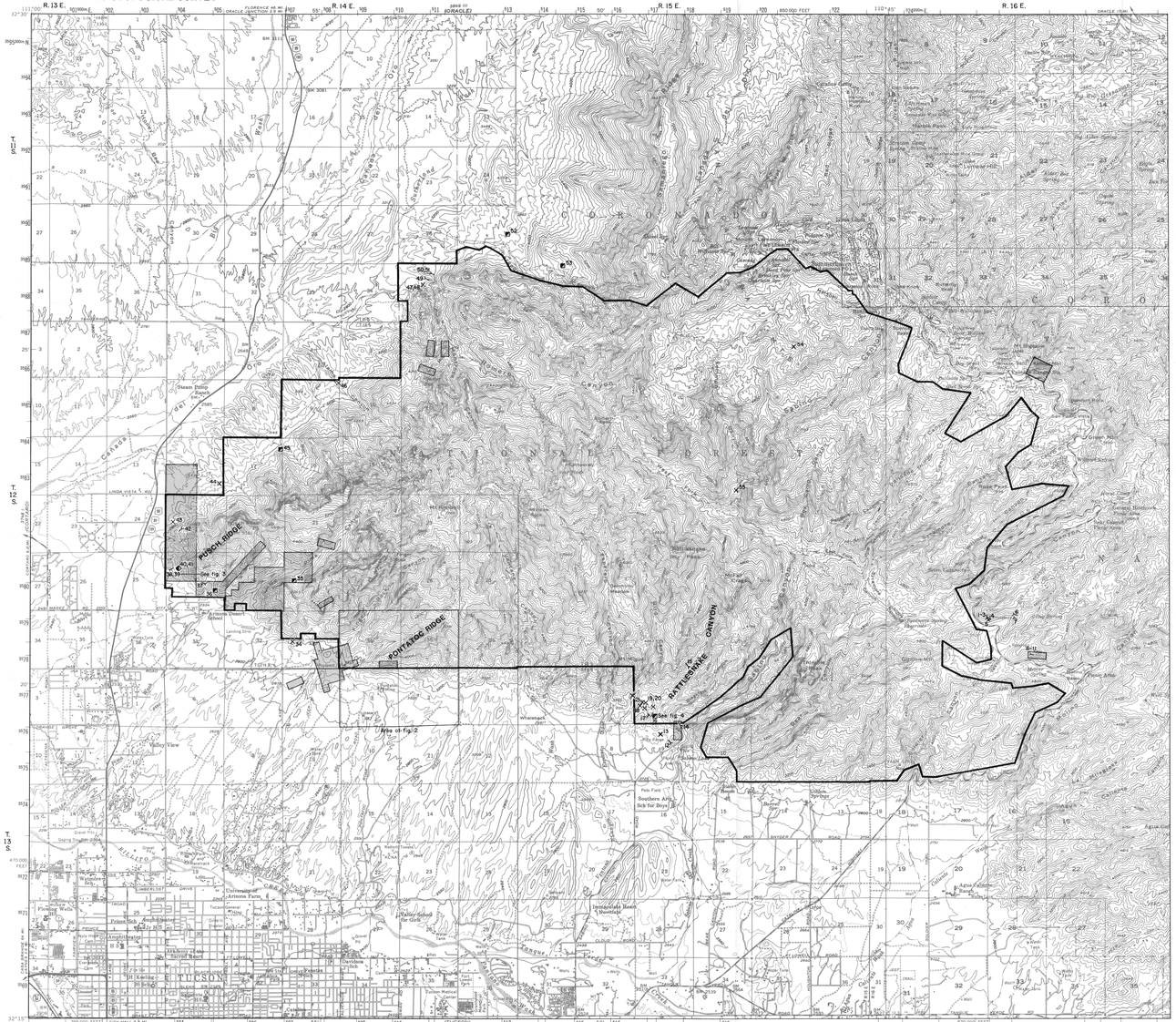
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1356-C



Base from U.S.Geological Survey, 1:62,500
Mount Lemmon, 1957; Helotta Ranch, 1957

Field work completed in 1979; assisted by N. B. Sawyer

MINE AND PROSPECT MAP OF THE PUSCH RIDGE WILDERNESS AREA, PIMA COUNTY, ARIZONA

By

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U.S. Bureau of Mines

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MAP EXPLANATION

- APPROXIMATE BOUNDARY OF THE PUSCH RIDGE WILDERNESS AREA
- UNPATENTED MINING CLAIMS
- SAMPLE LOCALITY SHOWING NUMBER
- Prospect pit
- Shaft
- Inclined shaft
- Adit

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 resource survey of the Pusch Ridge Wilderness in the Coronado National Forest, Pima County, Arizona. Pusch Ridge Wilderness was established by Public Law 95-237, February, 1978.

INTRODUCTION

The Endangered American Wilderness Act of 1978 created the Pusch Ridge Wilderness. During 1979, the U.S. Geological Survey and the U.S. Bureau of Mines investigated the area to evaluate the mineral resources. In addition to field investigations, studies by the Bureau of Mines personnel included courthouse research to ascertain claim locations within and near the area. Field work involved sampling and mapping located prospects. Rock samples were obtained from most of the workings examined. A total of 55 samples were collected for assaying. All samples were fire-assayed for gold and silver, and at least one sample from each locale was checked by spectrographic analysis. Analytical results of all samples are available from the Bureau of Mines, Intermountain Field Operations Center, Denver Federal Center, Denver, Colorado 80225.

Location, size, and geographic setting

The wilderness is in the Coronado National Forest in northern Pima County, Ariz.; the south boundary of the wilderness is near the northern edge of the city of Tucson, and is located about 8 mi from the center of Tucson at the nearest point. The south-facing slopes of the wilderness present an imposing 14-mi, semiarid, mountainous facade to viewers from the Tucson Valley.

Encompassing 56,430 acres, the wilderness is roughly bounded by the Canada del Oro and the Florence Highway (U.S. 80) to the west, Cargodera Canyon to the north, the Catalina Highway to the east, and Tucson to the south (see fig. 1). Access to the boundaries is easily accomplished except on the north side. Because the wilderness has long been a favorite hiking area, there are many trails within the boundaries.

With a relief of 5,630 ft, the terrain has inclined canyons, sharp ridges, pinnacle type peaks, and flat areas covered with large blocks of intrusive and metamorphic rocks. Elevations range from 3,020 ft near the mouth of Sabino Canyon to 8,650 ft near the summit of Mount Lemmon.

Mining activity

At the time of the field work, November 1979, the Valerie May lode gold mine was the only producing property found. Located 400 ft north of the Catalina Highway in the NW1/4 sec. 4, T. 13 S., R. 16 E., the mine is about 1 mi east of the eastern boundary of the wilderness.

MINING DISTRICTS AND MINERALIZED AREAS

Mining districts

Three mining districts--Canada del Oro, Oracle, Catalina--are within the area studied. The boundaries of the districts are typically vague.

Canada del Oro Mining District

Canada del Oro lies 1-2 mi west of the wilderness boundary and was a source of placer gold. No location of old placer activities could be found along the drainage.

Oracle Mining District

An area 2.5 mi north of Mount Lemmon, known as the Old Hat Mining District, contains several old mines. The name "Oracle Mining District" came into general usage and is the present designation for this area. The district is located north of the wilderness on the north slope of the Mount Lemmon region of the Santa Catalina Mountains.

Catalina Mining District

Most of the wilderness is in the Catalina (Santa Catalina) mining district. Although the central part of the wilderness is characterized by barren granites, the periphery has a number of claims and prospects.

Mining claims

Since 1880, numerous claims have been staked within and adjacent to the wilderness boundaries. A search of the claim records for the last 105 years indicated that approximately 140 claims can be inferred as being within or near the wilderness. Only 22 claim groups were referenced sufficiently to be located on the ground.

Some patented claims in secs. 25 and 36, T. 11 S., R. 13 E. have been recovered to the United States. Remaining parcels, excluded from the wilderness, are now areas of housing developments.

Many placer claims were located along the southwestern part of the wilderness in the Canada del Oro drainage.

Most of the mining claims that could be identified as being within or near the wilderness were grouped in five general areas. Besides the placer claims in the southwest area and the claims in the Pontatoc Ridge area, the other loci of activity were Sabino Canyon, Pusch Peak, and the northwest corner of the wilderness area. Before 1900, at least 11 claims were staked within and adjacent to the central part of Sabino Canyon on behalf of a gold-mining company.

Mineralized areas

Other than the Pontatoc Mine and the new Continental Materials Corporation project, located in the Oracle mining district, no highly mineralized areas were found within or near the wilderness boundaries. Most of the prospecting activity within the wilderness has been along exposed copper-oxide-stained veins or dikes or on structures that appeared to be favorable to mineral concentration. Copper and gold sources were the principal targets of past prospecting (figs. 2-4).

Metallic

The owner of the Valerie May Mine stated that he had about 6 to 8 tons of ore stockpiled, but no grade or reserves had been established. Free gold could be seen megascopically in hand specimens from a highly oxidized zone along a small quartz vein. The workings consist of a 40-ft, 30° incline. The ore, from the one-man operation, was hand-sorted and stockpiled at the owner's home in Tucson.

Mineralization in the Canada del Oro area consisted entirely of placer gold. According to Keith (1974, p. 18):

> The gold-bearing gravel was derived from small and irregular gold-bearing quartz veins in Precambrian granitic rocks at the northwest corner of the mountain range. An estimated 100 ounces of gold, produced sporadically from the early 1700's through the 1930's, may have been recovered in Pima County.

Prospect pits are found in the granite along the wilderness boundary. Although there is no sign of recent mining activity, placer claims in and near the west side and southwest corner of the wilderness were located as late as 1980. From Pusch Peak to the northwest corner of the wilderness at the mouth of Cargodera Canyon, there are a number of prospect pits; several 10- to 12-ft-deep shafts are adjacent to the mouth of the canyon.

The most significant mineralization and production occurred north of the wilderness in the Oracle mining district. Although a limited section of sediments that were mineralized in the Oracle district are found in the northeast part of the wilderness, the mineralizing intrusives are missing. In the Oracle district mineralization was recognized in the early 1900's, actual production occurred mainly between 1937 and 1950. According to Keith (1974, p. 34):

> The metalliferous mineralization in the Pima County section of the district occurs mainly in and around the Marble Peak area where strong sharn or tactite replacements have developed in the pyrometamorphosed paleozoic limestones, along with veinlets and disseminations of chalcopyrite, bornite, and locally scheelite. Some spotty galena and sphalerite also occur, principally around the fringe of the more intense copper zone. Molybdenite occurs mainly in the quartz veins and dykes. Production figures from mines of the Pima County section of the Oracle district, through 1972, has been some 136,000 tons of ore containing 3,040 tons of copper, 94 tons of lead, 25 tons zinc, 118,000 ounces of silver, and 287 ounces of gold.

Producing mines were located in secs. 13, 15-18, and 20, T. 11 S., R. 16 E. and included the following: Bluff, Corregedor, Daily, Geesman, Hartmarr-Comstake, Leatherwood, Stratton, and the Taylor X claims. According to Keith (1974, p. 130-131):

> Tungsten was produced at the Corregedor Mine in the 1940's-100 tons of 41 WO3 and the Taylor X claims--a few tons of hand sorted ore, 365 WO3 concentrates in 1948 and 45 tons of 1-St WO3 in 1953.

Since 1969, Continental Materials Corporation has conducted an extensive exploration and development program in the area of the above mentioned mines. According to an article in the Arizona Pay Dirt magazine (anonymous, 1979, p. 10):

> Original exploration had shown there was approximately 10 million tons of copper ore...the ore grade was estimated at about two percent mill feed.

In 1981 the Continental Materials Corporation entered into a partnership with Union Mines, Inc., and formed the Oracle Ridge Mining Partnership. Present plans are to bring the Oracle Ridge Mine into production in early 1983. No mining is planned closer than 2.5 mi from the wilderness boundary.

Within the Catalina (Santa Catalina) mining district most claim locations are vague. A number of prospects are located on the southern edge of the district along the wilderness boundary. The Catalina fault lies south of, and parallel to, the wilderness boundary. From 1907 to 1918, the Pontatoc Mine, located on the Catalina fault, in sec. 3, T. 13 S., R. 14 E., produced "5,000 tons of hand-sorted ore containing about 207 tons of copper, 2,200 ounces of silver, and 1 ounce of gold" (Keith, 1974, p. 113). No production has been reported since 1918. At the time of this investigation, the two shafts at the mine were accessible although subject to a fluctuating water table that varied irregularly from 5 to 50 ft below the collars.

Pontatoc Ridge, northeast of the Pontatoc Mine, was intensely prospected during and shortly after the period of production from the Pontatoc Mine. Figures 2A, B, and C shows the location of the workings found and sampled on Pontatoc Ridge. Located on a shear cliff face, a 240-ft adit, is near the top of the ridge at an elevation of 4,800 ft in sec. 35, T. 12 S., R. 14 E.; there is no dump, and little mineralization is exposed. Samples taken at the working face and at the portal contained no anomalous mineralization.

E. McCullough, University of Arizona Geoscience Department, (oral commun., 1979), reported that a sample obtained from a pit on the northern boundary of the wilderness contained anomalous amounts of nickel. A sample taken at the same pit, sample no. 53, during this study assayed low in nickel (table 2). Nickel occurrences are rare in Arizona, as are the ultrabasic rock types normal to nickel mineralization. A few small amphibolite bodies and dikes were found in the wilderness. The scarcity of typical nickel host rocks in the area minimizes the potential of nickel resources being present.

Samples that yielded significant assay values are shown on table 1 and their locations on plate 1. Except for sample 4 which was taken from a quartz vein in granite-gneiss, these samples came from places that had visible copper mineralization. However, the copper mineralization at these sites did not appear to be extensive.

Non-metallic

Wilson (1962, p. 71) states: "Gneiss from the Santa Catalina Mountains is used for flagstone and other construction purposes." Although considerable augen gneiss was observed along the southern boundary of the wilderness and banded gneiss was observed along the west and northwest boundaries, no evidence of quarries was seen. Because of excessive deformation and fracturing, most of the exposures observed are not suitable for commercial use.

Before 1966, gypsum was produced in secs. 3 and 4, T. 13 S., R. 14 E., about 1 mi south of the southern boundary of the wilderness. According to Keith (1969a, p. 376) the gypsum obtained from Tertiary lake beds was used for plaster in the Tucson building industry. Production was small and the resource limited. The area of the producing beds, now occupied by recent housing construction, is south of the Catalina fault, and gypsum does not occur within the wilderness.

According to Keith (1969b, p. 433): "The Tucson area is generally the second largest consumer of sand and gravel in Arizona." Production is mainly from stream channels and dry washes in the extensive alluvial fans common to Arizona. Because the wilderness is in mountainous or foothill terrain, the only sources of sand and gravel within the boundaries are the canyon outwashes where the material is too variable in size and too sparse to be commercial.

Energy resources

A claim located in the SW1/4 sec. 34, T. 12 S., R. 14 E., in 1917, supposedly produced a small amount of lead. In 1953, the property was restaked and the new owner reported it to the Atomic Energy Commission (AEC) as a uranium occurrence. AEC examined the property in July, 1955, and a report (Atomic Energy Commission, 1955) was issued in which the following observations were made:

> Not enough development work done to determine potential; however, it appears to be poor, and if the operators clean out the shaft, it should be examined.

At the time of the present investigation, the shafts were filled with debris, and the samples (nos. 32 and 33) taken on the surface contained no anomalous values (table 2).

At least 75 percent of the wilderness area is within the boundary of "Regions of High Heat Flow" (Wahman, 1978). Because of the large areal extent of the potential steam source indicated on Wahman's map, any future use of the field for the geothermal energy could be made from wells drilled outside the wilderness.

Oil and gas production in Arizona has been restricted to the northeast part of the state. In 1975, oil discoveries in northern Utah and southwestern Wyoming, associated with a zone of overthrusting, suggested that a large area for potential oil and gas production existed. This zone has now been extended into southern Arizona as the result of extensive seismic studies (Keith, 1977, p. 10-14; 1980, p. 1-8). Without proof of the existence of significant thrusting or the presence of adjoining petroleum reserves, the rock types within the wilderness, namely metamorphosed Precambrian granites and Tertiary intrusives, would preclude the existence of oil and gas reserves at any depth.

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Wahman, W. R., Sr., Stone, Claudia, and Witcher, J. C., 1978, Preliminary map; geothermal energy resources of Arizona: Bureau of Geology and Mineral Technology; Geothermal map no. 1, scale 1:1,000,000.

Keith, S. B., 1969a, Gypsum and anhydrite, in Mineral and Water Resources of Arizona, Arizona Bureau of Mines Bulletin 180, p. 371-382.

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U.S. Atomic Energy Commission, 1955, Preliminary Reconnaissance Report No. A-13: 1 p.

Wilson, E. D., 1962, A resume of the geology of Arizona: Arizona Bureau of Mines Bulletin 171, p. 71, 107-108.

Table 1.--Samples with significant assay values from the Pusch Ridge Wilderness.

[<, less than; Tr, trace; NA, not assayed. Analytical results of all samples are available from the Bureau of Mines, Intermountain Field Operations Center, Denver Federal Center, Denver, CO 80225]

Sample No.	Au	Ag	Cu	Description
	oz/ton		percent	
1	0.220	1.8	5.80	4-ft chip sample of quartz vein in back of 16-ft adit; vein in wedge of barren granite-gneiss that narrows to 5-in. at end of adit.
4	0.130	0.4	0.05	6-ft chip sample of quartz vein in granite-gneiss.
22	<0.010	0.4	4.10	2-ft chip sample of gouge at portal of 15-ft adit, uppermost working in Precambrian Apache Group rocks at NE end of Pontatoc Ridge.
27	NA	NA	1.16	2-ft chip sample of structure at portal of 45-ft, 34° incline in Apache Group rocks.
44	Tr	2.0	0.43	Random chip sample of 4-ft diameter, 18-in. deep pit in pegmatite.

Table 2.--Assay results of samples taken for specific mineral values.

[<, less than; Tr, trace; NA, not assayed. Analytical results of all samples are available from the Bureau of Mines, Intermountain Field Operations Center, Denver Federal Center, Denver, CO 80225.]

Sample No.	Ni	U_3O_8	Description
	percent		
32		<0.001	Breccia pod on uranium claims.
33		<0.001	Intersection of minor structures on uranium claims.
53	0.0006		Dump grab sample at 15-ft-deep shaft in amphibolite plug.

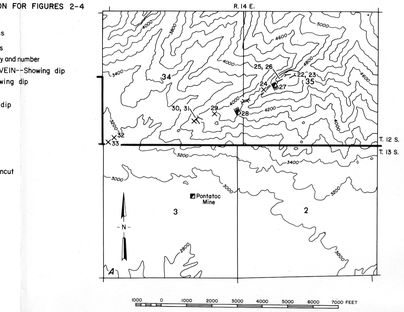

Figure 2A.--Location of mine workings and sample points on Pontatoc Ridge

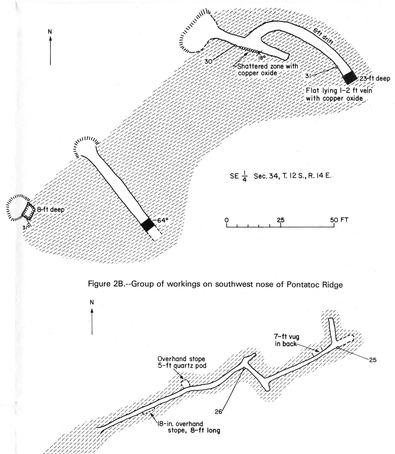

Figure 2B.--Group of workings on southwest nose of Pontatoc Ridge

Figure 2C.--Extensive exploration adit near top of Pontatoc Ridge

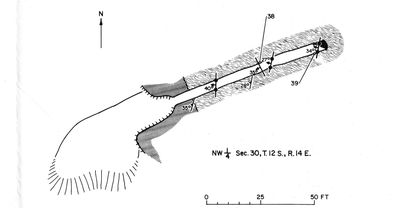

Figure 3.--Small adit at southwest nose of Pusch Ridge

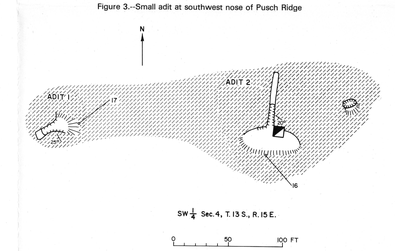

Figure 4.--Group of workings near mouth of Rattlesnake Canyon

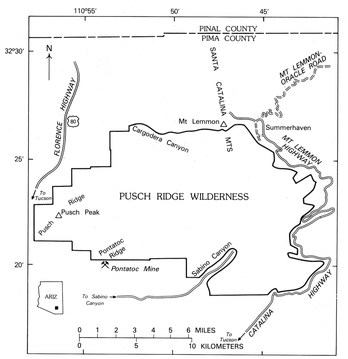

Figure 1.--Location of the Pusch Ridge Wilderness Area, Pima County, Arizona

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