 700 ft long; two adits are 10 and 415 ft long, four shafts were 10 to 20 ft deep; three shafts on adjacent private property are up to 50 ft deep. Property had production of 48.37 oz of gold from an unknown amount of gravel in 1891.	Low potential for placer gold resources on the basis of production history of similar deposits in the area at the Little Gap (51) and Bonanza (54) placers.
42	Indian Creek Bar prospect (placer gold)	A gravel bar on the Tuolumne River downstream from the mouth of Indian Creek. Five feet of beach sand was layered between the top and bottom gravel units.	No workings; no reported production.	The 8 ft of gravel above the water table contains about 9,000 yd^3 of subeconomic resources which averages 0.0022 oz gold per yd^3. The top 3 ft of gravel averages 0.0045 oz gold per yd^3; bottom 5 ft near the river averages 0.0009 oz gold per yd^3.
43	Garner mine (gold)	Vein strike ranges from N. 17° E. to N. 50° W., dip from 28° SE. to 59° NE. in a shear zone in pyritic phyllite. The general trend of the vein and shear is N. 50° W. Vein attains a maximum thickness of 3 ft but is generally less than 0.25 ft thick. Pyrite, possibly chalcopyrite, and one speck of gold were seen in the vein.	Two open adits, 80 and 360 ft long, and a 40-ft adit (portal inaccessible) with a connecting incline to the 360-ft adit. Workings are on both sides of the Tuolumne River.	Gold assays in 8 of 46 samples ranged from 0.010 to 0.159 oz gold per ton. The higher assays were at three localities and suggest the presence of shoots. Low potential for gold resources.

Table 1.--Mines and prospects in the Tuolumne River Roadless Area and vicinity--continued

Map no. (fig. 2)	Name (commodity)	Summary	Workings and production	Sample and resource data
44	Hull mine (patented) (gold)	Sebenius and Smith (1934, unpublished report) indicate the vein in phyllite trends east, dips 72° S., averages 3 ft thick, and contains 0.47 oz gold per ton overall. One 60 ft wide, west-plunging shoot and two other shoots are indicated by assays on a map in the report. Mine may be a western extension of the Grapevine prospect (46).	Workings are inaccessible. A map in the 1934 report shows two inclined shafts serving at least two levels. About 155 tons of ore averaging 0.66 oz gold per ton was mined prior to 1930. Part of this ore was milled and averaged 1.84 oz gold per ton.	Assays from the 1934 report suggest one large and two small shoots totalling about 2,700 tons of subeconomic gold resources averaging 0.57 oz gold per ton, and lower grade zones totalling 350 tons withich average 0.12 oz gold per ton. Three stockpile samples contained from 0.120 to 0.392 oz gold per ton. A grab sample from a long, narrow dump contained 0.964 oz gold per ton. The main dump grab sample had 0.010 oz gold per ton. The dump and stockpiles comprise about 20 tons. High potential for additional gold resources.
45	Corcoran Flat mine (placer gold)	A drift adit was driven in gravel of a reworked Tertiary Tuolumne River channel, probably in the 1860's or 1870's. The gravel is on a bench next to the Goldship-Mayflower placer mine and may have been worked as an extension of that property.	A drift adit of unknown length but at least 100 ft, boulder tailings piles, and a concrete platform for a steam engine are on the property. Adit is partially flooded. No production records.	No sample data, underground workings were unsafe for sampling.
46	Grapevine prospect (gold)	Orientation of working suggests that the vein trends N. 60° E. Dump material indicates a quartz vein at least 0.5 ft thick in phyllite.	One shaft, four caved adits estimated to be 10 to 150 ft long, several cuts and trenches.	Two of eight select samples from overlapping dumps have vein quartz containing 0.024 and 0.106 oz gold per ton. Low potential for gold resources, on the basis of these dump samples.
47	Golden Grain mine (patented) (placer gold)	Pit is in the Tertiary Tuolumne River channel and was probably worked in the late 1800's by hydraulic methods. The pit face is about 80 ft high. Slough material covered the gravel near bedrock.	One-acre hydraulicked pit, drainage tunnel, and trench. About 100,000 yd^3 removed. No production records.	Four pan samples, of which 3 yielded gold values from 0.0001 to 0.0033 oz gold per yd^3, values increased with depth. Moderate potential for placer gold resources based on past production of other close mines also on this channel.
48	Kanaka mine (gold)	Quartz vein generally trends north, arches eastward, dips 30-45° E. in pyritic phyllite. Three main ore shoots, 150, 175, and 300 ft along strike averaging 2 ft thick and containing 2 percent sulfides were reported by the California State Mining Bureau (1888). At that time the longest adit was 500 ft. The high-grade gold-rich areas in the mine suggest that the shoots generally pitch 20-30° to the northeast and that there may be several small high grade zones within the shoots.	Over 3,400 ft of horizontal workings, one inclined shaft, and seven adits, of which four are interconnected. Production, 1894-1898, was 2,219 oz of gold. Foundation of 10-stamp mill is on the property. Mine is currently in production.	An estimated 20,000 tons of subeconomic resources averaging 0.099 is in shoots. The mine contains a composite total of 7,000 tons averaging 0.19 oz gold per ton and 13,000 tons averaging 0.05 oz gold per ton. Individual blocks contain as much as 0.814 oz gold per ton. The three shoots reported by the California State Mining Bureau were not readily identifiable from sample data. Of 238 samples taken from the workings, 159 contained measurable gold with 0.006 to 4.266 oz gold per ton.
49	Lost Fox mine (gold)	Mine not found during the study but may be within 0.25 mi of the roadless area. Vein reported to be 4 ft thick, striking N. 68° E., and dipping 48° SE. in slate by McLaughlin (1903). Strike is toward the roadless area.	A 325-ft incline, 800 ft of other workings, and stamp mill ruins reported by McLaughlin (1903). Production probably occurred but none is recorded for the mine.	Mine not examined for this report.
50	Duplex prospect (gold)	Sheared phyllite with 0.5- to 1-in. quartz stringers containing oxidized pyrite; strike N. 5° W., dip 65° NE.	12-ft adit explores the stringers; adjacent gully was worked to bedrock for placer gold.	One sample from the adit contained 0.3 oz silver per ton, and no gold.
51	Clavey Falls prospect (placer gold)	About 5,500 yd^3 of gravel is in the vicinity of Clavey Falls and appear to average 10 ft deep. Underlying the gravel is 1,000 yd^2 of gold-bearing bedrock. Another 5,600 yd^3 of gravel upstream from the Clavey Falls in the Tuolumne River bed may average 3 ft deep. Gold found in small amounts of gravel in the lower reaches of the Clavey River may have been deposited by the Tuolumne River during spring flooding.	A cabin foundation and a few partially filled pits lie on the south side of the Tuolumne River upstream from the Clavey Falls. Although some gold was recovered by one claimant, no production was recorded.	The 5,500 yd^3 of gravel bars contain less than 0.0001 oz per yd^3. A bedrock sample at the Clavey Falls bar yielded 0.075 oz gold per sq yd. Suction dredge samples from gravel overlying bedrock in the Clavey and Tuolumne River channels yielded 0.032 and 0.006 oz gold per yd^3 respectively. Gold nuggets occur in some bedrock crevices. High potential for placer gold resources in the gravel near bedrock under the gravel bars, and in two river bed channels.

Table 1.--Mines and prospects in the Tuolumne River Roadless Area and vicinity--continued

Map no. (fig. 2)	Name (commodity)	Summary	Workings and production	Sample and resource data
52	Kings Road mine (placer gold)	A hydraulic placer pit in Tertiary Tuolumne River gravel on the south rim of the Tuolumne River. The pit covers about 3 acres and is 90 ft deep at the face. Two 5-ft zones in the gravel contain gold values of over 0.004 oz per yd^3. The bedrock is a weathered igneous rock. The mine probably operated in the 1890's when water was being supplied to the Little Gap and Bonanza placer mines for their operation.	About 200,000 yd^3 have been removed from the pit. Hydraulicked tailings cover two acres. No recorded production is attributable directly to this property, but it may be part of the Dorsey claims referred to by Turner and Ransome (1897) which produced 29,000 oz of gold in 1890. The Bonanza and Little Gap mines also may have been part of the Dorsey claims.	Twelve trench samples, six samples ranged from 0.00012 to 0.0068 oz gold per yd^3. An estimated 13,000 yd^3 of subeconomic placer gold resources average 0.0022 oz gold per yd^3.
53	Gold Queen mine (placer gold)	A shaft symbol and the name Gold Queen mine is given for this property on the Jawbone Ridge 7.5 min. topographic map (1947). The mine is between the Bonanza and Kings Road Placer mines. The shaft was probably sunk to explore the Tertiary gravel near bedrock.	One caved shaft of unknown depth is at the mine. No recorded production is known.	No gravel or tailings were seen.
54	Bonanza mine (placer gold)	This gravel is part of the Tertiary Tuolumne River channel. The floor of the pit is mostly argillite bedrock. Turner and Ransome (1897), and Lindgren (1911) mentioned that the gravel was primarily black, siliceous, argillite and rhyolite. About 30,000 yd^3 of undisturbed gravel remains at this hydraulic mine.	About 54,000 yd^3 have been removed from 17 acres of hydraulicked pit; there is a drainage tunnel in bedrock. Production in 1890 and 1891 yielded 1,277 oz of gold from unknown gravel volume. The mine may be part of the Dorsey claims referred to by Turner and Ransome (1897, and Economic Geology sheet) from 29,000 oz of gold was produced in 1890. The Kings Road and Little Gap mines may also be part of thia claim group.	Six samples taken in 1975 from a vertical section of gravel ranged in value from 0.0001-0.001 oz gold per yd^3. Pit banks were too badly sloughed to allow sampling of gravel on or near bedrock. Low potential for placer gold resources on the basis of the small volume and low values of remaining gravel.
55	Boasy Bar prospect (Tin Can Cabin Bar) (placer gold)	A gray gravel overlies higher-grade orange gravel on this bar which covers one-third acre. The bar is downhill from two Tertiary gravel placer mines, the Gold Queen and Bonanza.	Gold-bearing gravel bar remnants above Bossy Bar yielded about 1,500 oz in the late 1800's (Cassidy, 1981). One 7-ft-deep pit was dug behind a large boulder in 1980-1981, but bedrock was not reached. About 3 yd^3 were removed yielding an unknown amount of gold.	Bar contains 6,500 yd^3 of subeconomic placer gold resources averaging 0.020 oz gold per yd^3. This includes 5,500 cu yd of a lower, orange layer containing 0.023 oz gold per yd^3 and about 1,000 yd^3 of gray, upper gravel containing 0.0064 oz gold per yd^3.
56	Adit Spring prospert (placer gold)	A collapsed drift adit is along the bottom of Tertiary gravel on the south canyon rim. Gravel may be 40 to 50 ft thick.	Collapsed adit, unknown length.	One pan sample yielded no gold.
57	Little Gap mine (placer gold)	Tertiary gravel on the south rim of the roadless area. Gravel was reported to be 100 ft thick with a 75 ft bank height, and property was supposedly patented (McLaughlin, 1903). Deposit is chiefly pebbles of siliceous rocks from the Calaveras Complex and of quartz (Lindgren, 1911). A 12-mi ditch supplied water from the South Fork of the Tuolumne River to this mine and probably to the Bonanza and Kings Road placer mines.	Hydraulicked pit is approximately 1,000 ft by 300 ft, with a 75-ft face; about 1/3 million yd^3 of gravel were removed. Production in 1890 and 1891 was 1,372 oz gold and 580 oz respectively. This mine is referred to as the Dorsey claim or part of the Dorsey claims (Turner and Ransome, 1897, and Economic Geology sheet) which produced 29,000 oz gold in 1890.	An undetermined amount of gravel remains. High potential for placer gold resources based on past production.
58	Poverty Ridge prospect (placer gold)	Ravine gravel, containing minor gold, has been reworked by slope wash. Gold was probably from gravel deposits in stream tributaries to the Tertiary Tuolumne River. Bedrock is diorite or granodiorite.	Small boulder piles parallel the stream bed.	Two pan samples yielded minor amounts of gold per yd^3.
59	Sunderland's Chute prospect (placer gold)	Gravel bar is primarily waste material from the adit of the Hetch-Hetchey aqueduct tunnel uphill from the bar.	No workings or production.	Two placer samples contained traces of gold.
60	Nemisis prospect (placer gold)	About 3,000 yd^3 of gravel averaging 10 ft deep are present.	No workings or production.	Two bulk samples fr . trench . owed traces of gold.
61	Harvest Hole prospect (placer gold)	Large sand beach overlies an estimated 18,000 yd^3 of gravel.	No workings or production.	A suction dredge sample yielded minor amount of gold; a 5-ft trench sample at high water mark indicated gravel with 0.0022 oz gold per yd^3.

Table 1.--Mines and prospects in the Tuolumne River Roadless Area and vicinity--continued

Map no. (fig. 2)	Name (commodity)	Summary	Workings and production	Sample and resource data
62	South Fork prospect (placer gold)	Bar contains about 1 million yd^3 of gravel from 20 to 45 ft deep. About 300,000 yd^3 of the gravel occur in the roadless area.	Several shallow pits and trenches are in various parts of the bar.	One pan and 17 bulk samples were taken from four trenches. Gold value was up to 0.0010 oz per yd^3. The lower 20 ft of a 45-ft exposure averaged 0.00042 oz gold per yd^3, with value increasing with depth. Higher gold values probably occur near bedrock.
63	Lumsden Bridge prospect (placer gold)	100,000 yd^3 of gravel averaging about 15 ft thick occur at a bar used as a campground on the north side of the Tuolumne River.	No workings or production.	Two samples from a trench contained 0.00018 and 0.00024 oz gold per yd^3.
64	Bull Meadows prospect (placer gold)	Gravel is primarily cobbles and pebbles of quartzite and schist.	According to the claimant, gravel of the stream below Bull Meadows has produced gold. Small boulder piles are present. No recorded production available.	Four pan samples yielded no gold.