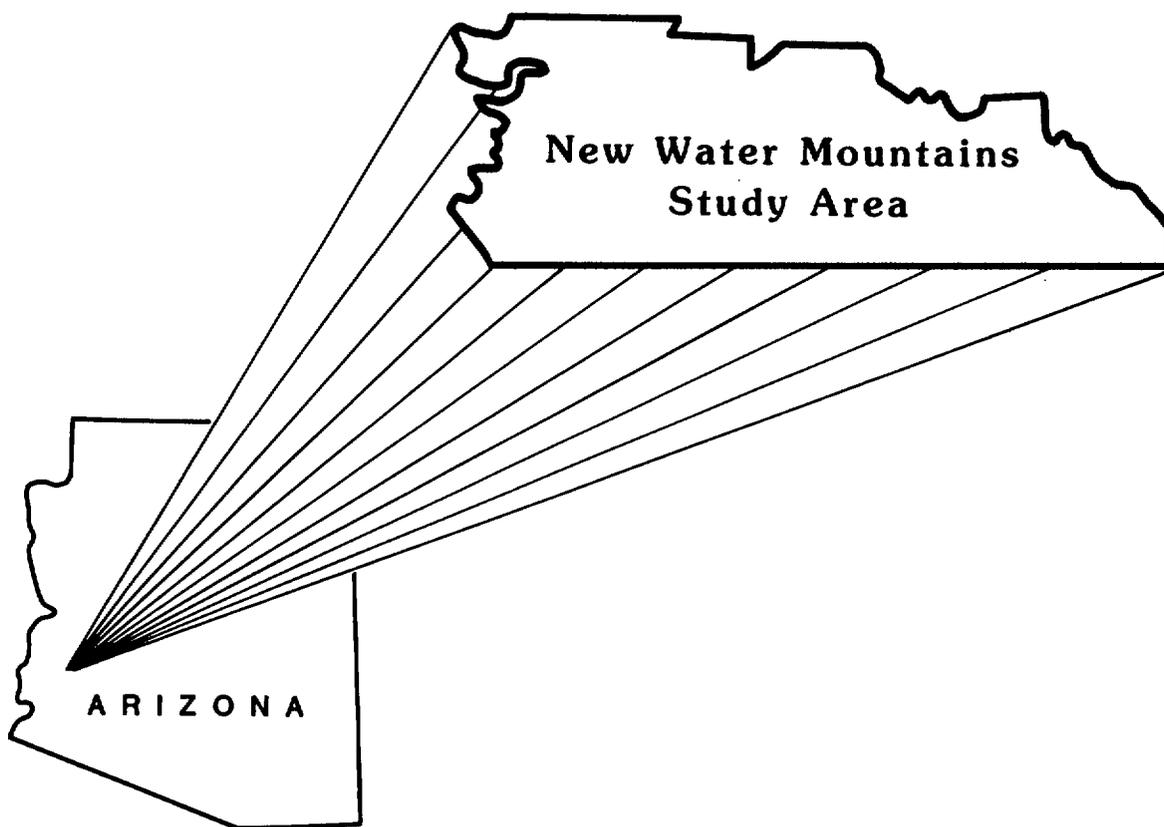


MLA 57-86

Mineral Land Assessment
Open File Report/1986

**Mineral Investigation of a Part of the New Water
Mountains Wilderness Study Area (AZ-020-125),
La Paz County, Arizona**



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

MINERAL INVESTIGATION OF A PART OF THE NEW WATER MOUNTAINS
WILDERNESS STUDY AREA (AZ-020-125), LA PAZ COUNTY, ARIZONA

by

Michael E. Lane

MLA 57-86
1986

Intermountain Field Operations Center
Denver, Colorado

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

BUREAU OF MINES
Robert C. Horton

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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 New Water Mountains Wilderness Study Area (AZ-020-125), La Paz 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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UNIT OF MEASURE ABBREVIATIONS USED IN THIS REPORT

ft	foot
mi	mile
oz	ounce
oz/st	troy ounce per short ton (2,000 pounds)
%	percent
°C	degree Celsius

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Michael E. Lane, Bureau of Mines

SUMMARY

In April and June 1985, the Bureau of Mines conducted a mineral investigation of 24,120 acres of the 40,375-acre New Water Mountains Wilderness Study Area in La Paz County, southwestern Arizona, as authorized by Public Law 94-579, October 21, 1976. Prospecting has occurred in and near the study area, but, there was no mining activity at the time of this investigation.

One hundred and fifty-one samples were taken; two were from within the boundary. Field and sample data did not indicate any identifiable resources; however, just outside the boundary, silver and gold occurrences were found at the Black Mesa Mine and copper minerals were found at the Moore patented claims. Gold and silver were found in limestone at the Black Mesa Mine and copper minerals were found in andesite at the Moore claims. Although these rock units occur inside the boundary and could be mineralized, no prospects were found.

INTRODUCTION

In April and June 1985, the Bureau of Mines, in a cooperative program with the U.S. Geological Survey (USGS), studied the mineral occurrences of a part of the New Water Mountains Wilderness Study Area, La Paz County, Arizona, on lands administered by the Bureau of Land Management (BLM), Phoenix, Arizona. The wilderness study area comprises 40,375 acres; the Bureau studied the 24,120 acres deemed 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 mineral 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 that was completed prior to the USGS investigation. The USGS will publish the results of their studies. A joint USGS-Bureau report, to be published by the USGS, will integrate and summarize the results of these surveys.

Geographic setting

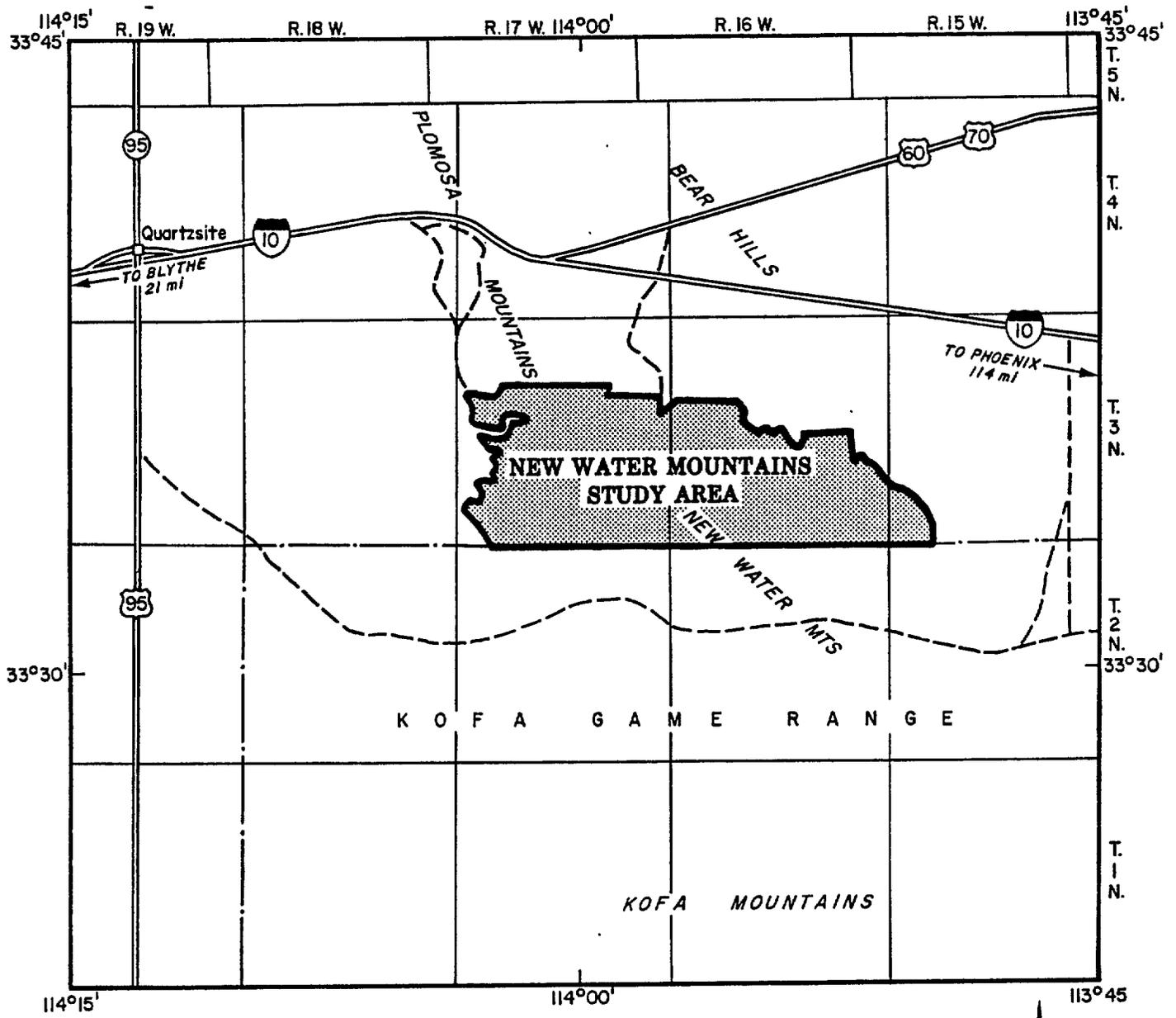
The New Water Mountains Study Area is in south-central La Paz County in southwestern Arizona about 4 mi south of Interstate 10 and about 10 mi southeast of Quartzsite, Arizona (fig. 1). The study area encompasses most of the New Water Mountains and includes Black Mesa, a prominent geomorphic feature.

Terrain is typical of the desert southwest and consists of steep mountains and sandy washes; the highest elevation is 3,639 ft on Black Mesa and the lowest elevation is about 1,800 ft along the periphery in the alluvial washes. Sparse vegetation, where present, consists mostly of cacti, mesquite, palo verde, and small shrubs.

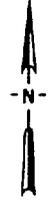
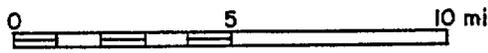
Access is by unpaved roads south from Interstate 10 and north from the pipeline road in the Kofa Game Range.

Methods of evaluation

Bureau personnel reviewed literature concerning mining and geology of the region. In addition, BLM records were reviewed for mining claim information, and oil and gas leases and lease applications.



MAP LOCATION



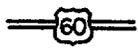
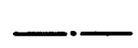
- EXPLANATION
-  INTERSTATE HIGHWAY
 -  U.S. HIGHWAY
 -  STATE HIGHWAY
 -  UNIMPROVED ROAD
 -  GAME RANGE BOUNDARY

Figure 1.--Index map of the New Water Mountains Study Area, La Paz County, Arizona.

Two geologists spent 20 days examining mines and prospects inside and within approximately 1 mi of the boundary. Surface workings and accessible mines were surveyed by compass and tape method, mapped, and sampled.

A total of 151 samples was taken; 2 samples were from within the study area (pl. 1, fig. 9). Chip samples were taken across geologic structures and grab samples were taken from dumps. All samples were fire assayed for gold and silver; selected samples were analyzed by semi-quantitative optical emission spectrographic methods for 40 elements and by atomic absorption spectrometry for copper. Sample data are summarized in table 1 and complete analytical data for all samples are available for public inspection at the Bureau of Mines, Intermountain Field Operations Center, Building 20, Denver Federal Center, Denver, CO 80225.

ACKNOWLEDGMENTS

The Bureau of Mines thanks Robert Muller, claim owner, Mammoth, Arizona, for assistance and information concerning the Moore patented claims and the Eagle Eye Mine area. The Bureau also appreciates information concerning these areas provided by Don Hammer, Newmont Exploration, Ltd., Tucson, Arizona.

GEOLOGIC SETTING

The northwest-trending New Water Mountains, which make up most of the study area, are in the Basin and Range physiographic province and are composed of Precambrian to Quaternary age rocks. The area is underlain primarily by Quaternary basalt and Cretaceous rhyolite and andesite; smaller amounts of Paleozoic and Mesozoic limestones, shale, sandstone, and quartzite also exist (Wilson, 1960). Quaternary sand and gravel covers the mountain periphery and washes; Quaternary basalt caps Black Mesa. Limestone and andesite are mineralized at the Black Mesa Mine and the Moore claims, respectively.

MINING HISTORY

Two pits were found within the study area, located in the New Water mining district; many workings were found within 1 mi of the boundary (pl. 1). Little or no production came from these workings; no recent mining activity has taken place.

BLM records indicate few mining claims are in the study area; however, about 200 unpatented mining claims are on the periphery (pl. 1). Twenty-three patented claims, the Moore claims, are adjacent to the northern boundary and cover the Eagle Eye Mine. Keith (1978, p. 165) states that about 518 tons of ore containing 175 tons of copper and 514 oz of silver was produced from the New Water Mountains. Production and mining activity are summarized in table 1.

ENERGY RESOURCES

Oil and gas leases exist about 1 mi to the northeast, but do not extend into the study area. The area is considered to have low to zero potential for hydrocarbons (Ryder, 1983, p. C19-20).

No evidence of geothermal occurrences was found during the field investigation; the nearest geothermal well is 8 mi north (Arizona Bureau of Geology and Mineral Technology, 1982). An "...area of significant lateral extent favorable for discovery and development of local resources of low temperature (90°C) geothermal water..." (Sammel, 1979, map 1) is about 2 mi north of the study area.

APPRAISAL OF SITES EXAMINED

Two small pits were found in the study area; analyses of samples 101 and 110 showed no significant metal content and no mineral resources were identified. Sample data are summarized in table 1.

With the possible exception of the Black Mesa Mine and the Moore patented claims, no significantly mineralized occurrences or structures outside the area extend inside the study area. At the Black Mesa Mine, the deposit is a limestone replacement type (Keith, 1978, p. 167). Samples taken at the mine (83-101) (fig. 9) outside the study area contained silver and gold. Fifteen samples contained silver from 0.2 oz/st to 16.1 oz/st and eight samples contained gold values between 0.01 oz/st and 0.58 oz/st (table 1). Similar mineral occurrences could exist in the limestone within the boundary, but no evidence of past mining activity exists in the study area.

Near the Eagle Eye Mine, at the west end of the Moore patented claims, secondary copper minerals, mostly chrysocolla, are abundant in fractures and faults in andesite and rhyolite. The andesite extends into the study area and could be mineralized but no evidence of past mining activity was found. Mapping, sampling, and drilling would be needed to determine the extent of any possible mineral resources.

Of the 18 samples taken at the west end of the Moore claims, only one contained a trace of gold and 11 contained silver between 0.1 oz/st and 1.6 oz/st. All samples contained copper and averaged 1.1%; the highest value was 2.85%.

Keith (1978, p. 63) states, "Known mineralization in the New Water Mountains is restricted to spotty, scattered, oxidized, copper mineralization associated with limonite, and to some local, small, high-grade chimneys of copper ore, in fracture veins and pipes in the andesitic volcanics. No continuous bodies of economic ore have been found."

CONCLUSIONS

Two small pits were found in the study area, but no mineral resources were identified. Mineralized rocks found outside the boundary may extend into the study area near the Black Mesa Mine where gold-bearing limestone exists and near the Moore patented claims where copper-bearing andesite and rhyolite exist. These rock units may occur in the study area, but there is no evidence of past exploration of these units in the area.

REFERENCES

- Arizona Bureau of Geology and Mineral Technology, 1982, Geothermal resources of Arizona: map, scale 1:500,000.
- Keith, S. B., 1978, Index of mining properties in Yuma County, Arizona: Arizona Bureau of Geology and Mineral Technology Bulletin 192, 185 p.
- Ryder, R. T., 1983, Petroleum potential of wilderness lands in Arizona, in Petroleum potential of wilderness lands in the western United States: U.S. Geological Survey Circular 902 A-P, p. C1-C22.
- Sammel, E. A., 1979, Occurrence of low-temperature geothermal waters in the United States, in Assessment of geothermal resources of the United States-1978: U.S. Geological Survey Circular 790, 163 p.
- Wilson, E. D., 1960, Geologic map of Yuma County, Arizona: Arizona Bureau of Mines, University of Arizona, scale 1:375,000.

EXPLANATION OF SYMBOLS FOR FIGURES 2-15

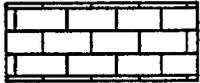


APPROXIMATE BOUNDARY OF THE NEW WATER MOUNTAINS STUDY AREA

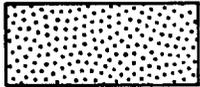


SAMPLE LOCALITY AND SAMPLE NUMBER

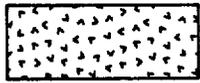
LITHOLOGY AND STRUCTURE



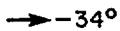
Limestone



Siltstone, sandstone



Andesite



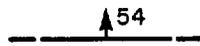
Decline showing dip



Trace and mapped shape of vein--Showing strike and dip;
dashed where approximate



Strike and dip of rock strata



Fault--Showing dip; dashed where approximate



Vertical fault

UNDERGROUND OPENINGS



Winze



Raise (bottom)



Shaft

EXPLANATION FOR FIGURES 2-15--Continued

SURFACE OPENINGS--SHOWING SAMPLE NUMBER(S)



Portal of adit with open cut

X 42

Prospect pit

■ 15, 16

Shaft

▣ 48

Inclined shaft

γ 14

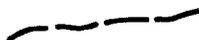
Adit

X 11

Trench



CONTOUR--SHOWING ELEVATION IN FEET ABOVE SEA LEVEL



UNIMPROVED ROAD

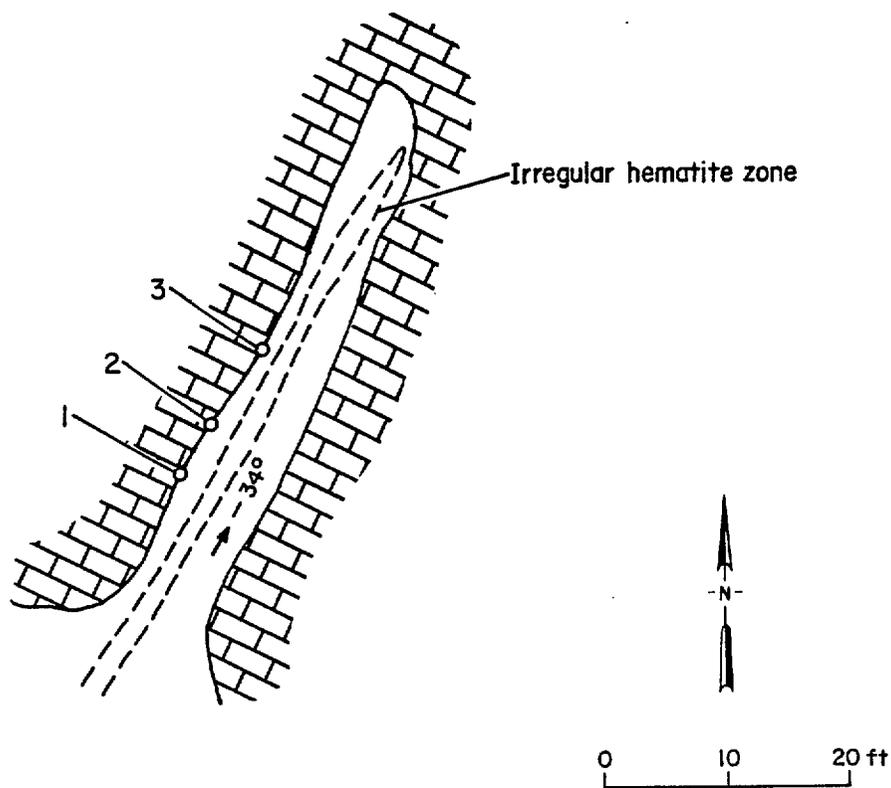


Figure 2.--Sample localities 1-3 taken in the Six Price Mine area.

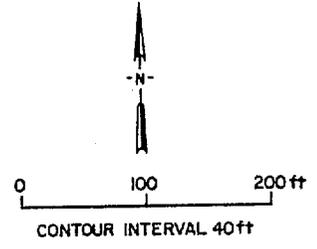
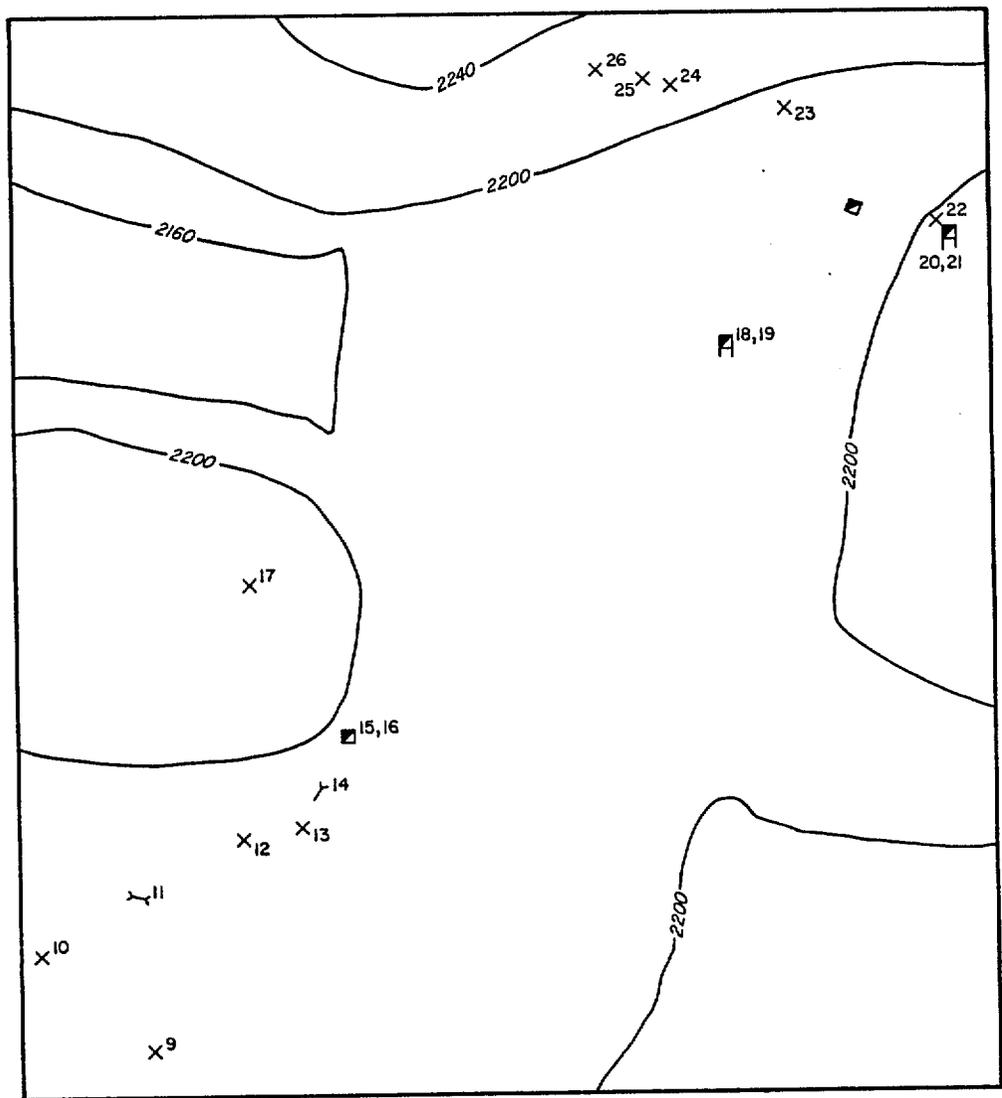


Figure 3.—Workings and sample localities 9-26 in the Poorman Mine area.
See plate 1.

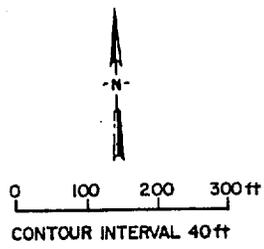
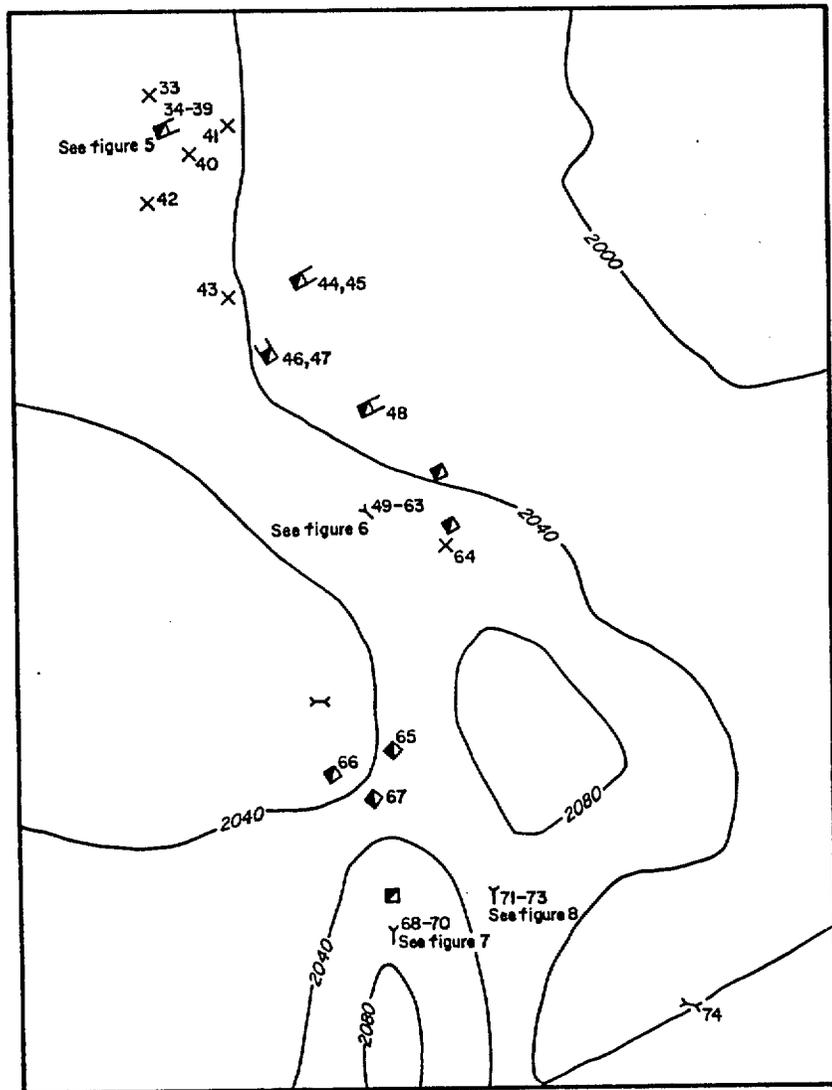


Figure 4.--Workings and sample localities 33-74 in the Apache Chief Mine area.
See plate 1.

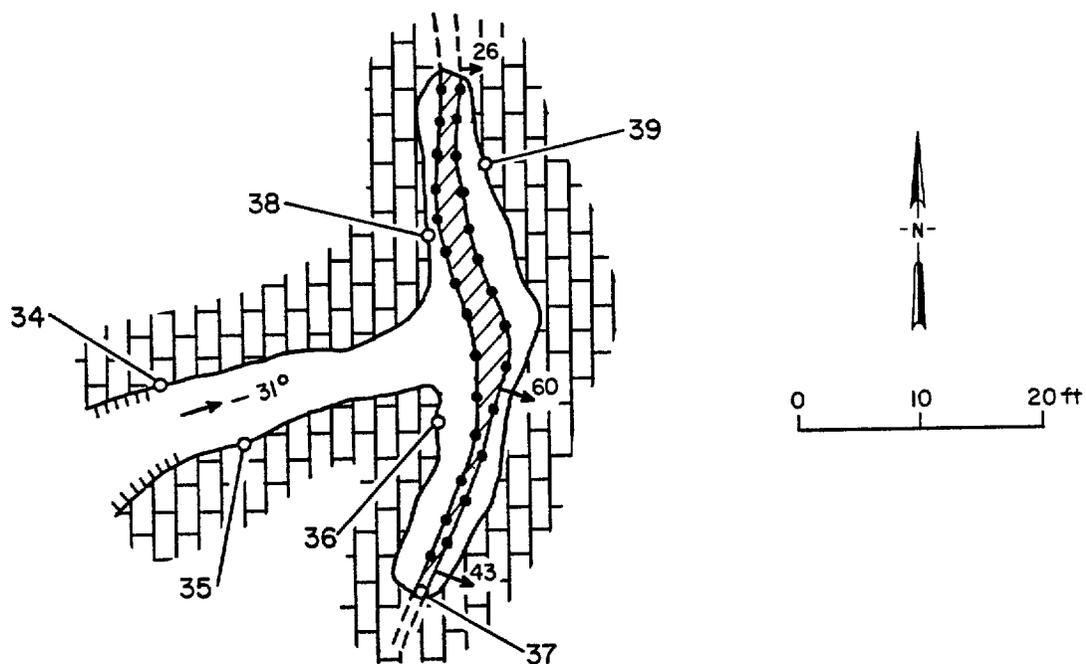


Figure 5.--Sample localities 34-39 taken in the Apache Chief Mine area.
See figure 4 for location.

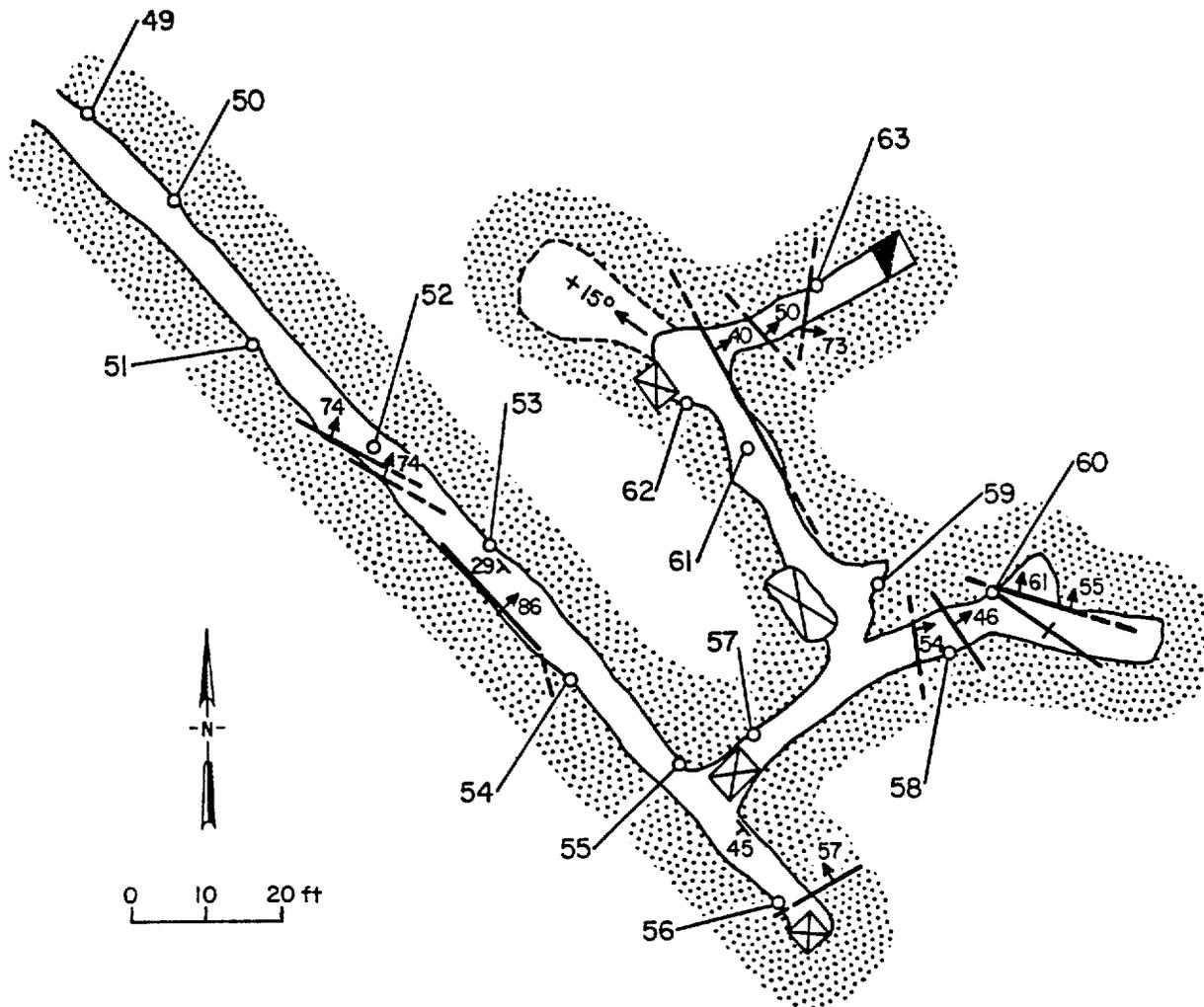


Figure 6.—Sample localities 49-63 taken in the Apache Chief Mine area. See figure 4 for location.

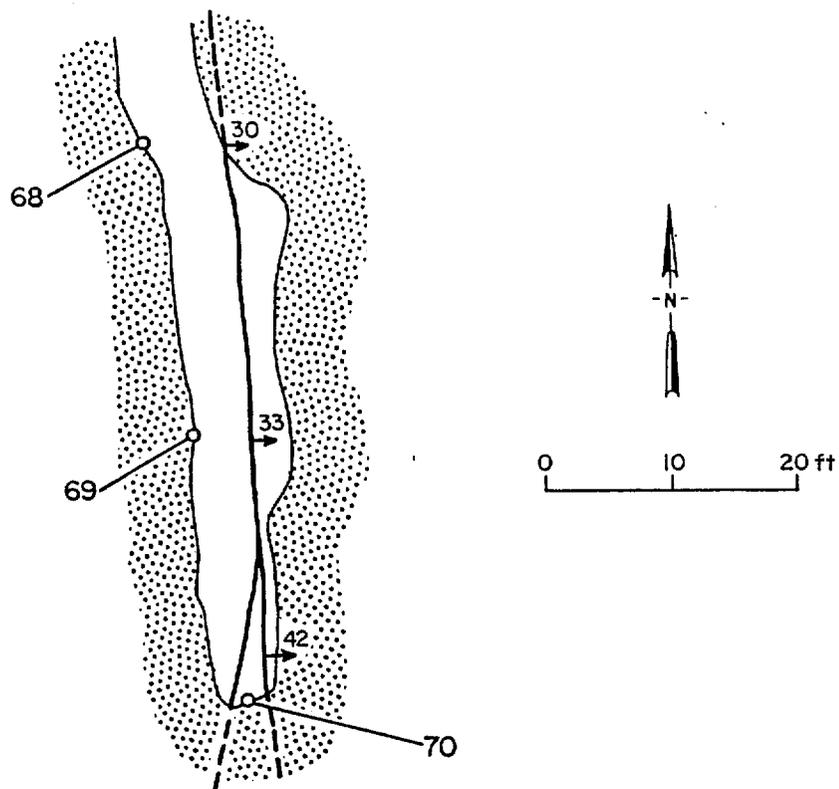


Figure 7.—Sample localities 68-70 taken in the Apache Chief Mine area.
See figure 4 for location.

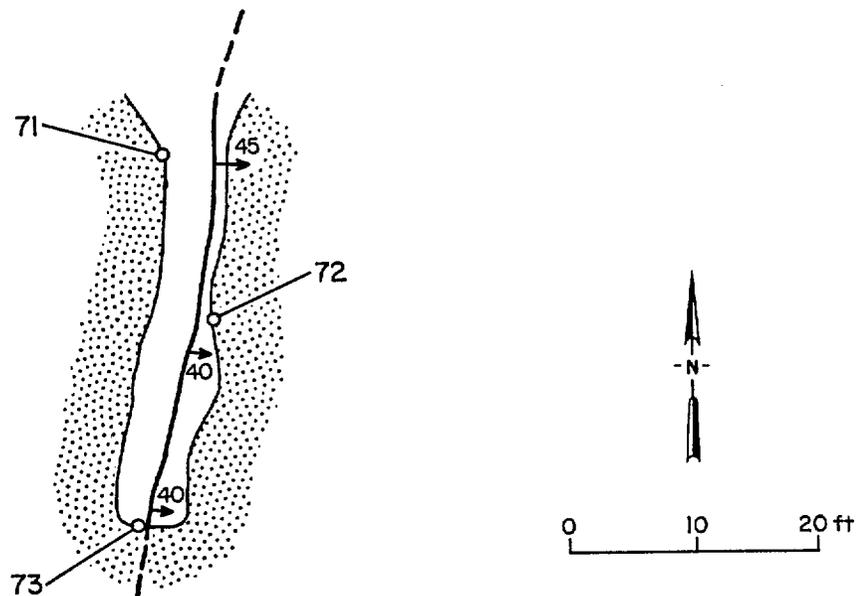


Figure 8.--Sample localities 71-73 taken in the Apache Chief Mine area.
See figure 4 for location.

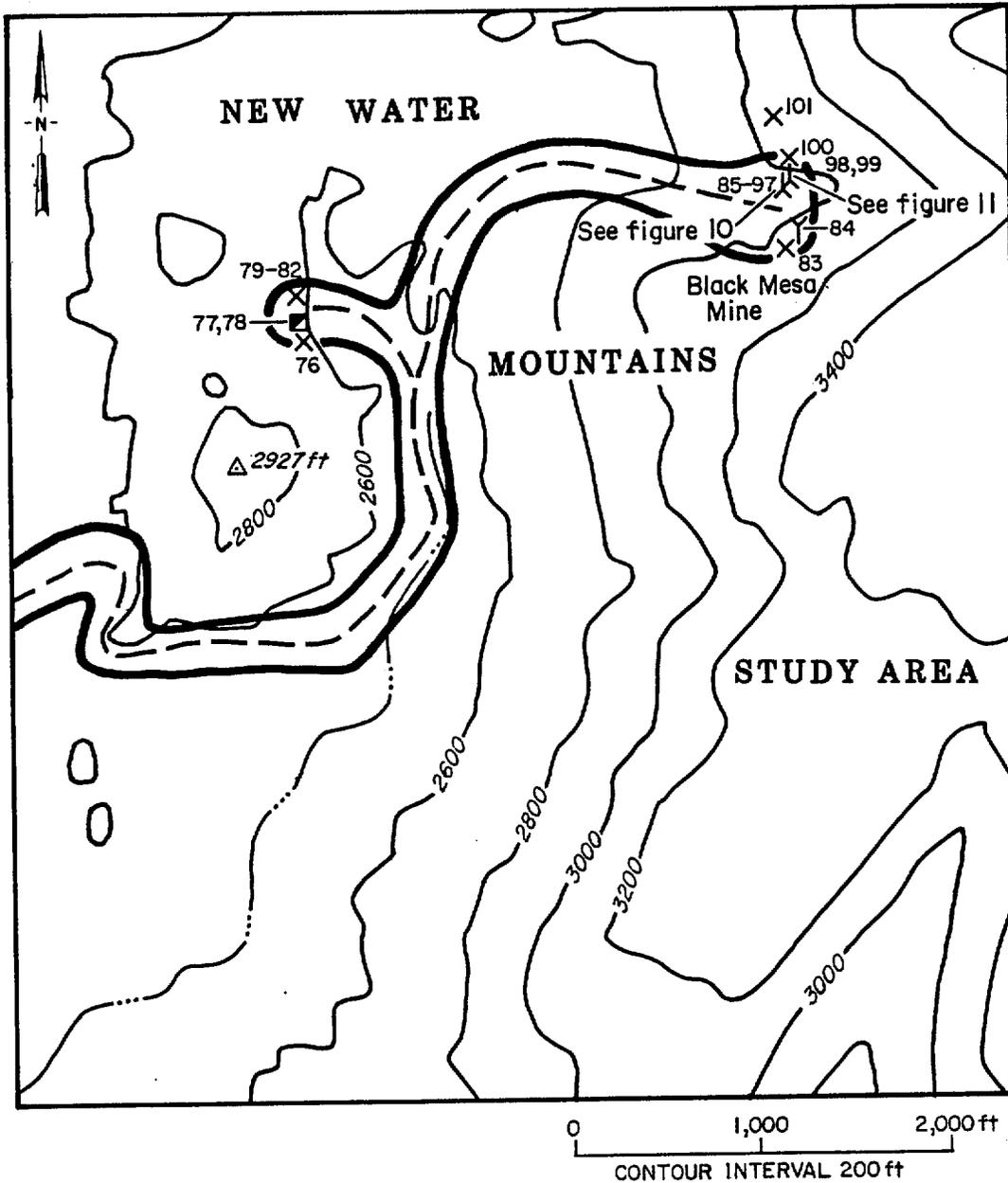


Figure 9.—Sample localities 76-101 taken in the Black Mesa Mine area. See plate 1.

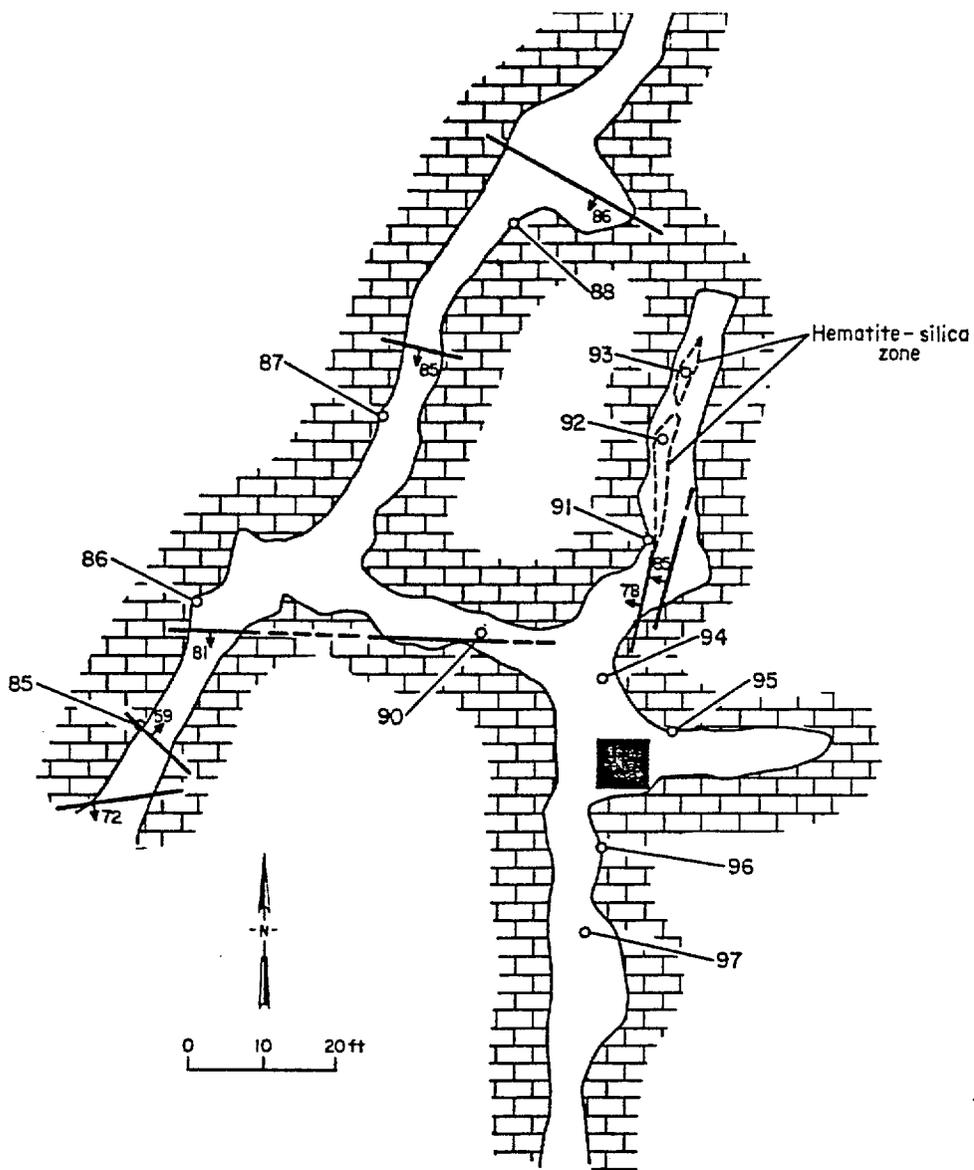


Figure 10.--Sample localities 85-97 taken in the Black Mesa Mine area.
See figure 9 for location.

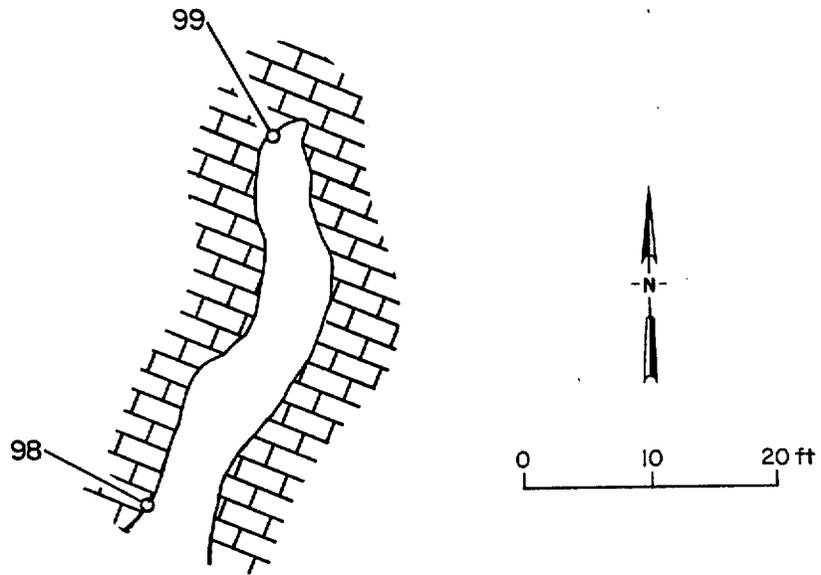


Figure 11.--Sample localities 98-99 taken in the Black Mesa Mine area.
See figure 9 for location.

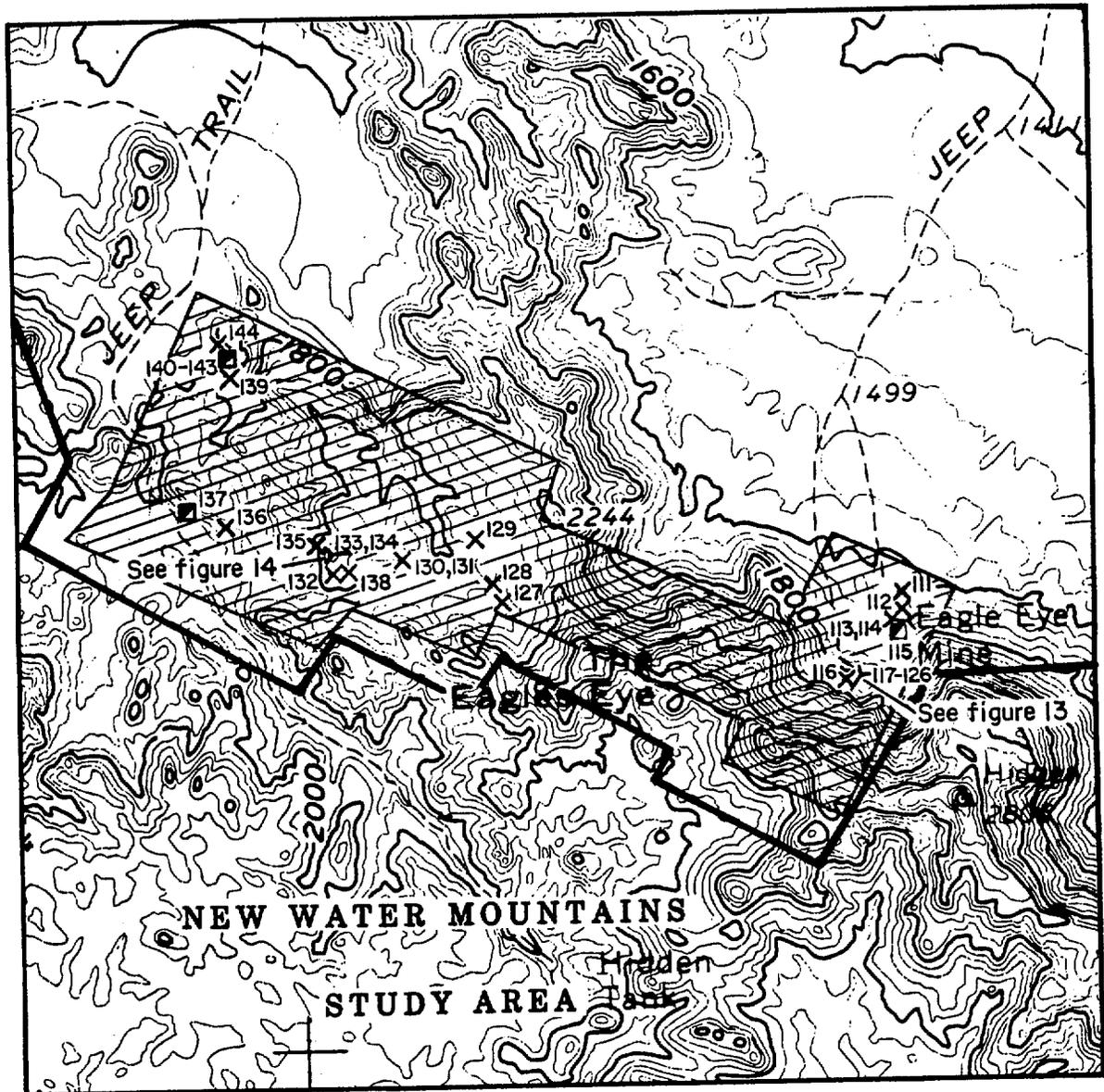


Figure 12.--Workings and sample localities 111-144 in the Eagle Eye Mine area.
See plate 1.

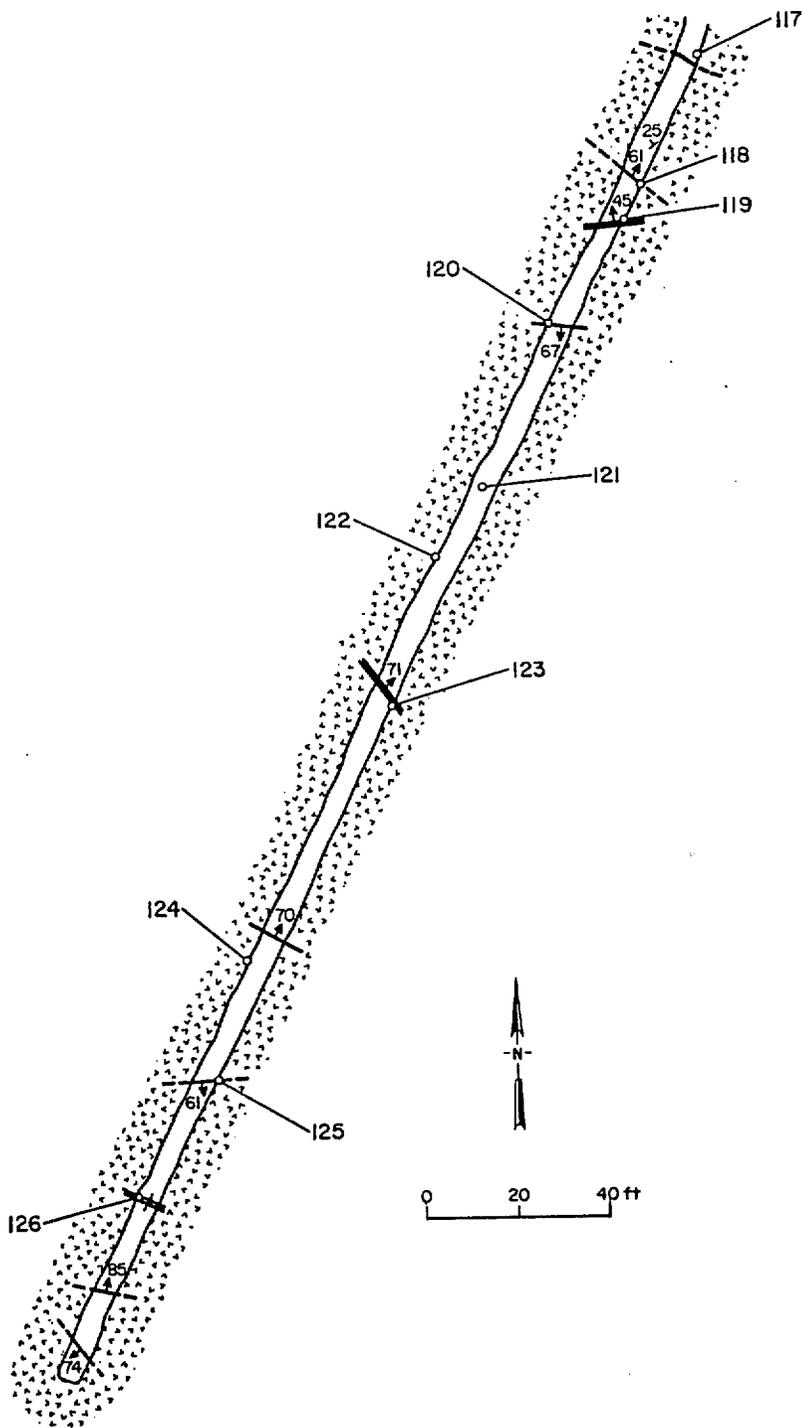


Figure 13.--Sample localities 117-126 taken in the Eagle Eye Mine area.
See figure 12 for location.

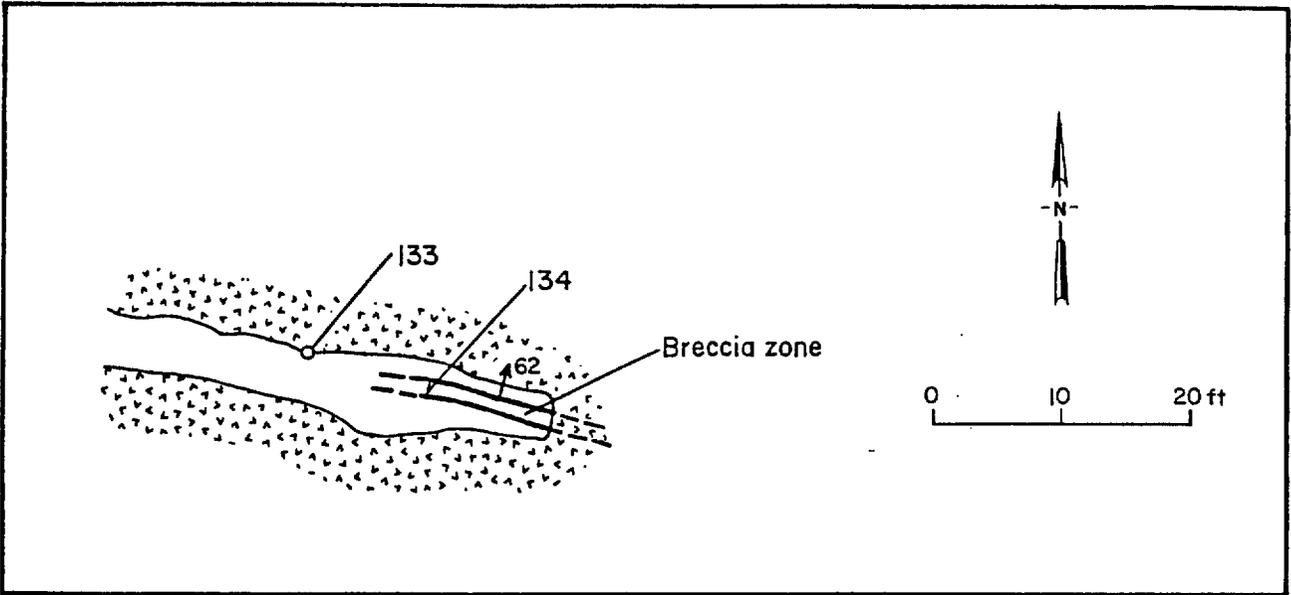


Figure 14.--Sample localities 133-134 taken in the Eagle Eye Mine area.
See figure 12 for location.

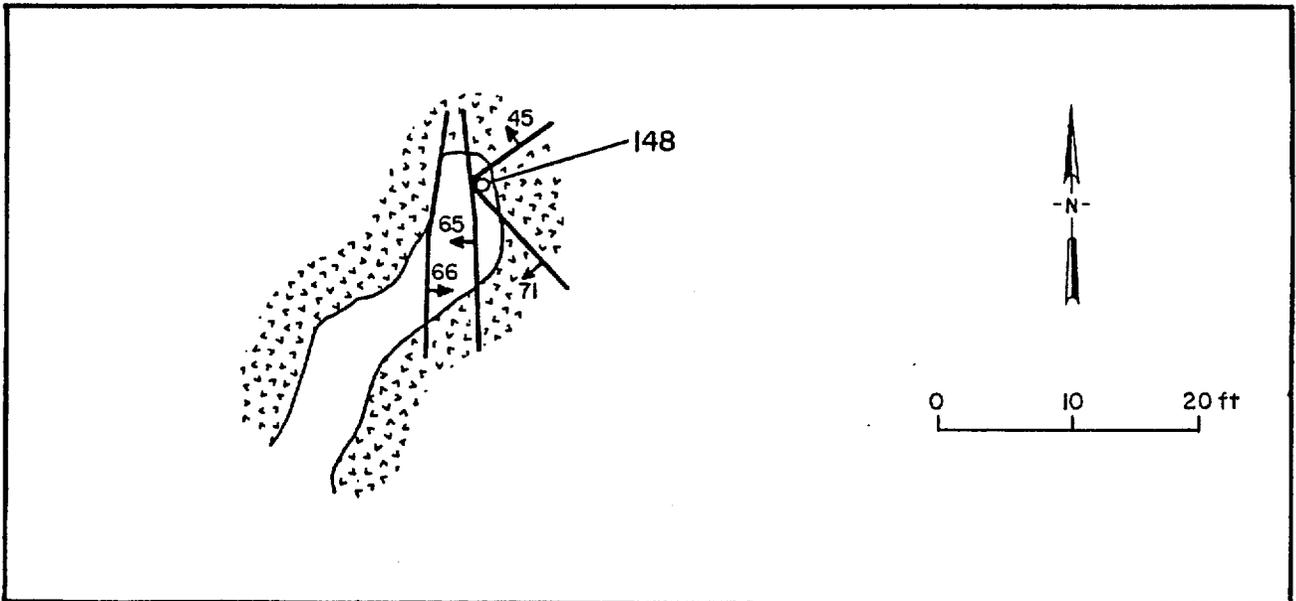


Figure 15.--Sample locality 148 taken near the New Water Mountains Study Area.
See figure 12 for location.

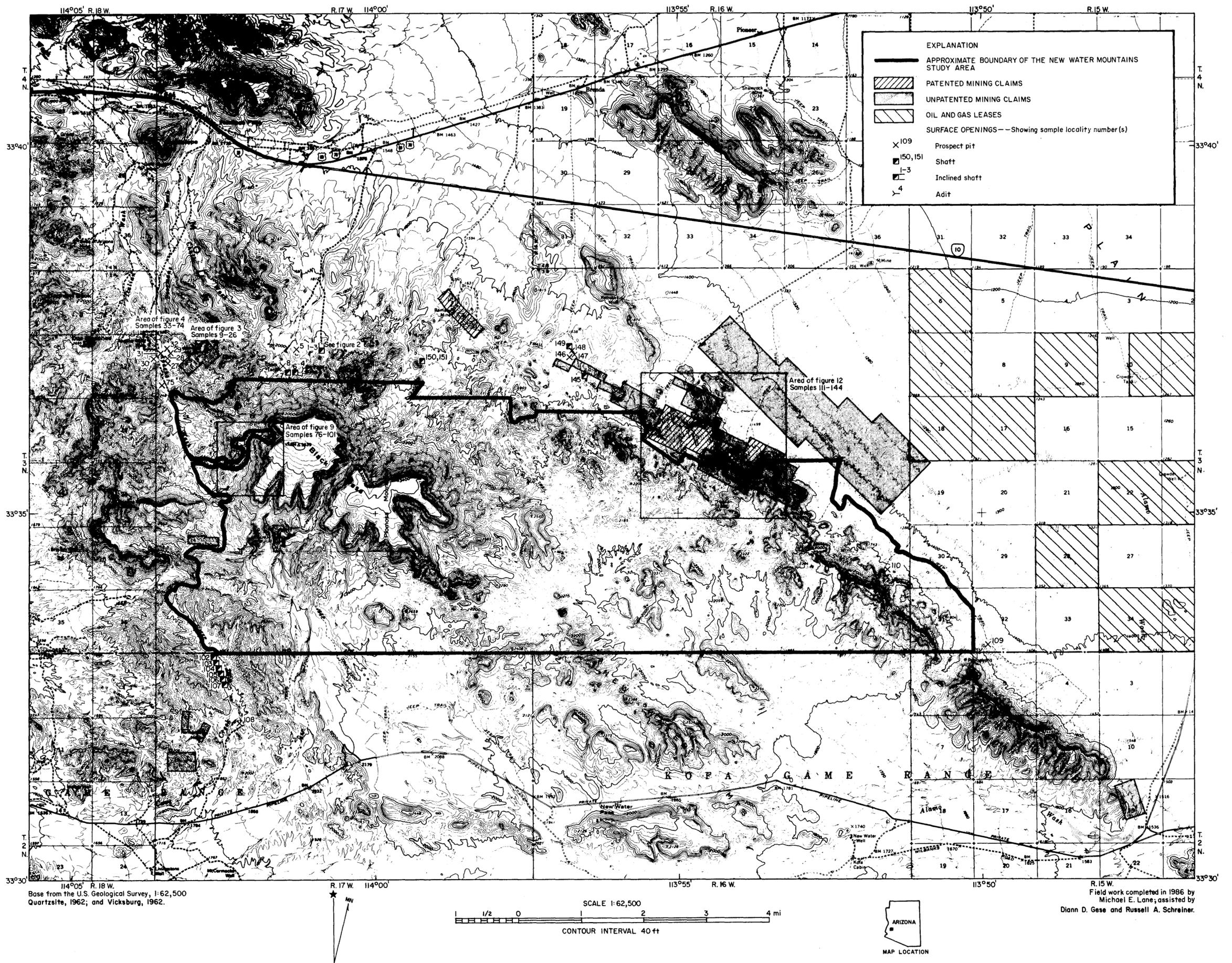
Table 1.--Sampled areas in and near the New Water Mountains Study Area, La Paz County, Arizona.

[Au, gold; Ag, silver; Cu, copper; Mn, manganese; Pb, lead; ppm, part per million; Tr, trace.]

Sample nos.	Locality	Summary	Workings	Sample and production data
1-8	Six Price Mine area.	Sampled areas consist of limestone, siltstone, quartzite, and granite country rock. NE. to NW. striking faults and quartz veins were sampled and mapped, and contained visible hematite, limonite, and calcite.	Inclined shaft, three pits, two shafts, one caved and one about 25 ft deep.	Samples were taken on faults and/or quartz veins. Highest Au content was 0.04 oz/st in a 1.9-ft chip sample and four samples contained trace Au. All samples were about 1/4 mi outside the study area.
9-26	Poorman Mine area.	Area consists mostly of quartzite and phyllite. Smaller exposures of graywacke(?), shale, and sandstone. Country rocks contain faults and/or associated quartz veins or stringers. Hematite, limonite, calcite and minor chrysocolla and malachite are found in structures.	Two inclined shafts, 2 vertical shafts, 10 pits, 1 adit and 1 trench.	Nine samples contained a trace Au and five samples contained 0.1 oz/st Ag. One sample contained 60 ppm Cu. All samples were about 3/4 mi outside the study area. Worked between 1909 and 1911 producing about 100 tons of ore averaging 3.8 oz/st Au and 0.8 oz/st Ag (Keith, 1978).
27-75	Apache Chief Mine area.	Apache Chief area consists of limestone, sandstone, quartzite, and siltstone containing faults and quartz veins. Some faults occur along bedding planes. Visible minerals include malachite, chrysocolla, hematite, gypsum, and limonite.	Four inclined shafts, six vertical shafts, six pits, three adits, two trenches.	Three samples contained Ag above 1 oz/st; 9.2 oz/st in a grab sample, 2.3 oz/st in a 1.3-ft chip sample, and 7.2 oz/st in a 0.4-ft chip sample. The remainder of the samples contained less than 0.4 oz/st Ag. The highest Au content was 0.01 oz/st in a 1.3-ft chip sample. The remainder of the samples contained trace or less Au. Three samples contained Cu; 3.2%, 0.36%, and 0.39%. Samples were 1/4 to 1 mi outside the study area.
76-101	Black Mesa Mine area.	Samples 76-82 were taken in fault gouge and massive specularite/quartz vein, both in diabase. Samples 83-101 were in limestone. Breccia and faults containing hematite, limonite, calcite, and vugs. Keith (1978) reports presence of cerussite, anglesite, galena, chrysocolla, malachite, brochantite, native Cu and cerargyrite.	One vertical shaft, five pits, three adits.	Of samples (76-82) taken in diabase country rock, all but two samples contained Tr Au; Ag (0.20 oz/st) was detected in only one sample. In samples 83-101 taken in limestone, the highest Au content was 0.58 oz/st in a 5.5-ft chip sample and the highest Ag content was 16.1 oz/st in a 2.4-ft chip sample. Fourteen samples contained Tr or more Au, and 15 samples contained 0.3 oz/st or more Ag. Sample localities are just outside the study area. From 1940's to 1964 production was 51 tons of ore averaging 25% Pb, 13 oz/st Ag, 2% Cu, 0.02 oz/st Au (Keith, 1978, p. 167).
102-108	Cave Creek area.	Alluvium in wash along Cave Creek. Shafts are about 50 ft deep.	Six shafts, one pit.	None of samples contained detectable Au, Ag, or other metals.
109-110	Unknown	Samples were taken at two isolated pits in volcanics and fragmented volcanics.	Two pits.	Do.

Table 1.--Sampled areas in and near the New Water Mountains Study Area, La Paz County, Arizona--Continued

Sample nos.	Locality	Summary	Workings	Sample and production data
111-144	Eagle Eye Mine area (Moore claims).	Area composed mostly of Cretaceous andesite and rhyolite. Cu mineralization is associated with NW. trending faults. Mesozoic quartzite, shale and siltstone crops out in small exposures near the Eagle Eye Mine. Cu minerals are predominantly chrysocolla, azurite, and malachite found in fractures, faults, and breccia zones.	Three vertical shafts, 2 adits, 13 pits, 1 trench.	Au was detected in three samples (Tr, Tr, 0.01 oz/st). Twenty-five samples contained Ag; the highest value was 1.6 oz/st in a 2.5-ft chip sample and the lowest was 0.1 oz/st. Cu was detected in all samples, the highest value was 3.3% in a 2.6-ft chip sample and the lowest was 23 ppm. Keith (1978) reported that 480 tons of 3.7% Cu ore was shipped from 1941-1944.
145-151	Unknown	Four samples (145-149) taken across faults containing minor chrysocolla in andesite(?) and one of dump material. Samples 150-151 were of sandstone dump material.	Three shafts, three pits.	Five samples contained detectable Au (0.01 oz/st, four contained Tr) and Ag (6.4 oz/st in a 1-ft chip sample was the highest and 0.4 oz/st was the lowest). Four samples contained from 5.8% in a 1-ft chip sample to 1.48% Cu.



MINE AND PROSPECT MAP SHOWING SAMPLED LOCALITIES, NEW WATER MOUNTAINS STUDY AREA,
LA PAZ COUNTY, ARIZONA
BY
MICHAEL E. LANE, U.S. BUREAU OF MINES
1986