

Base from U. S. Geological Survey Magdalena, 1:62,500, 1959; Molino Peak and South Baldy, 1:24,000, 1965.

SCALE 1:50,000

CONTOUR INTERVAL 40 FEET  
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Geology compiled in 1982

**EXPLANATION**

AREAS OF MINERAL RESOURCE POTENTIAL

- Area with moderate to high resource potential for manganese in vein deposits
- Area with low to moderate resource potential for manganese and base and precious metals in vein deposits

(The following correlation and description of map units is for the geologic map, shown in gray)

**CORRELATION OF MAP UNITS**

Qt	Qal	Holocene	QUATERNARY
Unconformity	Tru	Miocene	
Unconformity	Tfm	Oligocene	TERTIARY
Unconformity	Trl	Oligocene	
Unconformity	Pms	Pennsylvanian and Mississippian	PALEOZOIC
Unconformity	Ymi	Proterozoic (?)	
			PROTEROZOIC

**DESCRIPTION OF MAP UNITS**

Qt TALUS DEPOSITS (HOLOCENE)--Includes some landslide deposits and rock glaciers

Qal ALLUVIUM (HOLOCENE AND PLEISTOCENE)--Includes some older terrace deposits, minor colluvium, and an alluvial cap of uncertain age on Water Canyon mesa

Tru RHYOLITIC TUFFS AND MINOR LATITE FLOWS (MIOCENE)--Pale-red-brown, crystal-rich, densely welded ash-flow tuffs and light-colored, crystal-poor, densely to poorly welded ash-flow and air-fall tuffs; includes some quartz latite flows

Tau ROCKS OF INTERMEDIATE COMPOSITION (MIOCENE)--Predominantly red to gray, porphyritic quartz latite flows, ash-flow tuffs and basaltic andesite; includes some thin basalt flows

Tfm INTRUSIVE ROCKS (OLIGOCENE)--Generally quartz monzite

Trl RHYOLITE (OLIGOCENE)--white, pink, and purple-gray, crystal-rich to crystal-poor phenocryst-rhyolitic flows and densely welded ash-flow tuffs; poorly welded ash-flow, air-fall, and lithic tuffs; also includes some quartz latite, thin andesite, flows of basaltic scoria, and tuffaceous sandstones. Flow-domes of intrusive rhyolite are locally present

Tal ROCKS OF INTERMEDIATE COMPOSITION (OLIGOCENE)--Predominantly dark-gray-brown, greenish, and purple andesite flows, tuffs, and lahars; includes some dark-redish-brown quartz latite and dacite flows and welded ash-flow tuffs

Pms SEDIMENTARY ROCKS, UNDIVIDED (PENNSYLVANIAN AND MISSISSIPPIAN)--Predominantly limestone and shale

Ymi METAMORPHIC AND IGNEOUS ROCKS, UNDIVIDED (PROTEROZOIC ?)--Includes greenstone, biotite schist and gneiss, and granitic rocks

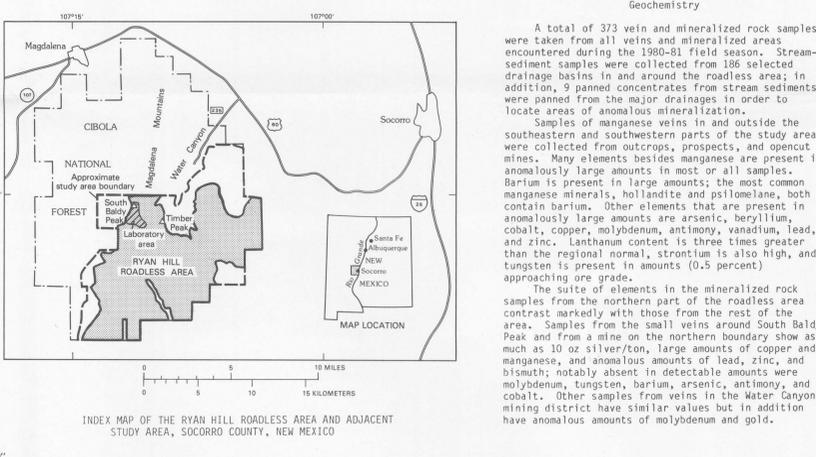
**CONTACTS**--Dashed where inferred

**FAULT**--Dashed where inferred; dotted where concealed. Bar and ball on downthrown side

**VEIN**

**APPROXIMATE STUDY AREA BOUNDARY**

**APPROXIMATE BOUNDARY OF RYAN HILL ROADLESS AREA AND ADJACENT AREAS**



INDEX MAP OF THE RYAN HILL ROADLESS AREA AND ADJACENT STUDY AREA, SOCORRO COUNTY, NEW MEXICO

Scale: 0 to 15 KILOMETERS / 0 to 10 MILES

**STUDIES RELATED TO WILDERNESS**

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts, requiring 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 Ryan Hill Roadless Area (03008), Cibola National Forest, Socorro County, New Mexico. Ryan Hill Roadless Area was classified as a recommended wilderness area during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979. Ryan Hill Roadless Area was later designated the Langmuir Research Site by Public Law 96-550, 1980.

**MINERAL RESOURCE POTENTIAL**

**SUMMARY STATEMENT**

The numerous productive mines and mineral deposits along the margins of the Ryan Hill Roadless Area indicate a low to high potential for manganese and base and precious-metal deposits. There is a moderate to high potential for manganese deposits along the eastern and southeastern sides of the roadless area. The potential for manganese and base and precious metals is low to moderate along parts of the north, south, and west perimeter of the roadless area, and low for the central part of the area.

**INTRODUCTION**

A mineral survey of the Ryan Hill Roadless Area and adjacent areas was made in 1980-81 by the U.S. Geological Survey and the U.S. Bureau of Mines. The entire study area comprises about 69 sq mi (44,000 acres) in the Magdalena Ranger district of Cibola National Forest, Socorro County, N. Mex., and is a composite of all the areas recommended for study. It is located in the southern part of the Magdalena Mountains at altitudes ranging from about 6,400 ft along the southern boundary to a maximum of 10,783 ft at South Baldy Peak. Local relief of 1,000-2,000 ft is common. The Ryan Hill Roadless Area was withdrawn from RARE II classification and part of it was reestablished as the Langmuir Research Site by Public Law 96-550, December 19, 1980. The Langmuir Research Site occupies about 48 sq mi within the study area, with the Langmuir Laboratory situated south of South Baldy Peak. In the northwestern corner of the research site, at altitudes of 10,500-10,600 ft. The laboratory is engaged in research on lightning and other atmospheric conditions and on astronomical phenomena.

**MINING DISTRICTS AND MINERALIZED AREAS**

Portions of two mining districts are located in and near the roadless area. The Magdalena Mountains manganese district (File and Northrop, 1966) trends north-northeast on the southeastern flank of the Magdalena Mountains and is about 8 mi long and 3 mi wide. The Water Canyon mining district (File and Northrop, 1966) is located in Water Canyon in the S1/2, T. 35 S., R. 3 W., is about 3 mi wide, and follows the course of Water Canyon for about 4 mi. Located 1 mi south of the Water Canyon mining district is the Big Timber mineralized area.

Water Canyon mining district and vicinity

Also known as the Silver Mountain mining district, the Water Canyon mining district is located on the northeast edge of the roadless area and is drained by Water Canyon, Copper Canyon, and North Fork Canyon. Although extensive exploration has been done in the district, there has been little known production.

Although there are no patented mining claims in the part of the district that overlies with the roadless area, two patented mining claims, the Buckeye and the Hall Lyten, are located approximately 1 mi from the study area. The Buckeye mine was the major producer in the district, however, the quantity of copper ore shipped is unknown. Three unpatented claims are on the northwest edge of the study area and more than 200 claims are located within 1 mi of the area. Assay results from this roadless area show minor amounts of gold, lead, manganese, silver, and zinc occur along the limestone-greenstone contact and in fractures in the limestone. The few workings in the roadless area are small pits and short adits, with the same mineral occurrences.

Barite was found in a vein in a small open pit in sec. 34, T. 35 S., R. 3 W. The 2- to 3-ft-thick vein trends N. 60° W. away from the roadless area and is exposed for only about 200 ft. Assay results show about 1.0 percent barium present in each of two samples taken from the vein (Ellis and Scott, 1982).

**Big Timber mineralized area**

Approximately 1 mi south of the Water Canyon mining district and 1 mi east of Timber Peak is the Big Timber mineralized area, where the Big Timber mine is located. One unpatented claim in the Big Timber mineralized area lies in the roadless area. Two patented claims and numerous unpatented claims are adjacent to this claim but are outside the roadless area.

**Magdalena Mountains manganese district**

The Magdalena Mountains manganese district is located in the southeast part of the Magdalena Mountains, parallel with the eastern side of the range.

There are no patented mining claims in the district. Approximately 240 unpatented claims have been located in the roadless area and an additional 300 claims located within a 2 mi radius of the area according to courthouse records.

There is known production in the district from several mines: Bear Canyon, Bianchi, Black-Eagle, Black Goose, Buena Vista, Burris, Combs and Wood, Lucky Ridge, Magnum, Manganese Chief, Manganese Queen, Niggerhead, Phillips lease, Rheinart, and the West Niggerhead. Records show 8,171 tons of concentrate containing 34 percent manganese was produced from about 140,000 long tons of ore from this group of mines (Farnham, 1961).

The Manganese Queen mine is geographically in the Water Canyon mining district, but is geologically part of the Magdalena Mountains manganese district; it has recorded production during World War I, World War II, and the Korean conflict.

Most workings in the Magdalena Mountains manganese district are open pits, and some pits are several hundred feet long and expose numerous fracture zones and faults. Manganese is associated with these faults, fracture systems, and shear zones in rhyolite country rock. The Niggerhead mine is a typical example of one of the open pit mines where psilomelane and pyrolusite occur as thin crustiform coatings on fracture surfaces. The manganese coatings also occur around breccia fragments in shear zones and as thin seams and veinlets in the rhyolite. High-grade manganese is generally confined to shear and breccia zones and does not persist at depth. Calcite, iron oxides, and quartz occur with the manganese. The manganese oxides are argenticiferous, but this has either not recognized or not reported during the periods of production. Extensive beneficiation was required to make a salable product from the low-grade manganese ore, and thus, the properties were minable

Established usage since 1937, listed in courthouse records.

**MINERAL RESOURCE POTENTIAL MAP OF THE RYAN HILL ROADLESS AREA, SOCORRO COUNTY, NEW MEXICO**

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and  
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