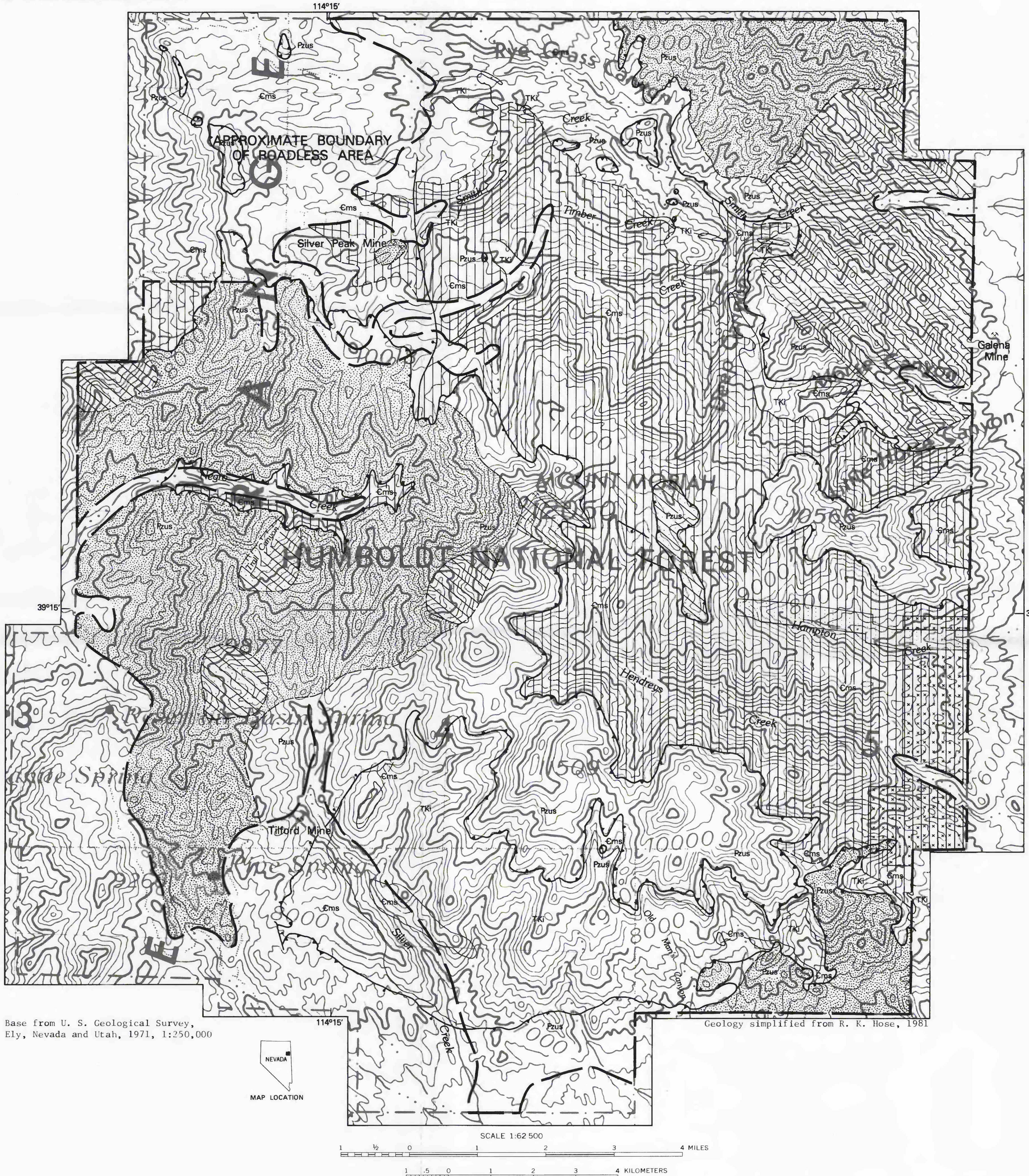
DEPARTMENT OF THE INTERIOR
U. S. GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1244-B
PAMPHLET ACCOMPANIES MAP



Base from U. S. Geological Survey, Ely, Nevada and Utah, 1971, 1:250,000

Geology simplified from R. K. Hose, 1981

MAP LOCATION

EXPLANATION

- AREA OF HIGH-GRADE BUILDING STONE RESOURCE
- AREA OF LOW-GRADE GARNET ABRASIVES RESOURCE
- AREAS WITH HIGH POTENTIAL FOR RESOURCES OF HIGH-QUALITY DECORATIVE QUARTZITE BUILDING STONE AND LOW POTENTIAL FOR RESOURCES OF GARNET ABRASIVES
- AREA WITH MODERATE POTENTIAL FOR RESOURCES OF LEAD, ZINC, SILVER, AND COPPER
- AREAS WITH LOW TO MODERATE POTENTIAL FOR RESOURCES OF LEAD, ZINC, SILVER, AND COPPER
- AREAS WITH LOW POTENTIAL FOR RESOURCES OF LEAD, ZINC, SILVER, AND COPPER

CORRELATION OF MAP UNITS

Lower plate	Upper plate		
TKi		Tertiary or Cretaceous	
	Pzus	Permian through Ordovician	PALEOZOIC
€ms		Cambrian	

- APPROXIMATE BOUNDARY OF MOUNT MORIAH ROADLESS AREA (04352)
- CONTACT BETWEEN INTRUSIVE IGNEOUS ROCKS AND SEDIMENTARY ROCKS
- LOW-ANGLE FAULT (SNAKE RANGE DÉCOLLEMENT)--Sawteeth on upper plate
- HIGH-ANGLE FAULT--Bar and ball on downthrown side. Complex faulting in upper plate rocks not shown

DESCRIPTION OF MAP UNITS

TKi INTRUSIVE IGNEOUS ROCKS (TERTIARY OR CRETACEOUS)--Composition varying from monzonite to granodiorite, present only in lower plate rocks (below the Snake Range décollement). Exposed as sills and small stocks and dikes

Pzus UNMETAMORPHOSED SEDIMENTARY ROCKS, UNDIVIDED (PALEOZOIC)--Upper plate rocks (above the Snake Range décollement) consisting of limestone, dolomite, shale, siltstone, sandstone, and quartzite of the Arcturus Formation, Riepe Spring Limestone, Ely Limestone, Chainman Shale, Joana Limestone, Pilot Shale, Guilmette Limestone, Simonson Dolomite, Sevy Dolomite, Laketown Dolomite, Fish Haven Dolomite, Eureka Quartzite, Pogonip Group, Notch Peak Formation, Dunderberg Shale, Lincoln Peak Formation, and Pole Canyon Limestone

€ms METAMORPHOSED SEDIMENTARY ROCKS, UNDIVIDED (CAMBRIAN)--Lower plate rocks (below the Snake Range décollement) consisting of marble, metaquartzite, garnet schist, and phyllite of the Dunderberg Shale, Lincoln Peak Formation, Pole Canyon Limestone, Pioche Shale, and Prospect Mountain Quartzite

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 Moriah Roadless Area (04352) in the Humboldt National Forest, White Pine County, Nevada. The Mount Moriah Roadless Area (04352) 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.

MINERAL RESOURCE POTENTIAL SUMMARY STATEMENT

The U.S. Geological Survey and the U.S. Bureau of Mines made a geologic, geochemical, and mineral survey of the Mount Moriah Roadless Area, east-central Nevada in 1979-81. The area covers 97,205 acres of the Humboldt National Forest in eastern White Pine County, Nevada.

Exposed rocks consist of complexly faulted Paleozoic limestone, dolomite, siltstone, shale, and orthoquartzite emplaced over Cambrian metaquartzite, schist, phyllite, and marble which have been intruded by Cretaceous and (or) Tertiary stocks and sills of monzonite to granodiorite composition.

Past production within or immediately adjacent to the roadless area included building stone, lead, silver, zinc, copper, gold, tungsten, and garnet. Current mining activity within the roadless area consists of the quarrying of an uncommon, high-quality decorative building stone.

Much of the roadless area has high potential for additional resources of decorative quartzite building stone and low potential for resources of placer and lode garnet abrasive material. Several localities also have moderate or low potential for resources of lead, zinc, silver, and copper. There is no evidence of a potential for oil and gas resources, and as of June 1981, no oil and gas leases or lease applications were on record with the U.S. Bureau of Land Management for the Mount Moriah Roadless Area.

INTRODUCTION

The Mount Moriah Roadless Area covers 97,205 acres of the Humboldt National Forest in eastern White Pine County, Nevada. Located in the northern Snake Range and bounded on the west by Spring Valley and on the east by Snake Valley, the roadless area lies about 4 mi north of U.S. Highway 6 and 50. Baker, Nevada, about 10 mi south of the area, is the nearest small community; Ely, Nevada, about 35 mi to the west, and Delta, Utah, about 85 mi to the northeast, are the nearest main population centers.

The perimeter of the Mount Moriah Roadless Area generally follows the Humboldt National Forest boundary in the northern Snake Range, except in the northwest and southwest corners, where the roadless area boundary follows U.S. Forest Service roads 460, 469, 457, and 458. These and other Forest Service roads, along with other, unmaintained, roads and trails, provide access to the interior of the area. Elevations range from 6,000 ft along the eastern border, and 7,000 ft for much of the western border, to as much as 12,050 ft on Mount Moriah, located in the center of the roadless area.

GEOLOGY

The Mount Moriah Roadless Area is divided into two major geologic terranes by the Snake Range décollement, a slightly warped, low-angle to flat-lying fault. Exposed rocks below the fault consist of Lower Cambrian metaquartzite, schist, and phyllite, and lower Middle Cambrian marble. These rocks are intruded, and metamorphosed to garnet grade, by granitic stocks and sills of monzonite to granodiorite composition that probably date from the Cretaceous or early Tertiary. Although much cataclasis and mylonitization occurred in the lower plate rocks, faulting is virtually absent, compared to the rocks above the décollement.

The upper plate rocks range in age from early Middle Cambrian to Permian and consist of limestones, dolomites, siltstones, shales, and quartzites. These rocks are unmetamorphosed but are structurally complex due to much high- and low-angle faulting (Hose, 1981).

With possibly one exception, all significant mineralization within the roadless area appears to be confined to the upper plate rocks and to be associated with faults, which probably served as conduits for mineralizing solutions. Resources in the lower plate rocks appear to be limited to building stone and garnet abrasives that owe their origin to the metamorphism of certain lower plate rocks.

GEOCHEMISTRY

Stream sediments were sampled at 126 sites within and adjacent to the Mount Moriah Roadless Area. At each site a bulk sediment sample was collected and a comparable sample was panned to concentrate the heavy minerals. Magnetic separation of each heavy-mineral concentrate produced three fractions: a magnetic fraction containing mostly magnetite, ilmenite, and hematite; a semimagnetic fraction containing mostly amphiboles, pyroxenes, and garnets; and a nonmagnetic fraction containing heavy accessory minerals and most ore minerals. The nonmagnetic, heavy-mineral concentrates and the bulk sediment samples were analyzed spectrographically for 31 elements. Some of the concentrates contained anomalously high values of lead, zinc, copper, and barium; analytical values were as high as 10,000 ppm (parts per million) lead, 5,000 ppm zinc, 500 ppm copper, and 7,000 ppm barium. The semimagnetic fractions of the heavy-mineral concentrates were examined under a microscope for garnet content. The results of these observations were compared with the corresponding observation of a sample taken in Hampton Creek below the area of past placer garnet mining.

Ninety-five rock and placer samples were also collected from known mines, prospects, and mineralized zones in and adjacent to the roadless area. Mineralogical and chemical analyses of these samples showed anomalous amounts of zinc, lead, copper, silver, antimony, arsenic, barium, and garnet in some samples; values were as high as 10 percent lead, 25 percent zinc, 0.05 percent silver, 2 percent copper, 0.15 percent antimony, 0.5 percent arsenic, 19 percent barium, and 5.7 percent garnet.

GEOPHYSICS

Aeromagnetic data show little correlation with the exposed geology but they probably delineate granitic bodies which occur in the lower plate rocks. A broad magnetic high occurs along the west side of the roadless area and appears to have two east- and southeast-trending offshoots, the southernmost of which is over an outcropping granitic intrusive body in the lower plate. The aeromagnetic data do not appear to relate to known mineralized areas in the roadless area.

MINING DISTRICTS AND MINERALIZED AREAS

The roadless area includes parts of two adjacent mining districts: the Mount Moriah mining area, which covers all but the southwestern corner, and the Black Horse mining district which covers the southwestern corner of the roadless area.

The Mount Moriah mining area is named for several unrelated mine workings and prospects located on and around Mount Moriah (Hose and others, 1976) in the drainages of Hampton Creek, Hendrys Creek, Trail Canyon, and Smith Creek. Mineral commodities produced from within the roadless area include building stone, 26 tons of lead-silver ore, small amounts of garnet, and small amounts of copper and copper-silver ores. Other workings in the Mount Moriah mining area, that are just outside the roadless area boundaries, produced silver-lead-zinc ores, silver-lead-barite ore, and building stone.

Most of the Black Horse mining district is outside of the roadless area to the south and southwest; all production was outside the roadless area. Commodities produced include 4,655 oz gold, 4,535 oz silver, 38,948 lb lead, 337 short ton units of tungsten, 179 lb copper, and 44 lb zinc (Hose and others, 1976).

Current mining activity produces quartzite building stone from quarries in the southeast and north-central parts of the roadless area.

ASSESSMENT OF MINERAL RESOURCE POTENTIAL

The assessment of the mineral resource potential for the Mount Moriah Roadless Area is based on geologic controls as defined by the structural and stratigraphic setting; geochemical data from stream-sediment, heavy-mineral concentrate, rock, and placer samples; observed mineral occurrences in mines, prospects, and placers; and records of current and historical quarrying. This assessment shows the Mount Moriah Roadless Area contains several areas of resource potential. One area has reserves of an uncommon, high-quality decorative quartzite building stone; additional areas have high potential for resources of this quartzite building stone, low potential for resources of garnet placer and lode deposits, or moderate or low potential for resources of lead, zinc, silver, and copper.

The areas of mineral resource potential are divided into two geologic provinces. The building stone and garnet resources are confined to the metamorphosed rocks below the Snake Range décollement and the base-metal resources are generally confined to the upper-plate rocks. The building stone is in the metamorphosed Prospect Mountain Quartzite; current claims within the area cover over 3 1/2 sq mi and an estimated half trillion tons of marketable stone (Richard Hatch, claim owner, oral commun., 1981, 1983).

Garnet-bearing schists in the Prospect Mountain Quartzite are the source of the garnet placer deposits mined in Hampton Creek (Hose and others, 1976). Lode and placer claims have been staked on the schist and stream gravels for 3 1/2 mi up Hampton Creek in the roadless area. Garnet content in panned concentrates, combined with the geology (Hose, 1981), expands the area of placer and lode deposit potential to the area indicated on the map. Further investigation indicated a high content of magnetite inclusions within the garnet crystals, and this together with the relatively low garnet content of the rocks and placers (4-20 percent), could make these areas less favorable for garnet abrasive resources.

The lead, silver, zinc, and copper mineralization that occurs sporadically in the roadless area appears to be associated with the high-angle faults in the upper plate rocks. It is here postulated that the few occurrences of mineralization in low-angle faults or along bedding planes in the roadless area resulted from their intersections with high-angle faults, which acted as conduits for mineralizing fluids. Considering the near lack of high-angle faults in the exposed lower plate rocks, and the observed termination of upper plate high-angle faults against the Snake Range décollement, mineralization of the upper plate rocks must have occurred prior to their displacement along the décollement. This severely limits the depth of possible upper plate deposits, because mineralization and associated high-angle faults would terminate at the décollement separating the two plates. One known exception to the confinement of base-metal minerals to the upper plate rocks is a lead-silver occurrence in a low-angle fault below a small lower plate marble klippe of Pole Canyon Limestone (at the Silver Peak mine). On the basis of geochemical evidence, the most likely region for the occurrence of base-metal resources in the roadless area is in the northeast, shown as areas of moderate potential on the map.

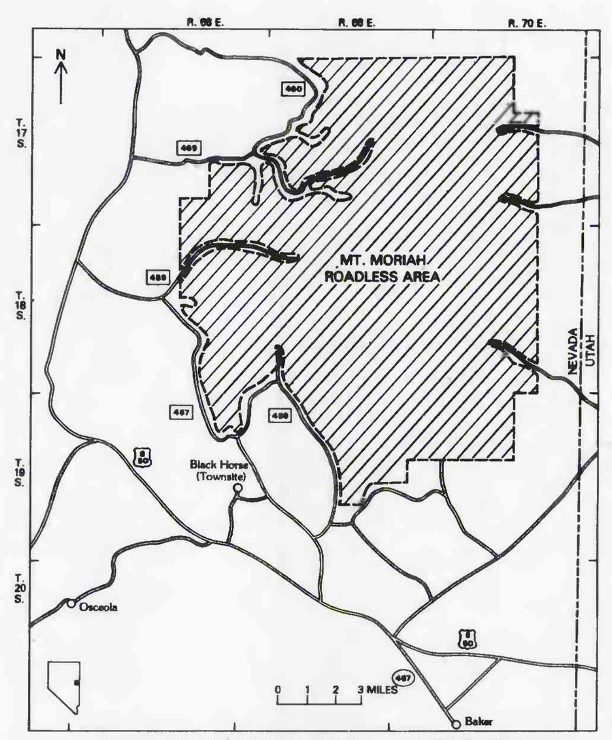
Several scattered drainages showed geochemical anomalies for barium, but the only observed sources were small veins of secondary barite associated with fault zones. No sedimentary occurrences of barite or barite interbeds in gypsum have been reported.

As of June 1981, no oil and gas leases or lease applications had been filed within the roadless area, although several leases were current in valleys surrounding the roadless area. There is no evidence of a potential for oil and gas resources within the roadless area.

REFERENCES

Hose, R. K., 1981 [1982], Geologic map of the Mount Moriah Further Planning (RARE II) Area, eastern Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-1244-A, scale 1:62,500.

Hose R. K., Blake, M. C., and Smith, R. M., 1976, Geology and mineral resources of White Pine County, Nevada: Nevada Bureau of Mines and Geology Bulletin 85, 105 p.



INDEX MAP SHOWING LOCATION OF THE MOUNT MORIAH ROADLESS AREA, NEVADA

MINERAL RESOURCE POTENTIAL MAP OF THE MOUNT MORIAH ROADLESS AREA, WHITE PINE COUNTY, NEVADA

By
Robert R. Carlson, and Ronny A. Martin, U. S. Geological Survey,
and
Robert H. Wood, II, U. S. Bureau of Mines

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