DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

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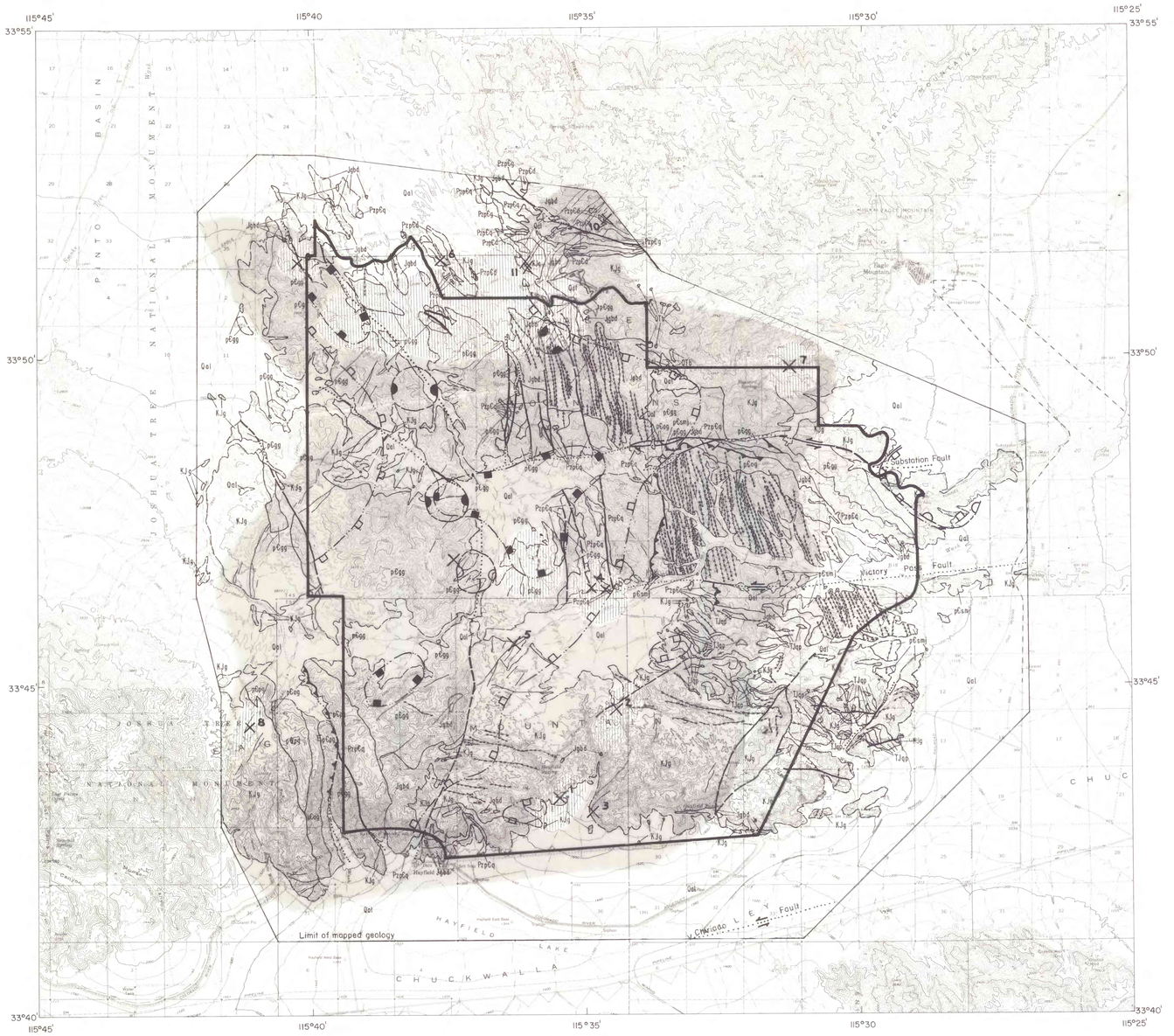

Base from U.S. Geological Survey
Chuckwalla Mtn., Coxcomb Mtn., Hayfield, Pinto Basin, 1963

APPROXIMATE MEAN DECLINATION, 1984

SCALE 1:62500

Geology mapped by R. E. Powell 1973-1980, 1983-1984

MINERAL RESOURCE POTENTIAL MAP OF THE EAGLE MOUNTAINS WILDERNESS STUDY AREA (CDCA—334), RIVERSIDE COUNTY, CALIFORNIA

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EXPLANATION

AREAS WITH POTENTIAL FOR UNDISCOVERED MINERAL RESOURCES

GOLD AND SILVER RESOURCES--Probably occur in vein deposits

High potential--Delineated on basis of assay values or silver concentrations in nonmagnetic heavy-mineral fractions of stream-sediment samples

Low to moderate potential--Delineated on basis of proximity to mafic or intermediate dikes and a lack of geochemical evidence for moderate or high potential

TUNGSTEN RESOURCES--Delineated on basis of elemental concentrations in nonmagnetic heavy mineral fractions of stream-sediment samples. Resources probably occur in vein deposits

High potential (concentration greater than 700 ppm)--Teeth on side of higher concentration

Moderate potential (concentration greater than 100 ppm)--Teeth on side of higher concentration

MOLYBDENUM RESOURCES--delineated on basis of elemental concentrations in nonmagnetic heavy-mineral fractions of stream-sediment samples. Resources probably occur in vein deposits

High potential (concentration greater than 70 ppm)--Teeth on side of higher concentration

Moderate potential (concentration greater than 10 ppm)--Teeth on side of higher concentration

COPPER AND LEAD RESOURCES--Low potential in all areas that have moderate or high potential for gold, silver, tungsten, or molybdenum resources

TIN AND THORIUM RESOURCES--Low potential throughout the wilderness study area

MINE OR PROSPECT--Numbered mines identified in table 1

CORRELATION OF MAP UNITS

Map units	Epoch	Era
Qal	QUATERNARY	CENOZOIC
QTb	QUATERNARY AND (OR) TERTIARY	CENOZOIC
TJcp	TERTIARY, CRETACEOUS, AND (OR) JURASSIC	CENOZOIC AND MESOZOIC
Kdg	CRETACEOUS AND (OR) JURASSIC	MESOZOIC
Jgbd	JURASSIC	MESOZOIC
San Gabriel terrane: Pz pCm, Pz pCg	PALEOZOIC AND PRECAMBRIAN	
Joshua Tree terrane (in gravitational slide or thrust fault): pCmsm, pCmig, pCgig, pCgGR	PRECAMBRIAN	

DESCRIPTION OF MAP UNITS

Qal — ALLUVIUM (QUATERNARY)--Sand and gravel in active stream channels and in older, inclised deposits; locally, may include Pliocene alluvium

QTb — BASALT (QUATERNARY AND (OR) TERTIARY)--Basalt flows and volcanic necks; in places overlies older alluvial deposits

TJcp — QUARTZ PORPHYRY DIKES (TERTIARY, CRETACEOUS, AND (OR) JURASSIC)--Quartz latite; light to medium gray on fresh surfaces; phenocrysts of quartz, alkali feldspar, plagioclase, and rare garnet in a siliceous aphanitic groundmass that constitutes 80 to 85 percent of the rock. Shown separately only where wide enough to show on map, otherwise, included with felsic dikes

FELSIC DIKES (TERTIARY, CRETACEOUS, AND (OR) JURASSIC)--Consist of: (1) aphanitic or fine-grained, light-gray or white felsite; (2) light- to medium-gray quartz porphyry (unit TJcp) where outcrop width is too thin to distinguish on map); (3) gray, fine-grained latite and dacite with microphenocrysts of feldspar, biotite, and hornblende in varying proportions; rare quartz and garnet; (4) feldspar porphyry with cream-colored or pinkish-white alkali feldspar phenocrysts and smaller phenocrysts of hornblende, biotite, and rare quartz set in a dark-gray, aphanitic groundmass that makes up 75-80 percent of the rock

MAFIC AND INTERMEDIATE DIKES (TERTIARY, CRETACEOUS, AND (OR) JURASSIC)--Consist of two principal varieties: (1) fine-grained diorite, commonly propylitically altered to a greenish-gray rock characterized by actinolite, chlorite, and epidote; nonresistant to erosion; 0.5 to 4 m thick; locally dikes are pervasively foliated parallel to their contacts; (2) hornblende porphyry with phenocrysts of hornblende and rare biotite, feldspar, and quartz in a dark-gray aphanitic matrix

Kdg — GRANITIC ROCKS (CRETACEOUS AND (OR) JURASSIC)--Consists of subunits of (1) coarse-grained biotite monzogranite (youngest), typically containing 25 to 35 percent quartz; (2) coarse-grained porphyritic biotite monzogranite with abundant quartz and phenocrysts of pink alkali feldspar; (3) medium-grained sphene-biotite-hornblende granodiorite; (4) coarse-grained quartz-poor monzogranite that contains abundant lavender-tinted alkali feldspar; and (5) coarse-grained hornblende-biotite quartz-poor porphyritic monzogranite (oldest) characterized by phenocrysts of lavender-tinted alkali feldspar, and ubiquitous secondary chlorite, epidote, and carbonate that impart a greenish cast to the rock

Jgbd — GABBRO AND DIORITE (JURASSIC)--Biotite-hornblende gabbro and diorite, and subordinate hornblende and biotite-hornblende monzodiorite; color index ranges from about 50 to 95+. Clinopyroxene and olivine locally are poikilitically enclosed within hornblende locally in the more mafic rocks; small amounts of alkali feldspar and quartz are almost always present; sphene and secondary epidote and chlorite are ubiquitous. As mapped, unit may contain pre-Jurassic mafic intrusive rocks

San Gabriel terrane

pCmsm — SYENITE-MANGERITE-JOTUNITE (PRECAMBRIAN)--Medium-grained, rusty-brown-weathering syenitic, monzodioritic, and dioritic rocks characterized by mesoperthite and mafic clots with relict corona-textures in which orthopyroxene(?) has been replaced by amphibole; typically contains less than 5 percent quartz

pCmig — ORTHOGNEISS (PRECAMBRIAN)--Consists of two subunits: (1) a heterogeneous mixture of tonalitic to granitic gneiss that locally displays relict mesoperthite, antiperthite, and garnet and corona-textured replacement of pyroxene(?) by clots of uralite, biotite, and quartz, all of which indicate that at least parts of the unit were formed under granulite-facies conditions and then retrograded to amphibolite-grade; (2) granodioritic to monzogranitic orthogneiss that is characterized by eye-shaped or tabular megacrysts of pink or white alkali feldspar oriented in a foliated dark-colored feldspar-quartz-biotite matrix

pCgig — PARAGNEISS (PRECAMBRIAN)--Biotitic and pelitic metasedimentary gneiss characterized by mineral assemblages containing prograde biotite + quartz + plagioclase + alkali feldspar ± sillimanite ± garnet with retrograde muscovite and chlorite

Joshua Tree terrane

Pz pCd — DOLOMITE (PALEOZOIC AND (OR) PRECAMBRIAN)--Very coarse-grained, recrystallized dolomite marble with grains up to 1 cm across; white to light-gray on fresh surfaces, grayish orange to buff on weathered surfaces; thin- to thick-bedded to massive; scattered layers are rich in dark-brown weathering nodules, pods, and lenses that were probably derived from chert. Layers of very coarse-grained white calcite marble occur sporadically, as do ferriferous layers of ankerite-dolomite

Pz pCg — GRANOFELS AND SCHIST (PALEOZOIC AND (OR) PRECAMBRIAN)--Predominantly pelitic and ferriferous pelitic granofels where undeformed; schist near the Red Cloud thrust. Ferriferous rocks are varicolored, mottled in red, purple, lavender, blue, gray, and white; in places, the ferriferous granofels is exclusively quartz + hematite. At least one thin layer of calcite marble occurs within the unit

Pz pCq — QUARTZITE (PALEOZOIC AND (OR) PRECAMBRIAN)--Consists of three subunits: (1) cross-bedded quartzite: coarse- to very coarse-grained, vitreous, mottled gray and bluish gray; medium-bedded to massive with low-angle sets of tangential planar cross-laminations; compositionally mature (95+ percent quartz) with abundant white sillimanite and (or) andalusite, locally with abundant green viridine; (2) conglomerate: contains pebbles and cobbles of quartz and quartzite in layers and lenses up to 10 ft thick interbedded near the base of the cross-bedded quartzite; hematite imparts a characteristic rusty-brown stain to the rock; deformation has stretched the pebbles as much as 10:2:1; (3) vitreous white to light-gray quartzite: very coarse-grained; massive with bedding obscure or obliterated; compositionally supermature, commonly with 98-99+ percent quartz

pCgGR — GRANITE GNEISS (PRECAMBRIAN)--Granitic to monzogranitic; augen and rod gneiss, with both deformed megacrysts of alkali feldspar and spindle-shaped aggregates of feldspar and quartz; typically contains less than 10 percent biotite in recrystallized, lenticular aggregates. Where overlain by the quartzite unit, the granite gneiss is capped by aluminous schist (sillimanite and (or) andalusite + muscovite + quartz ± chloritoid) characterized by 2-5-mm augen of recrystallized-quartz aggregates; the schist is inferred to represent a metamorphosed paleosol. Near the schist layer, the granite gneiss is muscovitic

CONTACT--dashed where approximately located

RED CLOUD THRUST FAULT--dashed where approximately located, dotted where covered; sawteeth on upper plate

HIGH-ANGLE FAULT OR FRACTURE--dashed where approximately located, dotted where covered; arrows indicate relative movement

APPROXIMATE BOUNDARY OF WILDERNESS STUDY AREA

STUDIES RELATED TO WILDERNESS

Bureau of Land Management Wilderness Study Areas

The Federal Land Policy and Management Act (Public Law 94-579, October 21, 1976) requires the U. S. Geological Survey and the U. S. Bureau of Mines to conduct mineral surveys on certain areas to determine their mineral values. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a mineral survey of the Eagle Mountains Wilderness Study Area (CDCA-334), California Desert Conservation Area, Riverside County, California.

SUMMARY

Geologic, geochemical, and geophysical investigations and a survey of mines and prospects indicate that those parts of the Eagle Mountains Wilderness Study Area (chiefly in the northwest half) that are intruded by propylitically altered mafic or intermediate, hornblende porphyry dikes with spatially associated quartz veins and shear zones have moderate or high potential for the presence of undiscovered low- to medium-grade gold, silver, and tungsten resources. High stream-sediment concentrations of molybdenum suggest that parts of those areas intruded by the dikes also contain molybdenum-bearing minerals and thus have moderate or high potential for the presence of undiscovered molybdenum resources. However, there has been no recorded production of molybdenum in the region and any resources that may be present in the study area that may be likely to be significant only if the mineralized quartz veins and shear zones are manifestations of an extensive subsurface quartz-vein stockwork system. All areas with moderate or high potential for gold, silver, tungsten, or molybdenum resources also have low potential for the presence of undiscovered copper and lead resources. Low potential for the presence of undiscovered tin and thorium resources exists throughout the wilderness study area. Sand, gravel, and stone suitable for construction material are found in the study area, but similar or better quality materials are abundant and equally or more readily accessible outside the area. No new mineral occurrence was located during this study.

INTRODUCTION

This report summarizes the results of geologic, geochemical, and geophysical surveys by the U.S. Geological Survey and an investigation of mines, prospects, and mineralized areas by the U.S. Bureau of Mines. Our objectives are to appraise known resources[1] in the study area and to assess the potential for undiscovered resources.

[1]Resource--a concentration of naturally occurring solid, liquid, or gaseous material in or on the Earth's crust in such form and amount that economic extraction of a commodity from the concentration is currently or potentially feasible (U.S. Bureau of Mines and U.S. Geological Survey, 1980). defined in this broad fashion, a resource may include material (reserves) that can be developed profitably under current market conditions or it may contain only material (marginal reserves, subeconomic resources) that requires more favorable market conditions or more advanced technological capability to be developed profitably.

The Eagle Mountains wilderness Study Area consists of about 49,723 acres in the southeastern and east-central part of the Eagle Mountains, Riverside County, Calif. just north of Interstate 10 about 170 mi east-southeast of Los Angeles (index map). The western boundary of the wilderness study area abuts Joshua Tree National Monument, the northern boundary skirts the Eagle Mountains mining district, and parts of the southern and eastern boundaries follow the Colorado River aqueduct. Principal access to the interior of the wilderness study area is provided by jeep trails in Big Wash and an unnamed, major north-draining wash in the western part of the study area.

GEOLOGY

Crystalline rocks of the Eagle Mountains Wilderness Study Area constitute parts of a Mesozoic batholith and Precambrian and Precambrian and (or) Paleozoic country rock into which the batholith has intruded. In the Eagle Mountains and several nearby mountain ranges, prebatholitic rocks comprise two lithologically distinct terranes: the Joshua Tree and San Gabriel terranes of Powell (1981, 1982). The two terranes are superposed along a prebatholitic low-angle fault system of regional extent, the Red Cloud thrust.

The structurally lower Joshua Tree terrane consists of Precambrian granite capped by a metamorphosed paleosol and overlain nonconformably by orthoquartzite that interlayers with pelitic and feldspathic granofels units. Dolomite occurs locally in the section. The rocks of the Joshua Tree terrane were metamorphosed under amphibolite-grade conditions and, near the Red Cloud thrust, were pervasively deformed to granite gneiss, lineated quartzite, and schist.

Precambrian units of the San Gabriel terrane comprise a three-part deep-crustal section. At the highest level, metasedimentary gneiss of uppermost amphibolite-grade is intruded by granodioritic augen gneiss. Both of these units are intruded by retrograded granulite gneiss at an intermediate level, and the granulitic rocks are in turn intruded by syenite-mangerite-jotunite at the lowest level exposed.

Mesozoic plutonic rocks comprise two batholithic suites, both of which intrude the Joshua Tree and San Gabriel terranes and the Red Cloud thrust system. West-northwest-, north-northwest-, and northeast-trending swarms of felsic, intermediate, and mafic dikes crosscut plutons of both batholithic suites in the Eagle Mountains. The orientations of the dikes are parallel to the orientations of fractures that crosscut batholithic and prebatholitic rocks throughout the Eagle Mountains and nearby ranges.

The principal mineral occurrences in the Eagle Mountains are iron deposits in the Eagle Mountain mine area in the northern part of the range. The iron deposits have usually been interpreted as skarns developed by metasomatic replacement of dolomite where it is intruded by plutonic rocks of the older batholithic suite (Harder, 1912; Hadley, 1945; Dubois and Brummett, 1968). Gold, scheelite, and copper minerals occur in quartz veins and bleached and limonite-stained rock associated spatially with propylitically altered mafic dikes and relatively unaltered hornblende porphyry dikes in the Eagle Mountains, although no associated mineral occurrences have been recognized in the study area.

Cenozoic east-west trending left-lateral strike-slip faults bound the Eagle Mountains to the north and south and transect the range.

GEOCHEMISTRY

Nonmagnetic heavy-mineral fractions of stream-sediment samples from the western part of the study area locally contain anomalously high concentrations of tungsten, molybdenum, silver, lead, and bismuth. The detectable metallic-element concentrations in this area are elevated relative to values expected from sediment derived from undeformed rocks, and linked with the identification of scheelite and fluorite in panned concentrates, indicate that these elements were mobilized and concentrated in a mineralizing system. Anomalously high concentrations of tin and thorium in heavy-mineral fractions for the most part are probably contained in common rock-forming minerals such as sphene, although small amounts of cassiterite (tin) may be present in a few samples and thorite (thorium) was identified in one sample.

GEOPHYSICS

Areas of anomalously low aeromagnetic signature that possibly indicate alteration of magnetite related to mineralization occur in the study area (see fig. 4 in accompanying pamphlet). These aeromagnetically low areas include most of the known exposures of mafic and intermediate dikes in the study area.

MINING DISTRICTS AND MINERALIZED AREAS

The Eagle Mountains mining district contains occurrences of gold, silver, scheelite, galena, sphalerite, hematite, and limonite. Production records indicate that mines in the district have produced a total of 7,257 oz of gold, 14,768 oz of silver, 114,424 lb of copper, 1,48 million lb of lead, and 215 million long tons of iron since the late nineteenth century, virtually all of which came from north of the wilderness study area. Three mining claims in the study area are filed with U.S. Bureau of Land Management.

During this investigation, the U.S. Bureau of Mines mapped and sampled all known mines, prospects, and mineralized areas that were accessible inside and within about 1 mi of the study area (table 1) (McColly, 1983). A total of 33 samples were collected and fire-assayed for gold and silver. About half of these samples contained detectable gold (greater than 0.005 oz/ton) and two contained detectable silver (greater than 0.02 oz/ton). Copper (2 percent) was detected in one grab sample from a mine dump.

ASSESSMENT OF MINERAL RESOURCES

Assessment criteria

Gold, silver, tungsten, molybdenum, bismuth, lead, and copper have been mobilized and concentrated in parts of the Eagle Mountains. Data gathered during this reconnaissance study permit neither specification of the processes or absolute timing of mineralization in the Eagle Mountains, nor substantiation of the presence of undiscovered resources. However, from the geologic, geochemical, and geophysical surveys, and the examination of the mines and prospects, we have established the following empirical criteria for assessing potential for the presence of undiscovered gold, silver, tungsten, and molybdenum resources in the region:

(1) the presence of quartz veins and zones of faulting and fracturing where accompanied by the presence of hornblende porphyry or of propylitically altered mafic dikes;

(2) elevated concentrations of tungsten, molybdenum, silver, gold, or bismuth in stream-sediment samples;

(3) the presence of mines and prospects and gold or silver detected in assays of samples of quartz veins and bleached or limonite-stained rock;

(4) troughs of anomalously low values on the aeromagnetic map.

Areas in which there is evidence for potential for gold, silver, tungsten, or molybdenum resources are usually indicated by more than one criterion. We judge all areas that contain mafic or intermediate dikes and are characterized by a low aeromagnetic signature relative to surrounding areas to have potential for these resources. Although areas with potential generally are indicated by a combination of geological, geochemical, and geophysical criteria, our assignment of a specific level of low, moderate, or high potential for the presence of a particular metallic mineral resource is based on the strength of the geochemical evidence for that resource. Because areas in which mafic or intermediate dikes are not exposed have not yielded geochemical or geologic evidence for mineralization, we have not assigned them a potential.

Gold and silver

In areas where a third or more of assays on systematically collected samples show gold or where silver is detected in the nonmagnetic heavy-mineral fraction of stream-sediment samples, we assign a high potential for the presence of undiscovered gold resources in quartz veins or shear zones. In areas where gold is rare in assayed vein samples or where field observations did not indicate a need for assays, we assign a low to moderate potential.

Known vein gold deposits in the Eagle Mountains are small in volume and typically of low or medium grade, although high-grade pockets have been found. Although any undiscovered gold deposits in the study area are likely to be similar in size and grade to those already known, the presence of much larger subsurface deposits of gold in veins or disseminated in country rock cannot be ruled out.

Potential for the presence of undiscovered silver resources in quartz-vein deposits parallels, and is incidental to, potential for gold resources.

Tungsten

We assign a high potential for the presence of undiscovered tungsten resources in vein deposits in areas that are characterized by high tungsten concentrations (greater than 700 parts per million (ppm)) in the nonmagnetic heavy-mineral fraction of stream-sediment samples. Where stream-sediment tungsten concentrations fall in the range from 100 ppm to 700 ppm, we assign a moderate potential. Areas where stream-sediment tungsten concentrations are 100 ppm or less are also characterized by the absence of mafic or intermediate dikes, and thus are areas in which we have recognized no evidence of a potential.

A lack of tungsten production from the Eagle Mountains, together with comparison of the stream-sediment tungsten concentrations with those of the Chuckwalla Mountains are consistent with the presence of small, low-grade vein deposits. However, by analogy with vein scheelite deposits elsewhere in the region, it is possible that larger and higher-grade subsurface deposits are present.

Molybdenum

We assign a high potential for the presence of undiscovered molybdenum resources to areas that are characterized by high concentrations of molybdenum (greater than 70 ppm) in the nonmagnetic heavy-mineral fraction of stream-sediment samples. Where stream-sediment molybdenum concentrations fall in the range from 10 ppm to 70 ppm, we assign a moderate potential. Areas where stream-sediment molybdenum concentrations are 10 ppm or less are also characterized by the absence of mafic or intermediate dikes, and thus are areas in which we have recognized no evidence of a potential.

There has been no molybdenum production from the Eagle Mountains and little production from molybdenum deposits anywhere in southern California. Evidence for molybdenum mineralization in the study area occurs in and around the same vein and fracture system as evidence for tungsten, gold, and silver mineralization. However, more detailed mineralogical and geochemical studies are needed to evaluate the likely form and content of potential molybdenum resources in the Eagle Mountains.

Copper and lead

In and around the wilderness study area, evidence for copper and lead mineralization tends to be found in areas characterized by evidence gold, silver, tungsten, and molybdenum mineralization. Consequently, we assign a low potential for the presence of undiscovered copper and lead resources in small vein deposits to all areas with potential for gold, silver, tungsten, or molybdenum resources.

Tin and thorium

Although tin and thorium concentrations in some panned concentrates from stream-sediment samples in the Eagle and nearby Chuckwalla Mountains are anomalously high for the region, the principal ore minerals of tin and thorium--cassiterite and monazite, respectively--have not been observed microscopically in panned concentrates. Comparison of geochemical data for stream-sediment samples from the Eagle Mountains with those for samples from the nearby Chuckwalla Mountains (Powell and others, 1984)--where identical rocks are exposed--shows that elevated concentrations of tin are derived from areas underlain both by the Precambrian granite gneiss of the Joshua Tree terrane and Mesozoic granitic rocks. This observation is consistent with deposition of tin in a crosscutting mineralizing system. Therefore, we assign a low potential for the presence of undiscovered tin and thorium resources in small vein deposits throughout the wilderness study area.

Iron

Iron has been mined extensively in the Eagle Mountains to the north of the wilderness study area, but there is no evidence that significant iron mineralization has occurred within the wilderness study area. The geologic conditions thought to have led to the deposition of iron to the north are not found in the study area: no dolomite is exposed and the stratigraphic interval at which it is found north of the study area projects thousands of feet beneath the study area. The aeromagnetic highs in the study area are not likely to be caused by the presence of magnetite ore bodies.

Sand, gravel, and stone

Sand, gravel, and crystalline rocks suitable for construction purposes are abundant in the study area, but similar or better grade material is abundant and accessible in the region outside the study area. Material suitable for use as roofing granules may occur at a locality in the northern part of the study area, within the southern half of the Little Stone-Jade Mountain claim. None is exposed, however, and the bulk of this resource lies outside the study area at the site from which it was originally produced.

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Table 1.--Mines and prospects in and adjacent to the Eagle Mountains Wilderness Study Area, Riverside County, California

Map no.	Mine or prospect name	Assay data (either literature values or files)	Geologic features controlling mineralization	Development and production	References
1	Golden Eagle mine (Hill mine, Jade mine, Lucky Jim, Lonesomebird)	Gold, 0.20-0.28 oz/ton.	Quartz veins in m. qtz-rich f.-g. striking about west; some in contact zone between quartz monzonite and Mesozoic granite. Alty qtz-rich gneiss.	Reported production: 50 lb copper (estimated); underground adit with stope (backfill 5) (estimated production: 1,000 short tons of iron ore in 1941).	Dubois (1968, unpublished report, California Division of Mines and Geology).
2	Bonanza Queen (Bonanza King, Hill mine, Hill, Hill's mine, Jade mine, Jade, Jade King, Jade Queen)	Gold, 0.020-0.040 oz/ton; silver, 0-0.4 oz/ton.	Veins, 0.5-4 m 0.5-0.75 mile, striking west-northwest, in contact zone; some ore can be traced for about 50 ft, perhaps as much as 200 ft.	Vertical shaft, 15 ft deep; adits, 100 ft long, small stoping; production unknown, probably small (10 tons).	None.
3	Lucky Strike (Lucky Strike, Hill, Hill's mine, Jade mine, Jade, Jade King, Jade Queen)	Gold(?); some samples contain silver.	Shear zone in blocky, coarse-grained granite; strike west, 3.5-100 m, dips 15° N.	Adits, 175 ft long; small stoping; production unknown, some limonite.	Campbell (1968).
4	Unofficial prospects (Hill's mine, Jade, Jade, Jade King, Jade Queen)	Gold, 0.006-0.050 oz/ton.	Highly fractured contact zone between felsic dike and quartzite; dike is hornblende porphyry and is chloritic within.	Inclined shaft, 50 ft deep; run-open cuts, 25 ft and 50 ft long; production unknown, some limonite.	None.
5	Unnamed prospect (Hill's mine, Jade, Jade, Jade King, Jade Queen)	Gold(?); none detected in assay.	Bull quartz veins or masses in granite gneiss. Trend varies.	Vertical shaft, 20 ft deep (estimated); production unknown, probably none.	None.
6	Bitter Jade mine (Bitter Jade, Jade, Green Giant-King Queen, Little Stone-Jade, Jade, Jade King, Jade Queen, Hill's, Hill, Hill's mine, Hill's, Hill's mine, Hill's, Hill's mine, Hill's