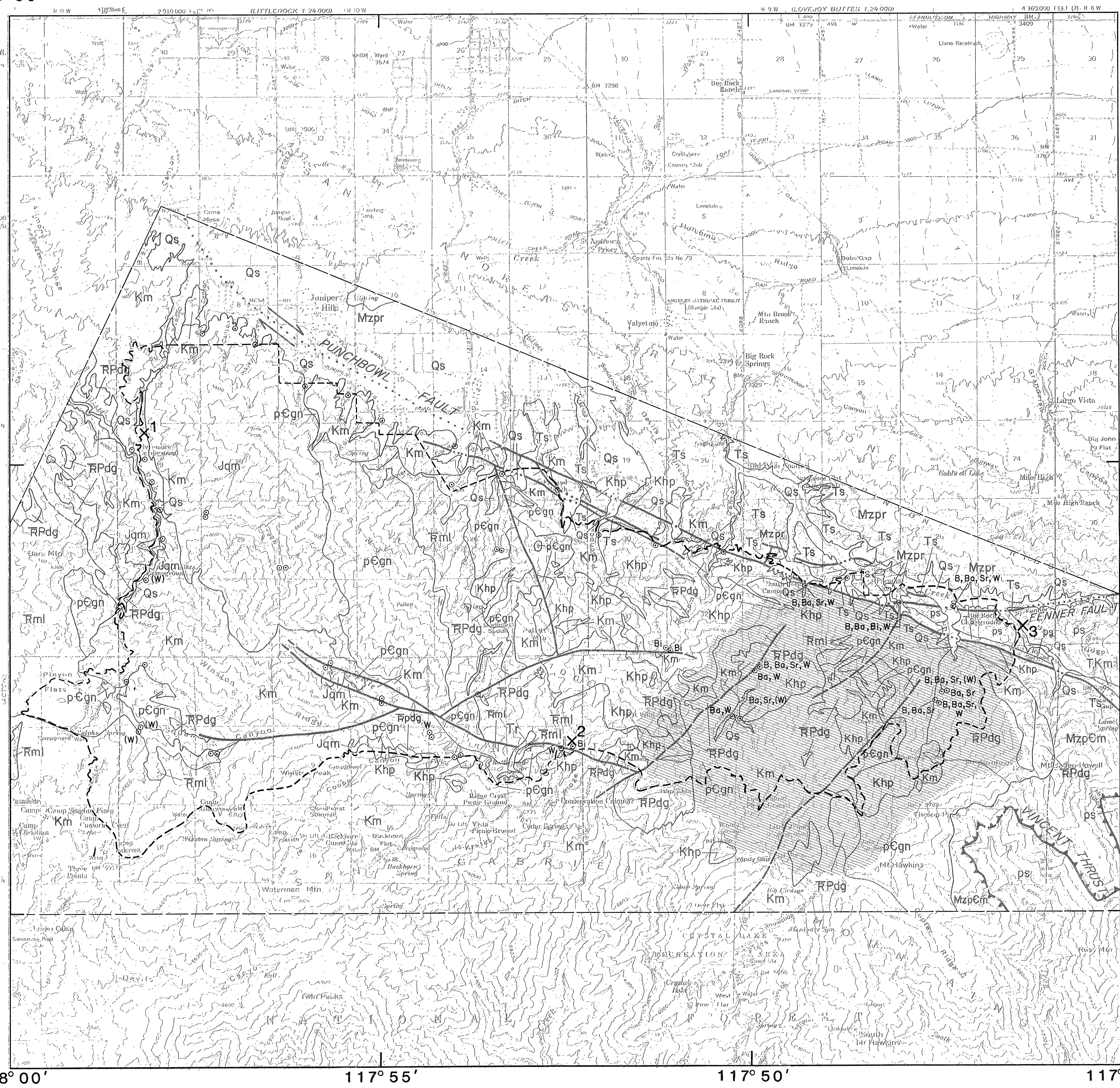
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1649-A

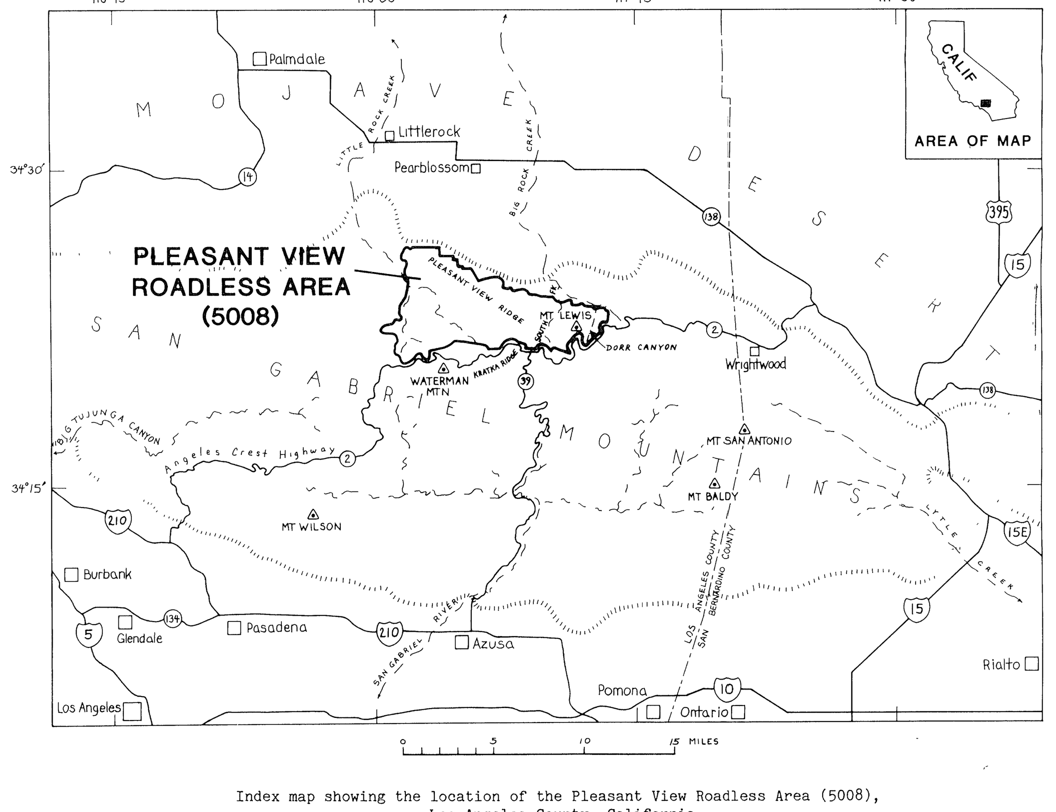


Base from U.S. Geological Survey Valyermo, 1959

SCALE 1:62500
CONTOUR INTERVAL 80 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

APPROXIMATE MEAN DECLINATION, 1983

Geology mapped by B.F. Cox and R.E. Powell, 1982



Index map showing the location of the Pleasant View Roadless Area (5008), Los Angeles County, California

CORRELATION OF MAP UNITS

- Qs — QUATERNARY } CENOZOIC
- Ts, Tr — TERTIARY } CENOZOIC
- TKm — MIOCENE(?) OR CRETACEOUS(?)
- ps — AGE UNCERTAIN
- Km, Khp — CRETACEOUS } MESOZOIC
- Mzpr — MESOZOIC
- Jqm — JURASSIC(?) } MESOZOIC
- Rml — TRIASSIC } MESOZOIC
- RPdg — TRIASSIC OR PERMIAN } MESOZOIC OR PALEOZOIC
- MzpCm — MESOZOIC, LATE PALEOZOIC(?), AND PRECAMBRIAN
- pCgn — PRECAMBRIAN

EXPLANATION

AREA WITH LOW TO MODERATE POTENTIAL FOR VEIN-RELATED TUNGSTEN RESOURCES--Inferred from stream-sediment geochemistry

MINES AND PROSPECTS
- X1 Sycamore prospect
- X2 Donaldson prospect
- X3 Fenner Canyon prospect

⊙ STREAM-SEDIMENT GEOCHEMICAL SAMPLE SITE--Geochemical anomaly present in heavy-mineral concentrate indicated by element symbol: B, boron; Ba, barium; Bi, bismuth; Sr, strontium; W, tungsten. (W), trace amount of tungsten

-------- BOUNDARY OF ROADLESS AREA

—— —— BOUNDARY OF MAPPED AREA

DESCRIPTION OF MAP UNITS[1]

Qs SURFICIAL DEPOSITS (QUATERNARY)--Sand and gravel in stream canyons and on alluvial fans. Consists of active alluvium of modern channels and older alluvium of stream terraces and dissected alluvial fans

Ts SEDIMENTARY ROCKS (TERTIARY)--Consists of Paleocene marine shale, sandstone, and conglomerate (San Francisquito Formation: Dibblee, 1967; Kooser, 1980), upper Miocene and lower Pliocene (Clarendonian and Hemphillian) nonmarine sandstone and conglomerate (Punchbowl Formation: Noble, 1953, 1954; Woodburne and Golz, 1972), and a fault-bounded sliver of undated nonmarine conglomerate south of Punchbowl fault

Tr RHYOLITE (TERTIARY)--White to pale-gray aphanitic-porphyritic rhyolite; contains sparse small phenocrysts of quartz, potassium feldspar, biotite, and plagioclase in felsitic microcrystalline groundmass. Forms dike north of Kratka Ridge. Age of unit may be late Oligocene or Miocene

TKm BIOTITE MONZOGRANITE (MIOCENE? OR CRETACEOUS?)--Pinkish-gray, medium- to coarse-grained biotite monzogranite; comprises single small body located north of Punchbowl fault near Vincent Gap. Contact relations with the Pelona Schist unresolved

ps PELONA SCHIST (AGE UNCERTAIN)--Heterogeneous gray to greenish-gray schist in lower plate of Vincent thrust; metamorphosed to greenschist facies. Protolith includes shale, argillaceous sandstone, basalt, and chert. A rubidium-strontium isochron age of 59.0 ± 1 m.y. (Gary Lass, cited in Evans, 1982b) suggests that the Pelona Schist was metamorphosed during and (or) before Paleocene time; but the depositional age of protolith is uncertain.

Km LEUCOCRATIC BIOTITE MONZOGRANITE (CRETACEOUS)--Pale-gray biotite monzogranite, locally grading into granodiorite. Along Angeles Crest Highway, unit is coarse grained and massive; near western and northern margins of study area unit typically is fine to medium grained, prominently foliated, and locally contains disseminated garnet and muscovite. Intrudes the Cretaceous heterogeneous plutonic rocks unit and has yielded several Late Cretaceous minimum (reset) potassium-argon ages of 65 to 67 m.y. within and near study area (Evernden and Kistler, 1970, sample No. KA-1675; Miller and Morton, 1980, sample Nos. T36-4, T82-4, T83-4)

Khp HETEROGENEOUS PLUTONIC ROCKS (CRETACEOUS)--Assemblage of medium- to dark-gray, massive to prominently foliated rocks consisting of quartz diorite, tonalite, and granodiorite. Most rocks in assemblage contain biotite, hornblende, and conspicuous accessory sphene. Similar quartz diorite and granodiorite in southern and southeastern San Gabriel Mountains have yielded Cretaceous radiometric ages of 80 to 122 m.y. (Larsen and others, 1958; Hsu and others, 1963; Carter and Silver, 1971, 1972)

Mzpr PINYON RIDGE GRANODIORITE (MESOZOIC)--Dark-gray, massive to gneissic plutonic rocks, predominantly biotite-hornblende quartz diorite and quartz monzodiorite. Named by Noble (1954). Intruded by undated small bodies and dikes of aplite, pegmatite, and monzogranite. Noble (1954) assigned a Jurassic(?) age to the Pinyon Ridge Granodiorite; however, we believe that the limited existing chronologic evidence justifies only the more general age of Mesozoic

Jqm PORPHYRITIC QUARTZ MONZODIORITE (JURASSIC?)--Greenish-gray, coarse-grained, foliated, porphyritic, biotite-hornblende quartz monzodiorite, locally grading into mafic hornblende quartz diorite and hornblendite. Contains conspicuous accessory sphene, large potassium-feldspar phenocrysts; plagioclase partly altered to epidote. Resembles Jurassic plutonic rocks that are abundant north of the San Andreas fault in the eastern Transverse Ranges and eastern Mojave Desert regions

Rml MOUNT LOWE GRANODIORITE OF MILLER (1926, 1934) (TRIASSIC)--White to light-gray foliated quartz monzodiorite and quartz diorite. Consists of two facies in the study area (not differentiated on map): (1) white quartz diorite and quartz monzodiorite that contain sparse amounts of biotite and, locally, small crystals of garnet and large phenocrysts of potassium feldspar; and (2) light-gray quartz monzodiorite that contains abundant hornblende, lesser amounts of biotite, and conspicuous accessory sphene. The Mount Lowe Granodiorite west of study area has been dated radiometrically at 220 ± 10 m.y. (Silver, 1971) and 208 ± 7 m.y. (Joseph and others, 1978)

RPdg MAFIC DIORITE AND GABBRO (TRIASSIC OR PERMIAN)--Dark-gray, fine- to coarse-grained rocks composed chiefly of andesine or labradorite feldspar and variable amounts of hornblende, biotite, and minor relict augite. Primary igneous layering locally conspicuous. Intruded by the Triassic Mount Lowe Granodiorite

MzpCm MYLONITIC ROCKS (MESOZOIC, LATE PALEOZOIC?, AND PRECAMBRIAN)--Mylonite and mylonitic gneiss; protolith consists of Precambrian gneissic rocks and late Paleozoic(?) and Mesozoic plutonic rocks. Forms zone lying mostly east of the mapped area, adjacent to Vincent thrust. Deformed pegmatite yielded rubidium-strontium isochron age of 58.5 ± 4 m.y. (Conrad and Davis, 1977), which suggests that mylonitization occurred during and (or) before Paleocene time

pCgn GNEISSIC ROCKS (PRECAMBRIAN)--Heterogeneous unit that consists of three distinct varieties of gneiss (not differentiated on map): (1) biotite-rich gneiss that locally contains sillimanite, garnet, and occasional staurolite occurs in the eastern half of study area; (2) quartzofeldspathic gneiss with alternating leucocratic and mafic layers is predominant in western half of study area; and (3) biotite-granodiorite augen gneiss containing potassium-feldspar megacrysts forms a large mass surrounded by layered quartzofeldspathic gneiss on Pleasant View Ridge. In the Soledad Basin area, northwest of the San Gabriel Mountains, rocks similar to the quartzofeldspathic gneiss and augen gneiss have yielded Precambrian radiometric ages (Silver, 1971)

[1]Plutonic rock classification after Streckeisen (1973)

——— - - - CONTACT--Dashed where approximate

— — ..... FAULT--Dashed where approximate; dotted where concealed. Arrows indicate relative lateral movement

▲▲▲ ▲ ▲ THRUST FAULT--Dashed where approximate. Barbs on upper plate

STUDIES RELATED TO WILDERNESS

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to determine their mineral resource potential. Results must be made available to the public and submitted to the President and the Congress. This report presents the results of a mineral resource survey of the Pleasant View Roadless Area (5008), Angeles National Forest, Los Angeles County, California. The area was originally classified as nonwilderness during the Second Roadless Area Review and Evaluation (RARE II) by the U. S. Forest Service, January 1979, but was reclassified as a further planning area during April 1979.

SUMMARY

A mineral resource survey of the Pleasant View Roadless Area included geologic mapping, a geochemical survey of rocks and stream sediments, and a study of mines, prospects, and mineralized areas. There are no known mineral deposits and there is no evidence of past mineral production from the study area. Although gold has been produced 2 mi southeast of the study area and minor amounts of gold were detected in samples of vein quartz from one prospect in the study area, gold was not detected by the geochemical survey of stream sediments. This limited evidence suggests that the entire study area has low potential for gold resources. Stream-sediment samples slightly enriched in tungsten and containing grains of the tungsten mineral scheelite cluster in an 8.5-mi^2 zone at the east end of the study area. However, evidence of tungsten mineralization was not observed in the crystalline rocks exposed within this zone. Judging from the small amounts of tungsten detected in the stream sediments, from the lack of historical tungsten mining or other conclusive evidence of tungsten mineralization in the study area, and from the limited scale of tungsten mineralization in neighboring areas, any bedrock or placer concentrations of tungsten that may be present in the study area probably are small and (or) low grade. Thus, there is low to moderate potential for tungsten resources within the designated 8.5-mi^2 zone at the east end of the study area. Evidence of resource potential was not observed for any mineral other than gold and tungsten.

INTRODUCTION

The Pleasant View Roadless Area is located on the north slope of the San Gabriel Mountains (index map) directly south of the western Mojave Desert region and approximately 25 mi northeast of Los Angeles, Calif. The study area encompasses 26,700 acres of rugged mountainous terrain in the Angeles National Forest.

GEOLOGY

The study area lies in the northern San Gabriel Mountains south of the Punchbowl fault. Cox and Powell (unpub. map, U.S. Geological Survey, Menlo Park, 1982) mapped the study area to provide data for the present report; a simplified version of their geologic mapping is shown on this map. Crystalline bedrock is exposed throughout most of the study area. The main bedrock units consist of Precambrian gneiss, several assemblages of late Paleozoic(?) and Mesozoic plutonic rocks, and poorly dated schist and mylonitic rocks. Cenozoic units locally present in the study area consist of Tertiary sedimentary rocks, Tertiary rhyolite, and Quaternary alluvial deposits. The crystalline bedrock and Tertiary rock units are cut by numerous minor faults and by three regionally prominent structures: the Vincent thrust, exposed 1 mi southeast of the study area, and the Fenner and Punchbowl faults.

Concentrations of ore minerals were not observed within rock units, or along fractures, veins, faults, or intrusive contacts while mapping the geology of the study area; neither are there any special lithologic or structural features that would seem to provide an ideal geologic setting for any particular type of mineralization. However, southeast of the study area, veins and placer concentrations containing subeconomic resources of gold and tungsten occur near the Vincent thrust fault in a geologic setting generally similar to that present in the eastern part of the study area (Evans, 1982a; Ridenour and others, 1982; Zilka and Schmauch, 1982). Gold-bearing veins occur in both the upper and lower plates of the Vincent thrust, whereas tungsten-bearing veins are almost entirely restricted to the upper plate of the thrust.

The apparent localization of vein-related occurrences of gold and tungsten near the Vincent thrust suggests that the thrust or related structures may have influenced the generation or migration of mineralizing hydrothermal fluids in the eastern San Gabriel Mountains. A broad zone of heterogeneous brittle and ductile deformation extends away from the Vincent thrust westward into the study area as far as the drainage divide west of the South Fork of Big Rock Creek. This zone of fractured and foliated rocks could have provided an access route for mineralizing fluids that may have originated near the Vincent thrust. This idea is supported by the geochemical survey (following section), which detected anomalous concentrations of tungsten and several other elements in stream sediments derived from the zone of deformed rocks; however, gold was not detected by the survey.

GEOCHEMISTRY

A reconnaissance geochemical survey of stream sediments and crystalline bedrock was conducted for 31 major, minor, and trace elements to identify any spatial variations in chemistry that might reflect local concentrations of ore minerals. Emission-spectrographic analyses were performed on stream-sediment samples collected at 57 sites and on samples of nonmineralized bedrock collected at 62 sites.

Each sample of sandy alluvium was processed to yield two fractions for spectrographic analysis: a minus-80-mesh fraction and a nonmagnetic heavy-mineral concentrate produced by hand panning in the field followed by bromoform immersion and electromagnetic separation in the lab. A split of each heavy-mineral concentrate was also examined microscopically to determine the mineralogy of the heavy-mineral grains. The bedrock samples were collected from visibly unweathered, nonmineralized outcrops in order to determine the background abundances of elements in all the main crystalline rock units in the study area.

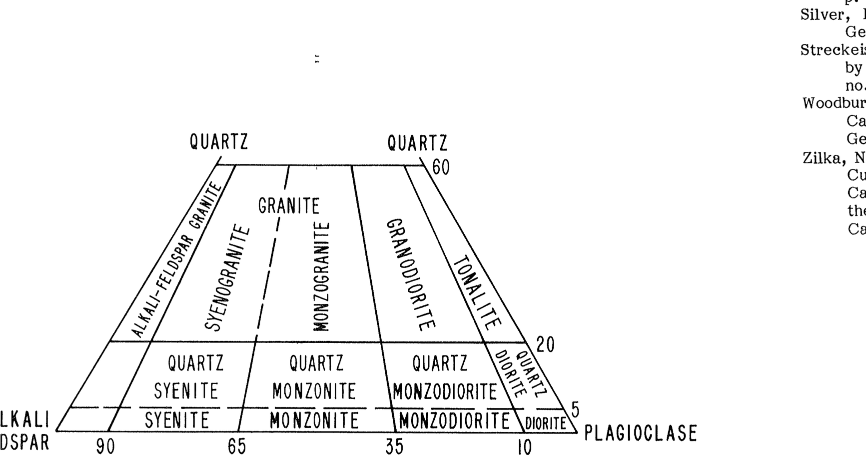
Compelling geochemical evidence of mineralization was found only for the heavy-mineral fraction of the stream sediments. The stream-sediment geochemistry indicates that most elements were derived from areas of nonmineralized crystalline rocks. Notable exceptions were found for tungsten, barium, strontium, boron, and bismuth, all of which were detected in anomalous amounts in heavy-mineral concentrates from sample sites clustered at the east end of the study area near Mt. Lewis. The sample sites of all anomalous values for these five elements are marked on the map. The patterned area on the map delineates the drainage areas represented by the cluster of anomalous samples near Mt. Lewis. No gold was detected by the survey; however, the apparent absence of gold may be deceiving and may be attributable to the low sensitivity of the emission-spectrographic method (detection limits: 20 ppm for heavy-mineral fraction, 10 ppm for minus-80-mesh fraction).

The aggregate drainage area represented by the cluster of geochemical anomalies covers approximately 12 mi^2, including 8.5 mi^2 within the study area and 3.5 mi^2 outside the area. The presence of the tungsten ore mineral scheelite in the heavy-mineral concentrates indicates that mineral-concentrating processes have occurred within the bedrock of this drainage area. Carbonate rocks, such as are hosts to metasomatic tactite deposits of scheelite elsewhere in southern California (Bateman and Irwin, 1954), were not observed in the study area. The scheelite probably occurs instead within hydrothermal veins that cut gneissic and plutonic rocks, although no veins were observed in the course of reconnaissance geologic mapping. The association of scheelite and barite with geochemical anomalies for strontium, boron, and bismuth is consistent with a vein origin. Barite is a common gangue mineral in vein-type ore deposits and commonly contains strontium substituted for barium in the crystal lattice. Boron and bismuth both are highly mobile in hydrothermal systems and commonly serve as pathfinders for vein-related deposits of tungsten (Levinson, 1980).

The occurrence of tungsten anomalies and scheelite at the east end of the study area is noteworthy because vein-related subeconomic resources of scheelite have recently been described in similar geologic settings 10 to 12 mi southeast of the study area (Ridenour and others, 1982; Zilka and Schmauch, 1982). It should also be noted that the largest amounts of tungsten determined by the geochemical survey (300 ppm in heavy-mineral concentrates) are small compared to tungsten anomalies as great as 2000 ppm and 10,000 ppm that have been reported for heavy-mineral concentrate samples collected 6 to 10 mi southeast of the study area (Evans, 1982a). However, the modest magnitudes of the tungsten anomalies are partly compensated by their pronounced clustering in association with the anomalies for barium, boron, and bismuth.

MINES, PROSPECTS, AND MINERALIZED AREAS

The Bureau of Mines inspected mines, prospects, and mineralized areas in and near the Pleasant View Roadless Area in 1981 and reviewed documents and reports pertaining to historical mining and prospecting activities. U.S. Forest Service and U.S. Bureau of Land Management records were examined to determine claim locations, and field examinations were conducted at all known claims and prospects. There is no active mining and there are no patented claims or mineral leases in the study area. The areas contain no known deposits and there is no evidence of past production of metallic mineral resources, industrial mineral resources, coal and hydrocarbons, or geothermal energy.



Classification of plutonic rock types (modified from Streckeisen, 1973)

Three prospects are located within or directly adjacent to the study area. The Sycamore prospect, located at the northwest end of the study area, consists of one 37-ft adit and an open cut measuring 13 ft long, 6 ft wide, and 10 ft deep. The prospect explores a zone of ductile shearing along the contact between Jurassic(?) quartz monzodiorite (unit Jqm) and Cretaceous monzogranite (unit Km). A quartz vein at the site is 0.5 to 0.7 ft thick and has an exposed length of over 10 ft. Two chip samples of the vein rock were collected for analysis. One contained 0.5 oz silver per ton; the other contained 0.028 oz gold per ton. Judging from the low metal content and small size of the vein, the Sycamore prospect contains no identified mineral resources.

The Donaldson prospect, located at the south side of the study area, consists of a single pit measuring 8 ft wide, 8 ft long, and 4 ft deep. The prospect is located in a small lens of gneissic rocks that is intruded on the north by the Mount Lowe Granodiorite of Miller (1926, 1934) and is truncated on the south by a fault. The gneiss is pulverized and brecciated adjacent to the fault but contains no evidence of metallic minerals.

The Fenner Canyon prospect, located just outside the eastern boundary of the study area, contains two caved adits. The workings are in limonite-stained schist that contains no evidence of significant mineralization.

The inactive Big Horn mine, located 2 mi east of the study area and outside the area of the map, has been the only mineral producer in the near vicinity (Ridenour and others, 1982). Minerals containing gold, silver, copper, and lead occupy veins within chlorite schist and carbonaceous schist directly beneath the Vincent thrust fault. Bureau of Mines records indicate that the property has produced 31,000 tons of ore containing 3,701 oz gold, 2,430 oz silver, 1,357 lb copper, and 1,296 lb lead. According to a 1975 estimate, the mine contains approximately 1.2 million tons of subeconomic mineral resources averaging 0.15 oz gold per ton (Ridenour and others, 1982). At 1983 gold prices ($400 per troy ounce), the mine probably contains at least marginal reserves of gold.

ASSESSMENT OF MINERAL RESOURCE POTENTIAL

The Pleasant View Roadless Area lacks identified mineral and energy resources, and there has been no recorded mineral production from the area. Deposits of sand and gravel might be used for concrete aggregate or road fill, and some of the gneissic and plutonic rocks within the roadless area could be used for crushed stone or riprap. These occurrences of potential construction materials have not attracted any commercial interest, however, probably because they are relatively inaccessible in comparison to deposits of equal or better quality that are available in nearby regions. No evidence of resource potential was observed for geothermal energy, coal and hydrocarbons, radioactive minerals, and most metallic minerals with the exception of gold and tungsten.

The study area as a whole has low potential for lode gold resources. This conclusion is based on the minor amounts of gold that were detected in a quartz vein at the Sycamore prospect and on the proximity of an historic gold producer, the Bighorn mine, located 2 mi southeast of the study area. No supporting evidence is provided by the stream-sediment geochemical survey. The available evidence for gold is too meager to indicate either a specific geologic environment or particular geographic zone within the study area where gold occurrence is most likely to be present.

Grains of scheelite and geochemical anomalies for tungsten in stream sediments suggest that tungsten-bearing veins are present within an 8.5-mi^2 zone near the east end of the study area. The zone containing the geochemical anomalies corresponds with a structural zone of foliated and fractured rocks west of the Vincent thrust; this zone of deformed rocks might have provided avenues for the migration of tungsten-bearing hydrothermal fluids. However, veins, metallic minerals, or other evidence of mineralization were not observed in the study area, nor has historical prospecting revealed any placer or bedrock concentrations of tungsten in the study area. With maximum values of 300 ppm, the tungsten geochemical anomalies are modest in size compared to anomalies reported elsewhere in areas with significant tungsten mineralization; however, tungsten is not always detected in fine-grained alluvium in areas with significant tungsten mineralization. Overall, the available evidence suggests that tungsten concentrations near the east end of the study area probably are limited to small and (or) low-grade occurrences comparable to those found in similar geologic settings 10 to 12 mi southeast of the study area. Thus, there is a low to moderate potential for tungsten resources in the 8.5-mi^2 zone near the east end of the study area.

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Explanatory pamphlet accompanies map

MINERAL RESOURCE POTENTIAL MAP OF THE PLEASANT VIEW ROADLESS AREA, LOS ANGELES COUNTY, CALIFORNIA

By
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and
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U. S. Bureau of Mines
1983

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