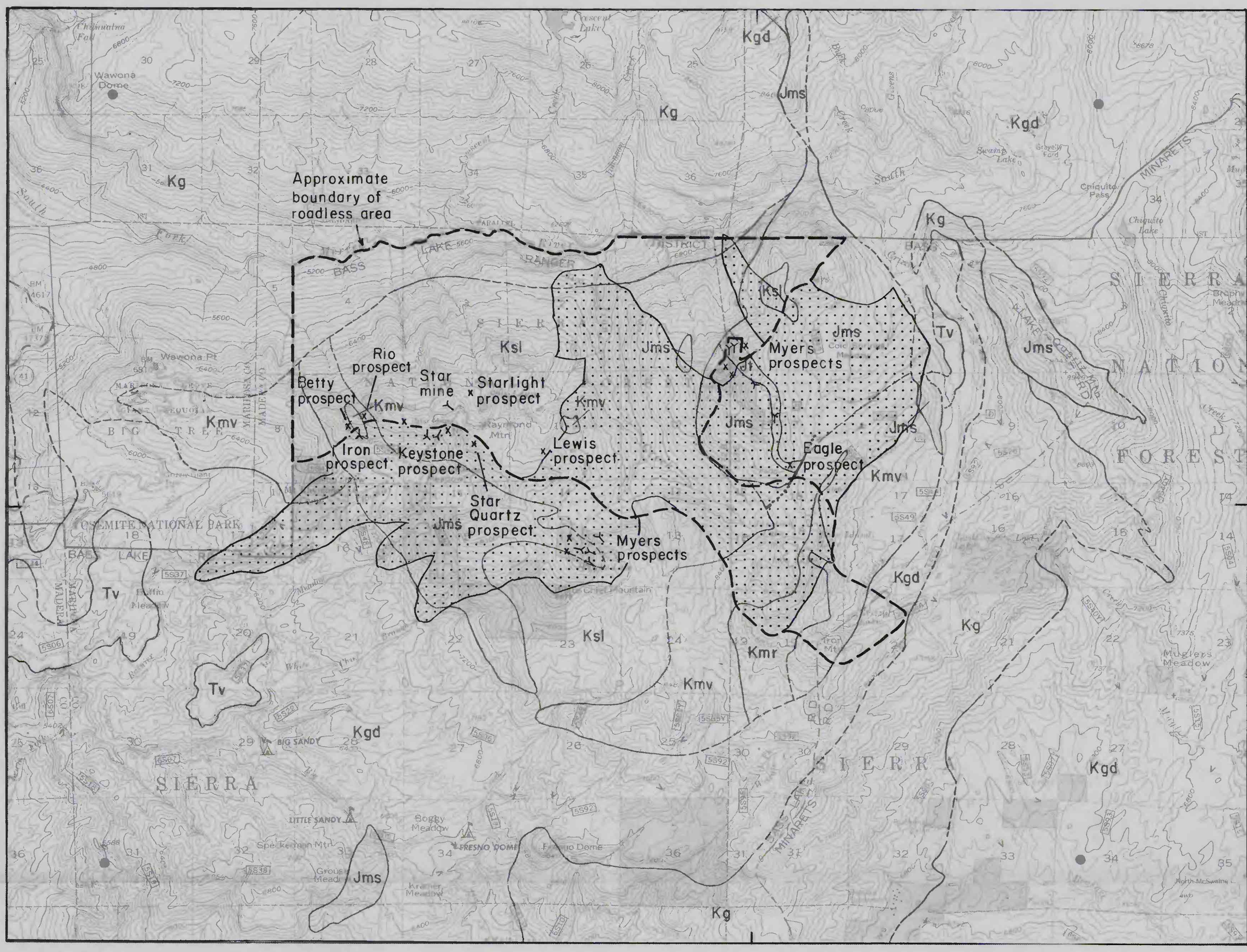
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES MAP MF-1417-B



Base from U.S. Geological Survey, 1:62,500, Bass Lake, Merced Peak, Shuteye Peak, 1953; Yosemite, 1956; with cultural additions by U.S. Forest Service (additional roads, road designations, and stipple pattern for lands under private ownership)

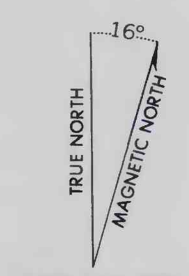
SCALE 1:62500

1 ½ 0 1 2 3 4 MILES

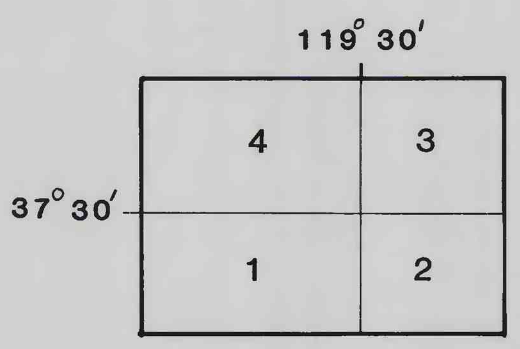
3000 0 3000 6000 9000 12000 15000 18000 21000 FEET

1 .5 0 1 2 3 4 5 KILOMETERS

Explanatory pamphlet accompanies map



APPROXIMATE MEAN DECLINATION, 1983



INDEX TO GEOLOGIC MAPPING

Geology compiled, field-checked, and modified by N. K. Huber, 1981, from:

1 Bateman, P. C., 1981, unpublished geologic mapping in progress, Bass Lake quadrangle, scale 1:48,000
2 Huber (1968), Shuteye Peak quadrangle
3 Peck (1980), Merced Peak quadrangle
4 Peck, D. L., 1981, unpublished geologic mapping in progress, Yosemite quadrangle, scale 1:48,000

MINERAL RESOURCE POTENTIAL MAP OF THE MOUNT RAYMOND ROADLESS AREA, CENTRAL SIERRA NEVADA, CALIFORNIA

By

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and

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U.S. Bureau of Mines

1983

CORRELATION OF MAP UNITS

VOLCANIC ROCKS

Tb } TERTIARY

PLUTONIC ROCKS

Ksl Kg Kgd } CRETACEOUS

METAMORPHIC ROCKS

Kmv Kmr } CRETACEOUS(?)

Jms Jt } JURASSIC(?)

DESCRIPTION OF MAP UNITS

VOLCANIC ROCKS

Tb BASALT (TERTIARY)

PLUTONIC ROCKS

Ksl GRANITE PORPHYRY OF STAR LAKES (CRETACEOUS)--The main plutonic unit within the roadless area

Kg GRANITE (CRETACEOUS)--Undifferentiated masses of granite

Kgd GRANODIORITE AND TONALITE (CRETACEOUS)--Undifferentiated masses of granodiorite, tonalite, and minor quartz diorite

METAMORPHIC ROCKS

Kmv METAVOLCANIC ROCKS, UNDIVIDED (CRETACEOUS?)

Kmr METARHYOLITE (CRETACEOUS?)

Jms METASEDIMENTARY ROCKS, UNDIVIDED (JURASSIC?)

Jt TACTITE (JURASSIC?)

CONTACT--Approximately located, dashed where concealed

FAULT--Dotted where concealed

CLAIMS AND PROSPECTS

X Prospect pit

Adit

AREA YIELDING ANOMALOUS SAMPLES--Drainage areas yielding heavy-mineral-concentrate samples containing anomalous amounts of tungsten and associated elements

STUDIES RELATED TO WILDERNESS

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to determine their mineral resource potential. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a mineral survey of the Mount Raymond Roadless Area in the Sierra National Forest, Madera County, California. The Mount Raymond Roadless Area was classified as a further planning area (5-242) during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

SUMMARY OF MINERAL RESOURCE POTENTIAL

The Mount Raymond Roadless Area has two types of metallic-mineral deposits or occurrences. One consists of silver-lead-zinc minerals in aplitic dikes, and the other of concentrations of iron minerals in tactite zones near intrusive igneous rocks. Both types have been prospected since at least the early 1880's.

The largest silver-lead-zinc surface mineral occurrence was developed in 1888-89 at the Star mine. After three failures to operate profitably, the mine has remained idle since about 1908. Production of silver and, possibly, lead was reported, but is not thought to be significant. Field examination and data assessment suggest little potential for further production from the depleted Star mine ore bodies, low probability for further development of the Star mine property, and low resource potential for the remaining exposed Star-mine-type occurrences situated nearby.

The iron-mineral deposits and occurrences, which are mostly peripheral to and just outside the roadless-area boundary, have not been developed, although they have been explored and were included in at least one 1960's development proposal. The iron occurrences have a low resource potential; they are scattered, sporadic, and discontinuous. Heavy-mineral concentrates of sediment from streams draining the areas of altered iron-rich metasedimentary rocks commonly contain anomalous amounts of an elemental suite (boron, bismuth, molybdenum, tin, tungsten) considered to characterize tungsten mineralization and indicate that at least some of the altered metasedimentary rocks contain possibly significant amounts of tungsten. Except for a narrow belt along the east side of the roadless area, the altered metasedimentary rocks lie outside the roadless-area boundary.

Heavy-mineral placer occurrences are not known or suspected to occur within the study area. Stone and sand and gravel suitable for construction materials are available in the area, but development and utilization for other than minor local demands are unlikely because similar or better grade materials are available nearer to major markets. There is no potential for fossil fuels in the roadless area.

INTRODUCTION

Area Description

The Mount Raymond Roadless Area (study area) is in the Sierra National Forest, Madera County, California. It is located on the west slope of the Sierra Nevada adjacent to the south boundary of Yosemite National Park (fig. 1), just east of the Mariposa Grove of Big Trees. The South Fork of the Merced River forms most of the north boundary of the roadless area, whereas the south boundary mostly follows a discontinuous ridge reaching elevations of 8712 ft at Raymond Mountain and 9165 ft at Iron Mountain. The Mount Raymond Roadless Area encompasses an area of 6,700 acres (10.5 mi^2). Access to the south and east margins of the study area is by several graded roads leaving State Highway 41 near the small community of Fish Camp.

GEOLOGY, GEOCHEMISTRY, AND GEOPHYSICS

Geology

The Mount Raymond Roadless Area is underlain by various plutonic rocks of the Sierra Nevada batholith and by metamorphic rocks that occur as septa or roof pendants within the batholith. Bedrock is well exposed on ridges and in glacial cirques, but much of the area is covered by talus and slopewash and, locally, by glacial moraine. Only the generalized bedrock geology is shown on this mineral resource potential map; details of the geology and a fuller description of the geologic units are shown on a geologic map published separately (Huber, 1982).

More than 80 percent of the study area is underlain by plutonic rocks of the Sierra Nevada batholith. The most extensive plutonic unit in the study area is the granite porphyry of Star Lakes. Alaskite and aplite dikes locally intrude the Star Lakes unit; in the vicinity of the Star mine, west of Raymond Mountain, they contain sporadic zones of base-metal sulfide mineralization with accessory silver. The other plutonic units in the study area are not known to host any mineralization.

Geochemical Studies

A total of 59 rock, 32 stream-sediment, and 32 heavy-mineral-concentrate samples were analyzed for a geochemical investigation of the Mount Raymond Roadless Area (Huber and Chaffee, 1983).

Rock samples containing anomalous concentrations of elements of potential interest are confined to areas of known mineralization. The overall anomaly levels in the rock samples not collected from obviously mineralized outcrops range from low to moderate.

Significant stream-sediment and heavy-mineral-concentrate anomalies occur in the Rainier Creek drainage and include an elemental suite (silver, arsenic, gold, copper, manganese, lead, zinc) considered to characterize base- and precious-metal mineralization. However, these anomalies are probably, at least in part, the result of milling activity in that area related to attempted development of the Star mine. Abandoned mine workings are also present in this drainage.

In the Iron Creek drainage basin heavy-mineral-concentrate anomalies include an elemental suite (boron, bismuth, molybdenum, tin, tungsten) considered to characterize tungsten mineralization. Both Iron Creek and the Cold Springs Meadow area receive sediment from highly altered iron-rich metasedimentary rocks, such as those at the southern group of Myers prospects adjacent to the roadless area. The anomalous metallic elements in the heavy-mineral-concentrate stream-sediment samples are probably derived from these altered rocks.

Geophysical studies

Examination of an aeromagnetic map of the Mount Raymond Roadless Area and vicinity, superimposed on the geologic map, indicates that some of the metamorphic rocks are moderately magnetic, with anomalies ranging from 200 to 500 gammas in amplitude (Griscom and Huber, 1983). In general, most of these magnetic features appear to be caused by the rocks observed at the surface and to have no likely resource significance. Two anomalies of rather restricted extent may deserve further investigation, although all except a tiny part of one anomaly are outside the roadless area. These anomalies are linear highs that flank the tactite unit. Hematite and magnetite occurrences are reported from this general area, and so the anomalies may be caused by these magnetic iron oxides, somehow associated with the tactite. The amplitude of the anomalies is relatively small (300-500 gammas), and so if they are caused predominantly by magnetite, they are probably not of resource importance.

ASSESSMENT OF MINERAL RESOURCE POTENTIAL

The geology of the Mount Raymond Roadless Area consists of plutonic rock of the Sierra Nevada batholith that intrudes metamorphic rocks exposed in roof pendants. The reported and observed mineral occurrences are of two types. One type is associated with injections of late-stage alaskite dikes in contact-zone plutonic rock. Deposits and occurrences found within this environment are of sulfides containing silver, lead, and zinc, and generally are confined to a small dike complex in a limited geographic area near Raymond Mountain. These mineral-bearing zones are typically sporadic and discontinuous within the dikes, and the largest zones are no more than 50 ft in maximum dimension. The Star mine was developed on the best surface exposures in 1888-89, but production is not thought to have been significant. Mining has depleted the original deposits. Remaining occurrences at the mine are estimated to total about 4,300 tons of dike rock averaging 1.5 troy oz. silver per ton, 0.9 weight percent lead, and 1.9 weight percent zinc.

The second type of mineral occurrence consists of magnetite and other iron minerals in tactite bodies associated with carbonate-bearing metamorphic rocks. These sporadic and discontinuous deposits and occurrences are found over a wider area than those of silver-lead-zinc. In the 1960's, an attempt was made to consolidate the numerous small iron occurrences along the south and east peripheries of the study area with larger ones farther to the south and east; however, the total resources apparently did not warrant the necessary investments. Therefore, these deposits are considered to have a low resource potential. Heavy-mineral concentrates of sediment from streams draining the areas of altered iron-rich metasedimentary rocks commonly contain anomalous amounts of an elemental suite (boron, bismuth, molybdenum, tin, tungsten) considered to characterize tungsten mineralization and indicate that at least some of the altered metasedimentary rocks contain possibly significant amounts of tungsten. Except for a narrow belt along the east side of the roadless area, the altered metasedimentary rocks lie outside the roadless area.

No heavy-mineral placer resources are known or suspected. Some potential may exist for stone and sand and gravel; however, development and utilization of these materials for other than minor local demands are unlikely because similar or better grade materials are available nearer to major markets.

REFERENCES CITED

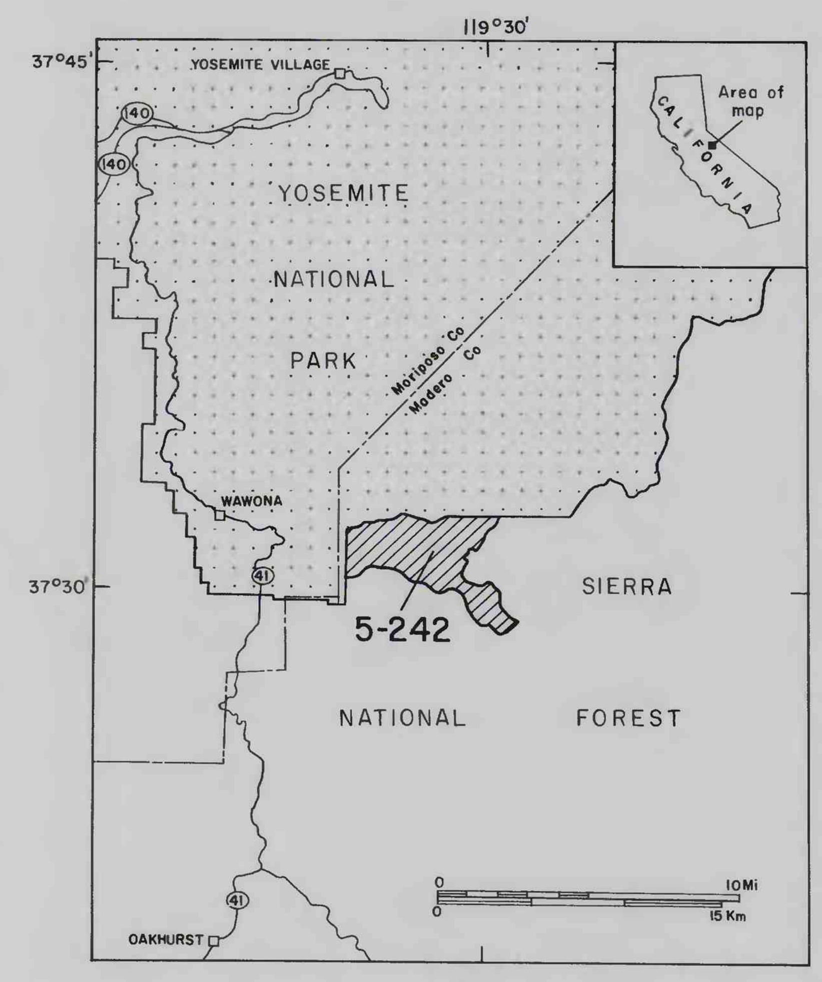
Griscom, Andrew, and Huber, N. K., 1983, Aeromagnetic map of the Mount Raymond Roadless Area, central Sierra Nevada, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1417-D, scale 1:62,500.

Huber, N. K., 1968, Geologic map of the Shuteye Peak quadrangle, Sierra Nevada, California: U.S. Geological Survey Geologic Quadrangle Map GQ-728, scale 1:62,500.

_____ 1982, Geologic map of the Mount Raymond Roadless Area, central Sierra Nevada, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1417-A, scale 1:62,500.

Huber, N. K., and Chaffee, M. A., 1983, Geochemical maps of the Mount Raymond Roadless Area, central Sierra Nevada, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1417-C, scale 1:62,500.

Peck, D. L., 1980, Geologic map of the Merced Peak quadrangle, central Sierra Nevada, California: U.S. Geological Survey Geologic Quadrangle Map GQ-1531, scale 1:62,500.



Index map showing location of Mount Raymond Roadless Area (diagonal lines) in east-central California.

Interior—Geological Survey, Reston, Va.—1983

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