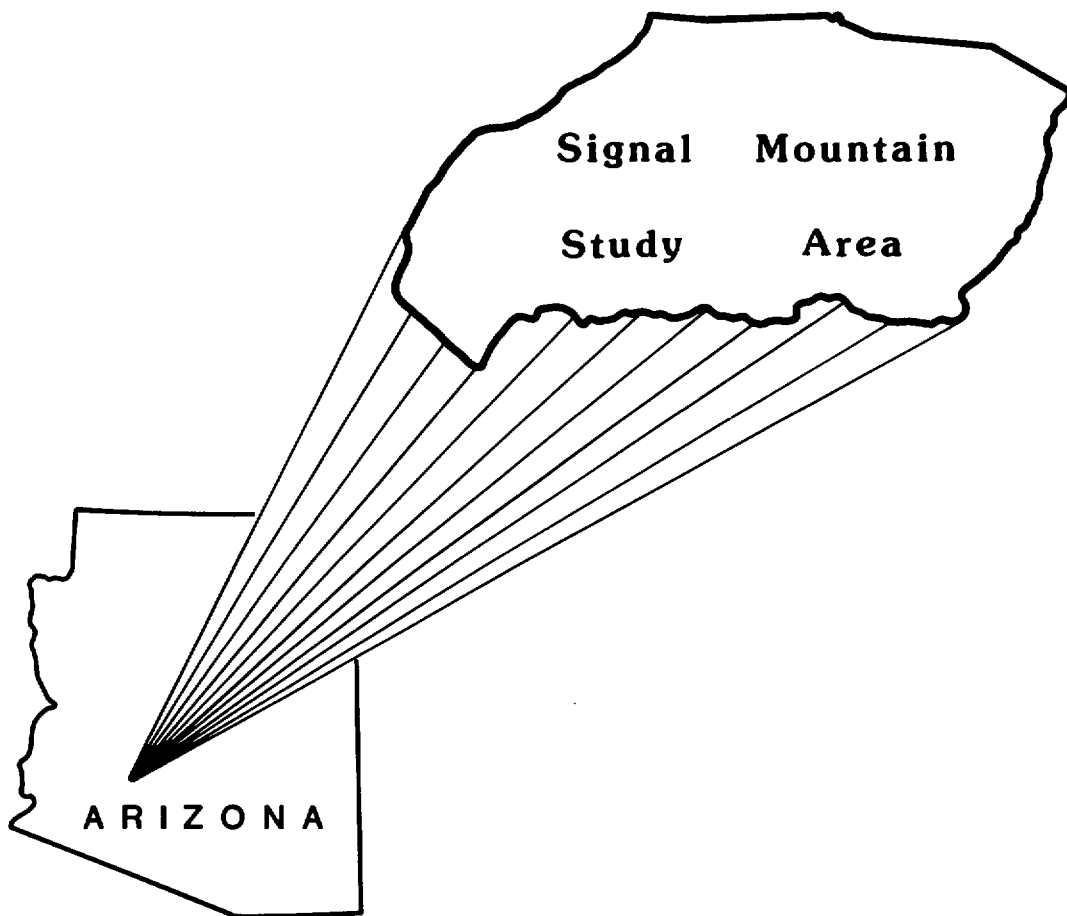


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Mineral Land Assessment
Open File Report/1986

**Mineral Investigation of a Part of the Signal
Mountain Wilderness Study Area (AZ-020-138),
Maricopa County, Arizona**



**BUREAU OF MINES
UNITED STATES DEPARTMENT OF THE INTERIOR**

MINERAL INVESTIGATION OF A PART OF THE SIGNAL MOUNTAIN WILDERNESS
STUDY AREA (AZ-020-138), MARICOPA COUNTY, ARIZONA

by

Terry J. Kreidler

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1986

Intermountain Field Operations Center
Denver, Colorado

UNITED STATES DEPARTMENT OF THE INTERIOR
Donald P. Hodel, Secretary

BUREAU OF MINES
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PREFACE

The Federal Land Policy and Management Act of 1976 (Public Law 94-579) requires the U.S. Geological Survey and the U.S. Bureau of Mines to conduct mineral surveys on certain areas to determine the mineral values, if any, that may be present. 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 a part of the Signal Mountain Wilderness Study Area (AZ-020-138), Maricopa County, Arizona.

This open-file report summarizes the results of a Bureau of Mines wilderness study. The report is preliminary and has not been edited or reviewed for conformity with the Bureau of Mines editorial standards. This study was conducted by personnel from the Branch of Mineral Land Assessment (MLA), Intermountain Field Operations Center, Building 20, Denver Federal Center, Denver, CO 80225.

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SUMMARY

In accordance with the Federal Land Policy and Management Act of 1976, the Bureau of Mines conducted a mineral survey in March 1986 to appraise the mineral resources in that part of the Signal Mountain Wilderness Study Area, Maricopa County, Arizona, designated preliminarily suitable for inclusion in the National Wilderness Preservation System (15,250 of the original 19,640 acres).

Mineral resources were not identified in the Signal Mountain study area. Nine stream sediment samples contained insignificant amounts of base and precious metals. About 37 percent of the area is under oil and gas lease, probably based on speculation that the hydrocarbon-rich overthrust belt of Wyoming extends into Arizona. As of September 1986, no oil and gas exploration has occurred in the study area. Sand and gravel occurrences in the study area are too far from prospective markets to be developed and have no current local use.

INTRODUCTION

In March 1986, the Bureau of Mines, in a cooperative program with the U.S. Geological Survey (USGS), studied the mineral resources of a part of the Signal Mountain Wilderness Study Area, Maricopa County, Arizona, on lands administered by the Bureau of Land Management (BLM), Phoenix District Office. The Wilderness Study Area comprises 19,640 acres; the Bureau studied the 15,250 acres designated preliminarily suitable for inclusion in the National

Wilderness Preservation System. "Study area" as used in this report refers only to the smaller area.

The Bureau surveys and studies mines, prospects, and mineralized areas to appraise reserves and identified subeconomic resources. The USGS assesses the potential for undiscovered mineral resources based on regional geological, geochemical, and geophysical surveys. This report presents the results of the Bureau of Mines study, which was completed prior to the USGS investigation. The USGS will publish the results of their studies. A joint report, to be published by the USGS, will integrate and summarize the results of both surveys.

Geographic and geologic setting

The Signal Mountain study area is in west-central Arizona in the Basin and Range physiographic province. Gila Bend, Arizona, is about 20 mi southeast, and Phoenix, Arizona, is about 60 mi northeast. All but the northern boundary parallel unimproved roads that provide easy access. The northern boundary generally follows section lines, and access to the northern side is provided by prospecting and ranching roads. The road forming the southern boundary of the study area also forms part of the northern boundary of the adjacent Woolsey Peak study area. (See fig. 1.)

The study area is characterized by steep, craggy hills of low relief surrounded by flat alluvial plains. Elevations within the study area range from 2,182 ft on Signal Mountain to about 750 ft along the southwestern boundary. This region of Arizona is among the driest in the country, receiving less than 6 in. of rain per year, thus vegetation is sparse, dominated by cacti and desert grasses. Summer temperatures usually exceed 100° F.

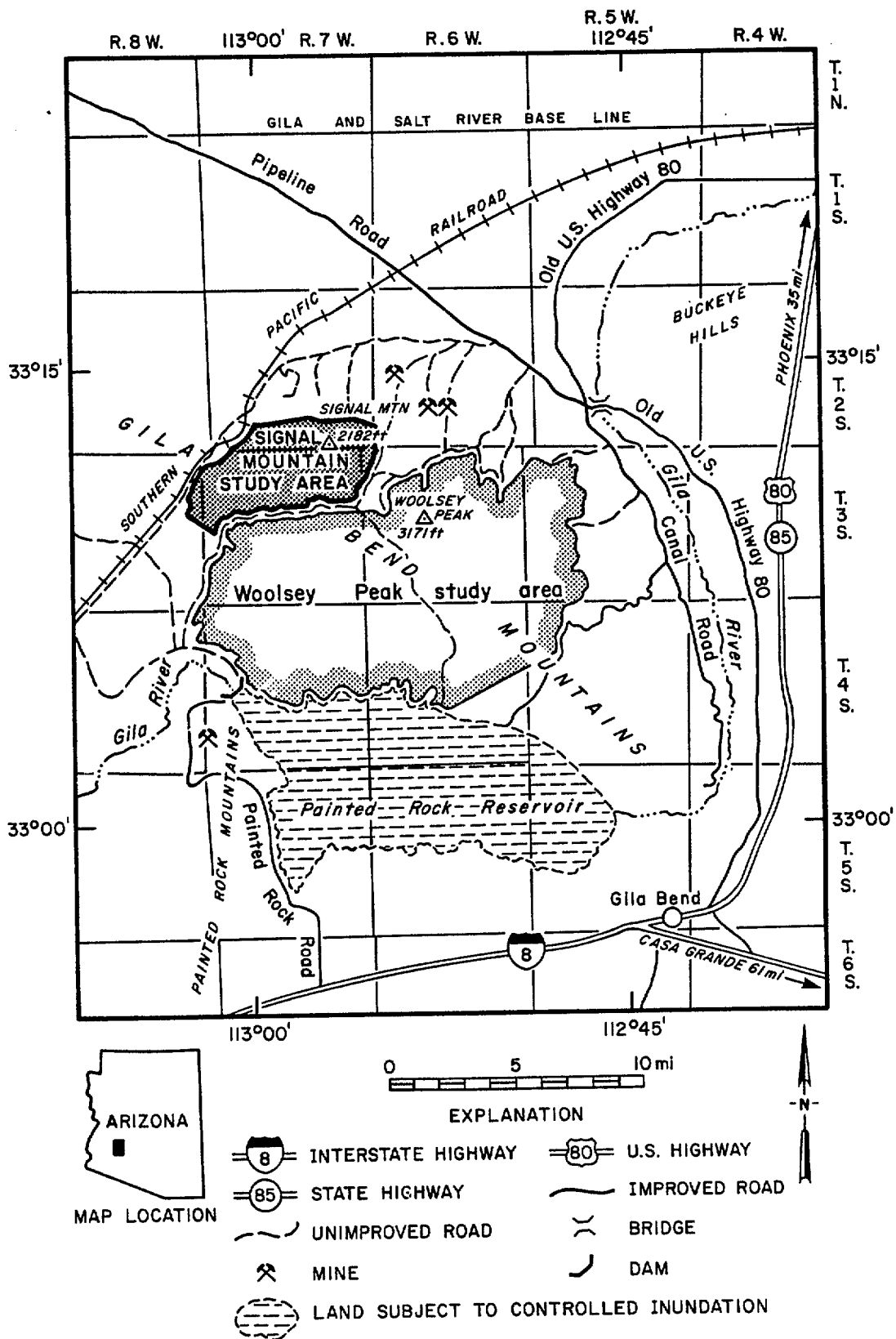


Figure 1.--Index map of the Signal Mountain study area, Maricopa County, Arizona.

The study area is underlain by middle Tertiary andesite and Tertiary-Quaternary basalt. The andesite forms flows and breccias and is interlayered with sedimentary rocks; the basalt is part of the Woolsey Peak volcanic complex. (See Krason and others, 1982, p. 195.)

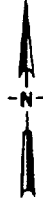
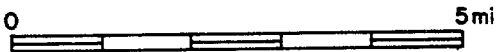
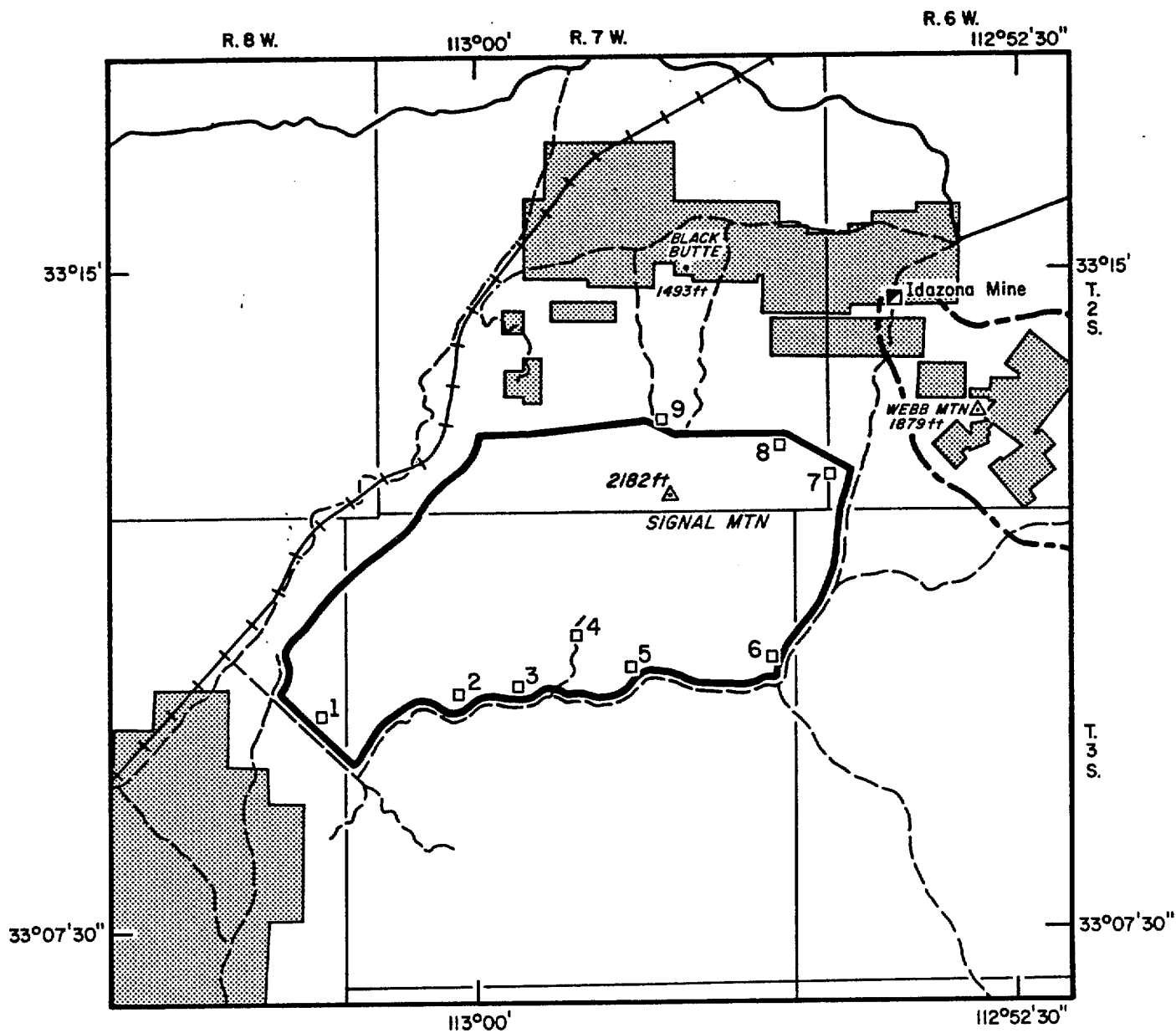
Method of investigation

Bureau personnel reviewed sources of minerals information including published and unpublished literature, Bureau files, and mining claim and oil and gas lease records at the BLM State Office in Phoenix. Discussions on the mineral resources of the study area were held with BLM personnel at the Phoenix District Office.

Field work, completed in 14 employee-days, consisted of a search for mines and prospects--none were found within the study area--and sampling sediments in washes that drain the study area. Nine samples were taken, eight from within the study area. All were analyzed for gold and silver by fire assay and for copper, lead, and zinc by inductively coupled plasma-atomic emission spectroscopy. Complete analytical data are available for inspection at the U.S. Bureau of Mines, IFOC, Building 20, Denver Federal Center, Denver, CO 80225.

Mining activity

No evidence of mining or exploration was found within the study area. Mining has occurred in the Webb mining district 1-3 mi northeast of Signal Mountain (fig. 2). The district extends northwest from Webb Mountain to the Idazona Mine in sec. 19, T. 2 S., R. 6 W. Between 1935 and 1951, copper (27,000 lbs), silver (200 oz), and gold (50 oz) were produced from six mines (Keith and others, 1983, p. 54-55). The mines were on quartz veins in Precambrian schist and gneiss that were intruded by granite, diorite, and



- EXPLANATION
- APPROXIMATE BOUNDARY OF THE SIGNAL MOUNTAIN STUDY AREA
 - IMPROVED ROAD
 - UNIMPROVED ROAD
 - RAILROAD
 - UNPATENTED MINING CLAIM
 - APPROXIMATE BOUNDARY OF THE WEBB MINING DISTRICT
 - STREAM SEDIMENT SAMPLE---Showing sample number
 - SHAFT

Figure 2.--Mining claim and sample localities in and near the Signal Mountain study area.

andesite. The andesite at Webb Mountain and in the study area are probably the same unit, but the mineralization in the district does not seem to be related to it.

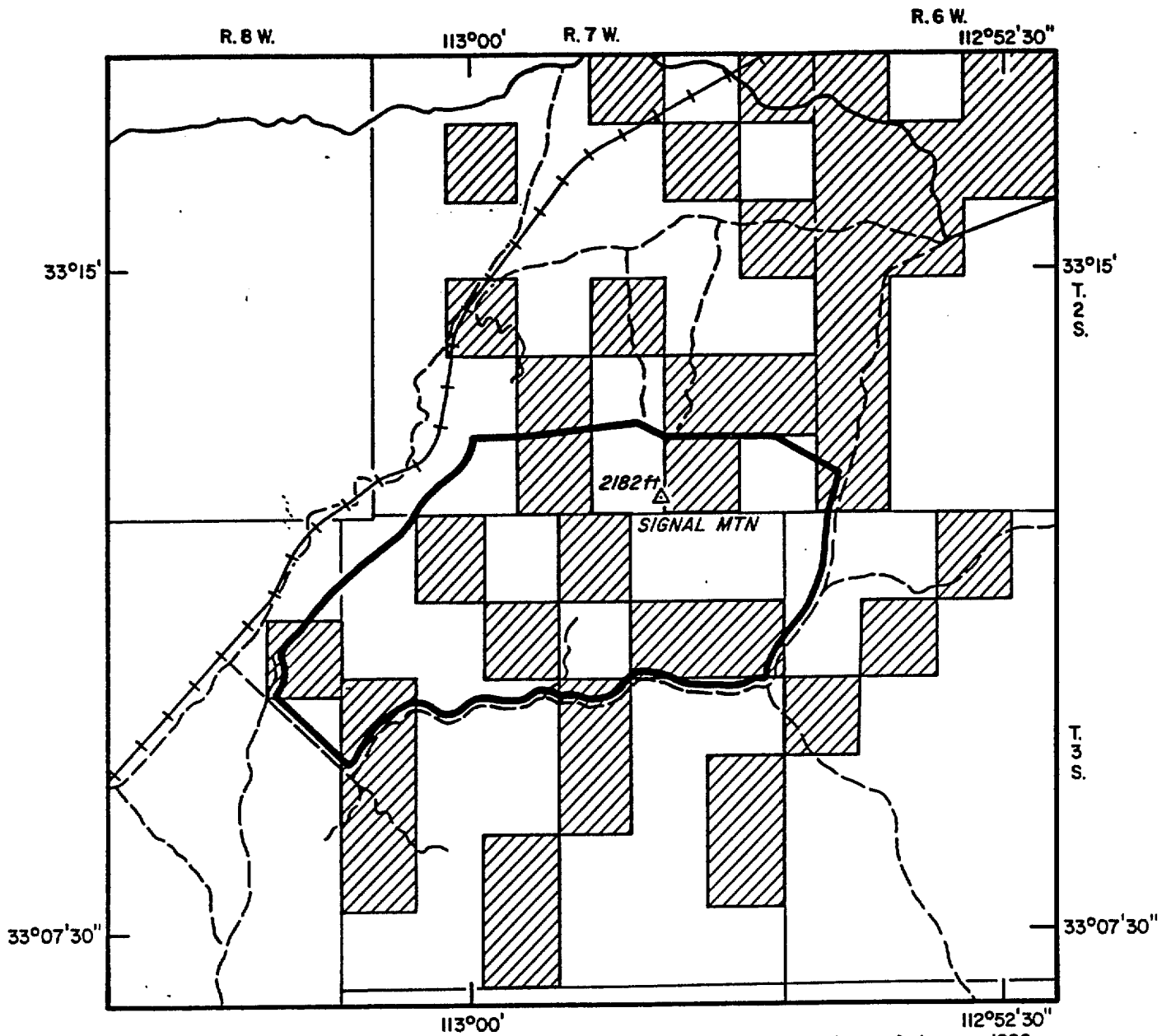
In February and March 1986, Texasgulf Minerals and Metals Co., Golden, CO, drilled 10 exploration holes on a claim block 2-3 mi north of the study area near Black Butte (fig. 2). They were trying to delineate a gold trend following fractures and faults associated with a structural arch. The trend of the structure, N. 70° W., precludes it from intersecting the study area. The holes penetrated metamorphic and igneous rocks of probable Precambrian age.

Energy resources

About 5,700 acres (or 37 percent) of the study area are covered by oil and gas leases (fig. 3); Ryder (1983, p. C19), however, rates the oil and gas potential low to zero because the rocks are volcanic. In the basins adjacent to the study area, the sedimentary rocks are no more than 5,000 ft thick and conditions are not conducive to the accumulation of significant volumes of hydrocarbons. The leasing is probably based on speculation that the overthrust belt, which produces large quantities of hydrocarbons in Wyoming, extends southward into Arizona (Keith, 1979, p. 10). As of September 1986, all exploratory drilling testing this theory has had negative results. Leases in and near the study area have not been tested.

RESOURCE APPRAISAL

No mineral resources were identified in the study area. The andesite and basalt that crop out inside the boundary bear no signs of mineralization. Stream-sediment samples taken in study area drainages contained insignificant amounts of gold, silver, copper, lead, and zinc (table 1).



Oil and gas lease information from the Bureau of Land Management; current as of January 1986.

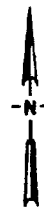
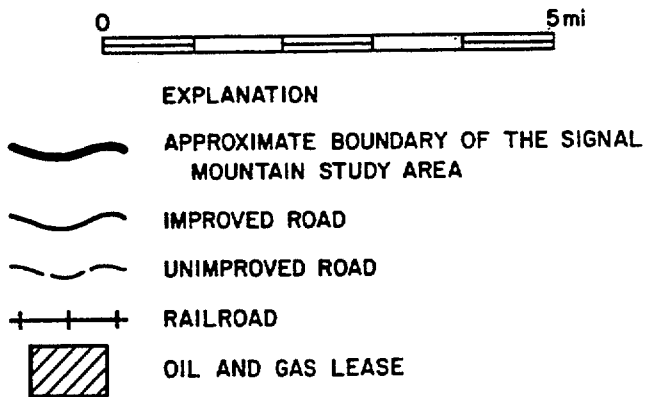


Figure 3.--Oil and gas leases in and near the Signal Mountain study area.

Sand and gravel is available in the study area, but is a high-volume, low-unit-value material that must be located close to markets to be profitable. The study area does not currently fit this criterion.

Table 1.--Analytical data for samples from the Signal Mountain study area, Maricopa County, Arizona.

[Gold and silver determined by fire assay, detection limits are 0.005 and 0.05 oz/st, respectively. Copper, lead, and zinc determined by inductively coupled plasma-atomic emission spectroscopy absorption, detection limits are 10 ppm. Symbols used: --, not detected; <, less than given value; ppm, parts per million; oz/st, ounces per short ton.]

Sample no.	Au oz/st	Ag	Cu	Pb ppm	Zn
1	--	--	55	<10	97
2	--	0.1	43	<10	78
3	--	.1	46	<10	76
4	--	--	63	<10	120
5	--	--	43	<10	98
6	--	.1	53	<10	98
7	--	.1	33	<10	87
8	--	--	30	<10	64
9	--	.1	29	<10	71

CONCLUSIONS

No mineral resources were identified in the Signal Mountain study area. Stream sediment samples contained insignificant amounts of base and precious metals. Oil and gas leases covering about 37 percent of the study area are probably a result of speculation that the hydrocarbon-rich overthrust belt of Wyoming extends into Arizona. As of September 1986, no oil and gas exploration has occurred in the study area. Sand and gravel occurrences in the study area are too far from prospective markets to be developed.

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