UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Mineral investigation of the Arrastra Mountain Wilderness Study Area, La Paz, Mohave, and Yavapai Counties, and Peoples Canyon Wilderness Study Area, Yavapai County, Arizona

U.S. Bureau of Mines Mineral Land Assessment
MLA 22-85
1985

By
Lane, M.E

This open file report summarizes the results of a Bureau of Mines wilderness study and will be incorporated in a joint report with the U.S. Geological Survey. The report is preliminary and has not been edited or reviewed for conformity with the U.S. Bureau of Mines editorial standards. Work on this study was conduced by personnel from Intermountain Field Operations Center, Building 20, Denver Federal Center, Denver, CO 80225.

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STUDIES RELATED TO WILDERNESS

Bureau of Land Management Wilderness Study Area

The Federal Land Policy and Management Act (Public Law 94-579, October 21, 1976) requires the U.S. Geological Survey and the U.S. Bureau of Mines to conduct mineral surveys on certain areas to determine their 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 the Arrastra Mountain (AZ 020-059) and Peoples Canyon (AZ 020-068) Wilderness Study Areas, La Paz, Mohove, and Yavapai Counties, Arizona.

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By

Michael E. Lane

SUMMARY

The contiguous Arrastra Mountain (AZ 020-059) and Peoples Canyon (AZ 020-068) Wilderness Study Areas comprise 78,775 acres and 10,320 acres, respectively, of Bureau of Land Management land in west-central Arizona. In 1984, there was no mining activity in either area and no records were found concerning past production. Bureau of Land Management records (1984) show unpatented mining claims and one patented mining claim in and near the wilderness study areas.

Manganese is found in veins, faults, conglomerate matrix, and as disseminated occurrences in the Arrastra Mountain Wilderness Study Area. Eight-hundred twenty tons of manganese resources are present in two adits. Uranium was detected in all samples, but most values were low. Drill hole data indicate that at least 140,000 tons of low-grade uranium resources exist near Artillery Peak. Gold was found in samples from the Button claims, but values are low to moderate and resources could not be estimated with available data.

Oil and gas leases cover both study areas; however, data on oil and gas are insufficient to determine the possibility of oil and gas occurrences.

INTRODUCTION

In 1984, the Bureau of Mines (Bureau), in conjunction with the U.S. Geological Survey (USGS), conducted a mineral investigation of the Arrastra Mountain Wilderness Study Area (WSA) La Paz, Mohave, and Yavapai Counties and Peoples Canyon Wilderness Study Areas (WSA) in Yavapai County, Arizona, on land administered by the Bureau of Land Management (BLM). The Bureau surveys and studies mines, prospects, and mineral occurrences to appraise identified resources. The USGS assesses the potential for undiscovered mineral resources based on reconnaissance geological, geochemical, and geophysical evidence. This report presents the results of the Bureau of Mines study of both areas.

Geographic and geologic setting

The Arrastra Mountain WSA comprises 78,775 acres in southeastern Mohave County, western Yavapai County, and northern La Paz County, Arizona (fig. 1). The Peoples Canyon WSA comprises 10,320 acres and is contiguous with and east of Arrastra Mountain WSA. The WSA's are about 40 mi northwest of Wickenburg, Arizona. Access to the WSA's is by improved and unimproved dirt roads from U.S. Highway 93; however, few roads and trails provide interior access. The Artillery Mountains lie along the western boundary and the Arrastra Mountains lie along the northern boundary of the Arrastra Mountain WSA . The Santa Maria River is adjacent to the southern boundaries of the study areas. The confluence of the Santa Maria and Big Sandy Rivers is at Alamo Reservoir in the southwest part of Arrastra Mountain WSA.

The WSA's are in the northern part of the Basin and Range physiographic province in mountainous desert terrain. Elevations range from 1,100 ft in the river beds near the confluence of the Big Sandy and Santa Maria Rivers to 4,807 ft at Poachie Peak in the Arrastra Mountains. Artillery Peak (3,213 ft) is a prominent feature in the western part of the Arrastra Mountain WSA.

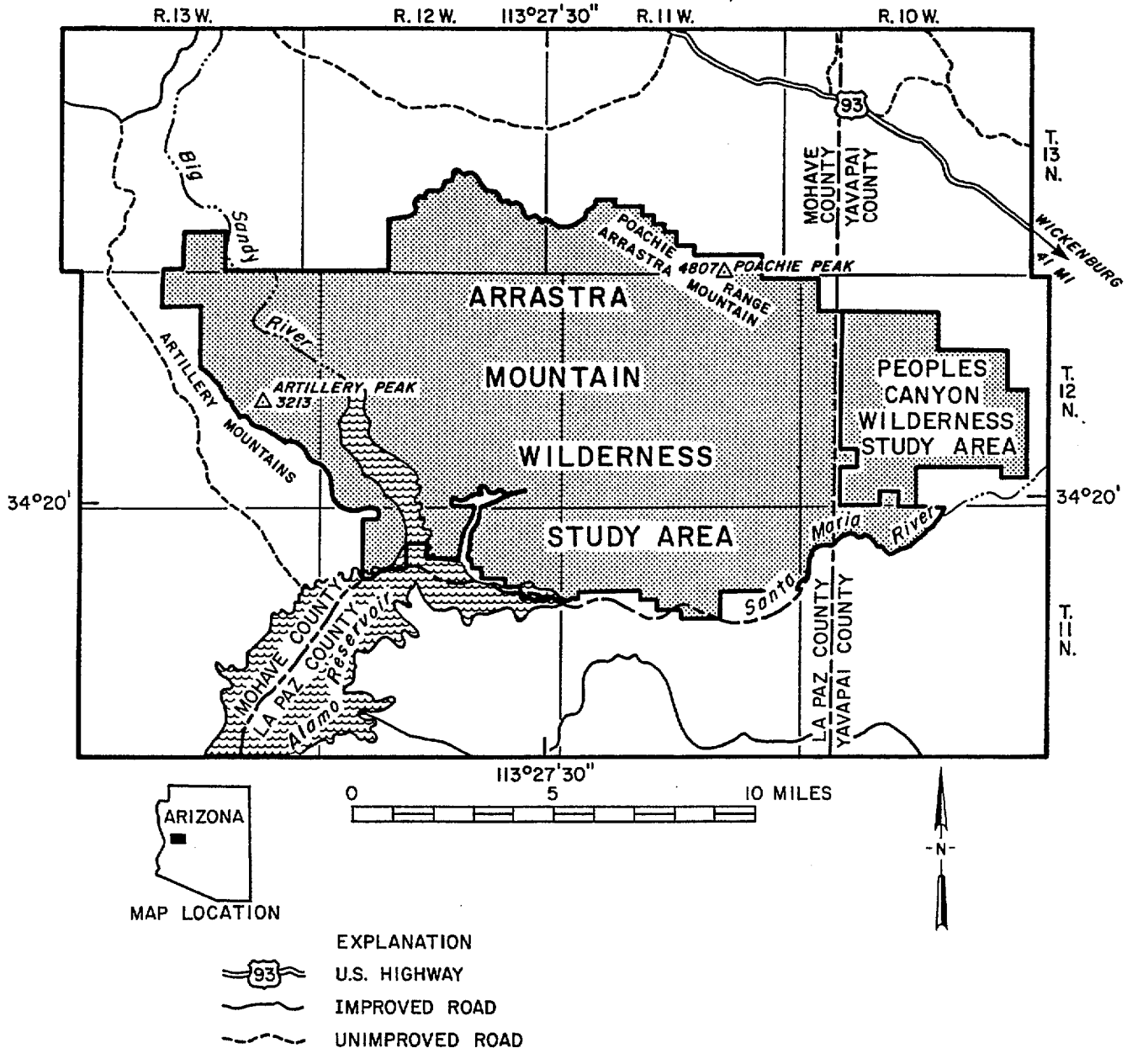

Figure 1.--Index map of the Arrastra Mountain Wilderness Study Area, La Paz, Mohave, and Yavapai Counties, and Peoples Canyon Wilderness Study Area, Yavapai County, Arizona

The WSA's consist mostly of Precambrian granite and granite gneiss. The Artillery Formation (Eocene?), comprised of sandstone, siltstone, conglomerate and basalt lenses (Arizona Bureau of Mines, 1958; 1959), crops out in the southwestern part of the Arrastra Mountain WSA. The Chapin Wash Formation (Miocene) crops out adjacent to the southwest part of the WSA. Manganese and uranium minerals are found in the Artillery and Chapin Wash Formations. Manganese minerals occur as lenses and veins; uranium occurs as irregular-shaped bodies.

Methods of investigation

Information about mineral occurrences and mining activity, in and near the WSA's, was collected from published and unpublished reports. Mining claim locations and land status plats from the BLM State Office in Phoenix, Arizona were reviewed.

Bureau personnel investigated the WSA's and peripheral area within 1 mi of the boundaries. Mineralized areas, mines, and prospects were mapped by compass-and-tape method and sampled. When data were sufficient, resource calculations were made.

A total of 68 chip, select, and grab samples was collected; 19 were from within the Arrastra Mountain WSA. No workings or mineralized areas were found and no samples were taken in the Peoples Canyon WSA. All samples were fire assayed for gold and silver and 61 samples were analyzed spectrographically for 40 elements (see appendix). Selected samples were analyzed by atomic absorption methods for manganese and by fluorometric methods for uranium.

Figures 2-10 are maps of workings and sample localities. Tables 1 and 2 show data for samples taken during the field investigation.

Previous Investigations

Manganiferous sediments in the Artillery Mountains and surrounding area have been investigated since the 1920's. This area was drilled intermittently by the M.A. Hanna Co. from 1937 to 1940 and by the U.S. Bureau of Mines in 1941 and 1949 for exploration purposes (Farnham and Stewart, 1958). Drilling by the Bureau was part of a joint investigation of the strategic mineral resources by the USGS and the Bureau (Lasky and Webber, 1949). Wilson and Butler (1930) described the geology of the various manganese properties. A detailed geologic report of an area bordered by the Bill Williams River and Big Sandy River (pl. 1) was completed by Lasky and Webber in 1949.

Uranium occurrences near the southern part of the WSA's were extensively studied by Otton (1977), Sherborne and others (1979), and Mueller and Halbach (1983). The areas around the Anderson Mine and near Artillery Peak (pl. 1) were drilled by Jacquays Mining Corp. in the 1950's(?) to determine the extent of uranium mineralization.

Mining activity

The western part of the Arrastra Mountain WSA is on the edge of the Artillery Mountain mining district, which contains some of the largest reserves of low-grade manganese in the United States (Farnham and Stewart, 1958). In the southwest corner of the Arrastra Mountain WSA, manganese mineralization occurs principally in the Artillery Formation. Field investigations by the Bureau showed manganese occurs in veins, as matrix in conglomerate, and in faults, but Farnham and Stewart (1958, p.30) state that stratified manganese deposits also occur.

Manganese production from the Artillery Mountains district began about 1914 and continued intermittently until 1955 (Farnham and Stewart, 1958). Most of the manganese production was at least 1 mi west and southwest of the Arrastra Mountain WSA. One pit and two short adits were found, but no production from the WSA's has been reported.

The Antler Mine, the only patented claim in the study area, was developed primarily for gold. Samples were taken at the Antler Mine but data is confidential by request of the owner.

The Button claims have the only other workings inside the WSA: a small inaccessible shaft, two trenches, and two pits. Several other claims and oil and gas leases are located inside and near the WSA (pl. 2) but no exploration evidence was noted.

No mineral occurrences or mining activity was found in Peoples Canyon WSA.

MINERALIZED AREAS

The following text discusses the commodities found in samples taken in the WSA's during the field investigation.

Manganese

Manganese is found in the southwestern part of the Arrastra Mountain WSA in the Artillery Formation of Eocene (?) age. It also exists in the younger Chapin Wash Formation, however, all workings and sample localities were in the Artillery Formation.

The manganese in the study area is found as veins, as matrix in conglomerate, in fault zones, and as disseminations in red sandstone and boulder-conglomerate. The veins and faults are less than five feet wide and have a traceable strike length of 150 ft.

Nineteen samples taken within the WSA's contained manganese; the average manganese content was 3.88 percent. The highest manganese content was 26.9 percent (sample 9); the lowest was 0.01 percent (sample 65).

An estimated 520 tons of material averaging 6.05 percent manganese exist in a vein in an unnamed adit (fig. 4) in the southwest part of the Arrastra Mountain WSA. In addition, at another adit (fig. 3), about 300 tons of manganese-rich material was estimated to be present. Samples 9 and 10 from the adit contained 26.9 and 5.09 percent manganese, respectively; a surface sample (sample 11) contained 3.17 percent manganese. An average grade could not be determined because of insufficient access for sampling but it would probably be less than 10 percent manganese.

Uranium

Uranium was detected in all samples taken during the field investigation. The highest uranium content of samples taken in the WSA's was 10.38 parts per million (ppm) (sample 10); the average was 3.32 ppm. The highest uranium content in all the samples was 2,419 ppm (sample 3).

Geologic cross-sections and analytical results of sparse holes drilled along the western boundary near Artillery Peak by Jacquays Mining Corp. in the 1950s(?) were obtained from the Arizona Department of Mineral Resources in Phoenix. Using these data, three tonnage-grade estimates of resources were calculated: 90,000 tons of material averaging between 0.01 and 0.05 percent, 20,000 tons between 0.05 and 0.1 percent, and 30,000 tons greater than 0.1 percent U_3O_8 exist near Artillery Peak in sec. 22, T.12N., R.13W., on the western boundary of the Arrastra Mountain WSA. Uranium resources were identified only in the Artillery Peak area.

The Anderson uranium mine (pl. 1) consists of extensive surface excavations about 1 1/2 mi south of the WSA's boundary. According to Mueller and Halbach (1983), the mine is in the Chapin Wash Formation, however, Sherborne and others (1979) describe the mine as being in the Anderson Mine Formation, which is intertongued with the Chapin Wash Formation. Ore grades range from 0.03 to 0.1 percent U_3O_8 and the average about 0.07 percent. Between 1955 and 1959, about 33,230 pounds of U_3O_8 was produced from 10,758 tons of ore (average grade was 0.15 percent) (Sherborne and others, 1979). From field observation, the uranium-bearing formation does not appear to be in the WSA's.

Gold and silver

Gold, in excess of trace amounts, was detected in 11 samples. Of these 11 samples, 4 are from the Arrastra Mountain WSA at the Button claims (pl. 1) from a fault and quartz vein. In these 4 samples, the highest gold value was 0.41 oz gold per ton (sample 61); the average was 0.23 oz gold per ton. The highest gold content of all the samples was 1.6 oz gold per ton (sample 68).

Silver was detected in 21 samples; 4 samples are from the Arrastra Mountain WSA at the Button claims. The highest silver content in samples in the WSA's was 0.3 oz per ton (samples 61, 63, 65); the average value was 0.1 oz per ton. The highest silver content of the 21 samples was 0.4 oz silver per ton (sample 68).

Gold- and silver-bearing faults and veins at the Button claims were in Precambrian granite. The structures were not visible on the surface and could not be traced beyond the workings.

Although gold and silver resources could not be estimated with available data, it appears that they would be limited to the Button claims, if present.

Sand and gravel

The WSA's contain numerous sand and gravel deposits in dry washes and river beds throughout the study area. The two largest and most accessible deposits are along the Big Sandy and Santa Maria Rivers. Such deposits are typical of desert environments and can be found in abundance outside the WSA's.

Oil and gas

The WSA's are covered with oil and gas leases and lease applications (pl. 2); however, no evidence was found to indicate the presence of oil and gas. At the time of this investigation (1984), there had been no oil and gas exploration in or near the study areas.

CONCLUSIONS

Manganese, uranium, and gold were present in samples taken in the WSA's. Manganese was found in veins, faults, conglomerate matrix, and disseminated in sandstone in the Arrastra Mountain WSA near the confluence of the Santa Maria and Big Sandy Rivers. Small manganese resources are estimated to be in the WSA. Uranium was detected in all samples taken; however, the grade is considered low for mining at current prices. A minimum resource of 140,000 tons above 0.01 percent U_3O_8 was estimated. The data used for this estimate are incomplete and the accuracy of the calculated tonnage and grade is not known.

Gold occurs in faults and veins at the Button claims. Field evidence shows that the gold is sparse and discontinuous and if gold resources exist they are considered small and low to moderate grade.

There was no indication of mineral occurrences or mining activity within Peoples Canyon WSA.

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Arizona Bureau of Mines, 1959, Geologic map of Mohave County, Arizona: scale 1:375,000.

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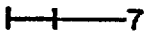
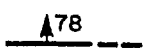
Wilson, E.D., and Butler, G.M., 1930, Manganese ore deposits in Arizona: University of Arizona Bulletin No. 127, 104p.

EXPLANATION OF SYMBOLS FOR FIGURES 2-10

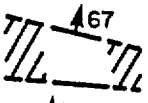
VERTICAL OR DIAGONAL SAMPLE LOCALITY--Showing sample number



HORIZONTAL SAMPLE LOCALITY--Showing sample number

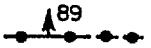


FAULT--Showing strike and dip; dashed where approximate

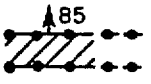


FAULT ZONE--Showing strike and dip; dashed where approximate

SHEAR ZONE--Showing strike and dip; dashed where approximate



TRACE OF VEIN--Showing strike and dip; dashed where approximate



MAPPED SHAPE OF VEIN--Showing strike and dip; dashed where approximate

DIKE--Showing strike and dip; dashed where approximate

BEDDING--Showing strike and dip

PORTAL OF ADIT

OPEN CUT

BOTTOM OF RAISE OR SHAFT

LITHOLOGY

Granite

Conglomerate or sandstone

Gneiss

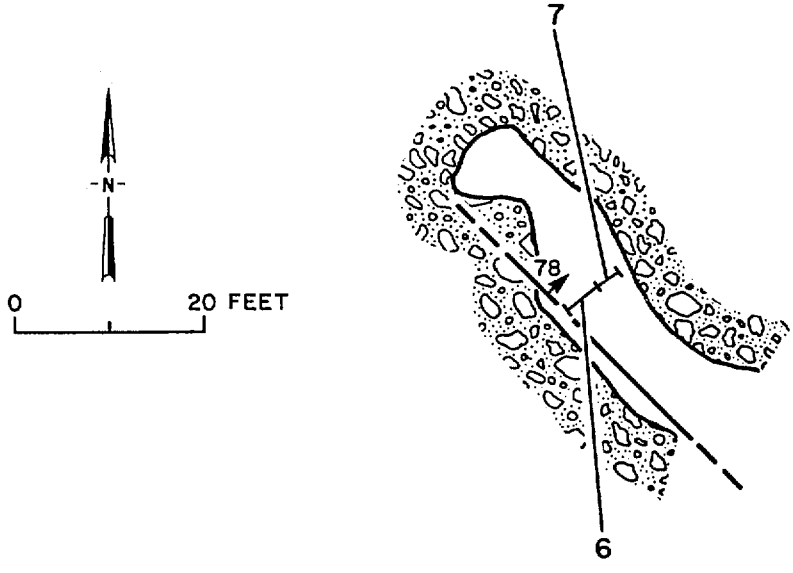


Figure 2.--Map showing sample localities 6-7.

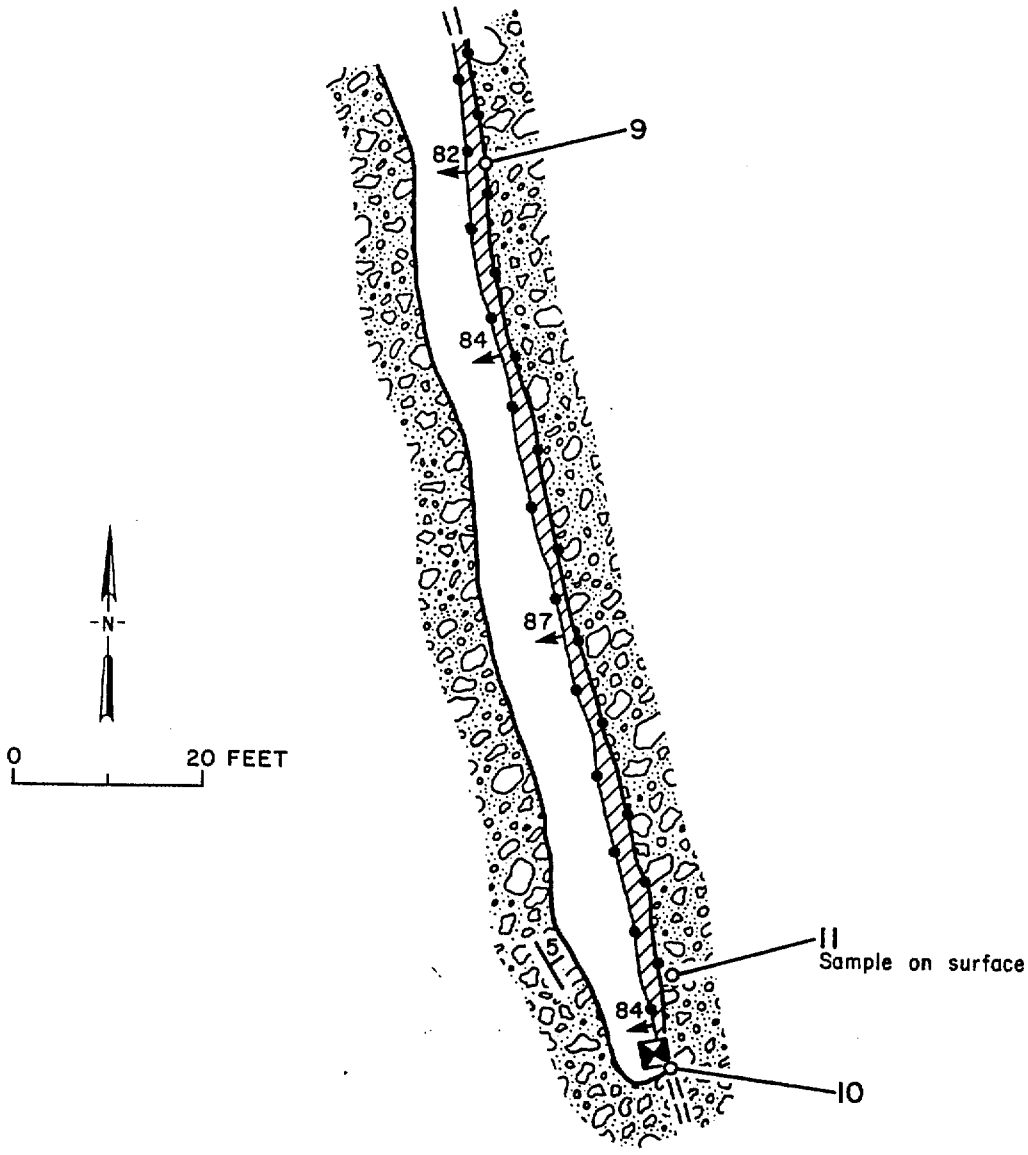


Figure 3.--Map showing sample localities 9-11.

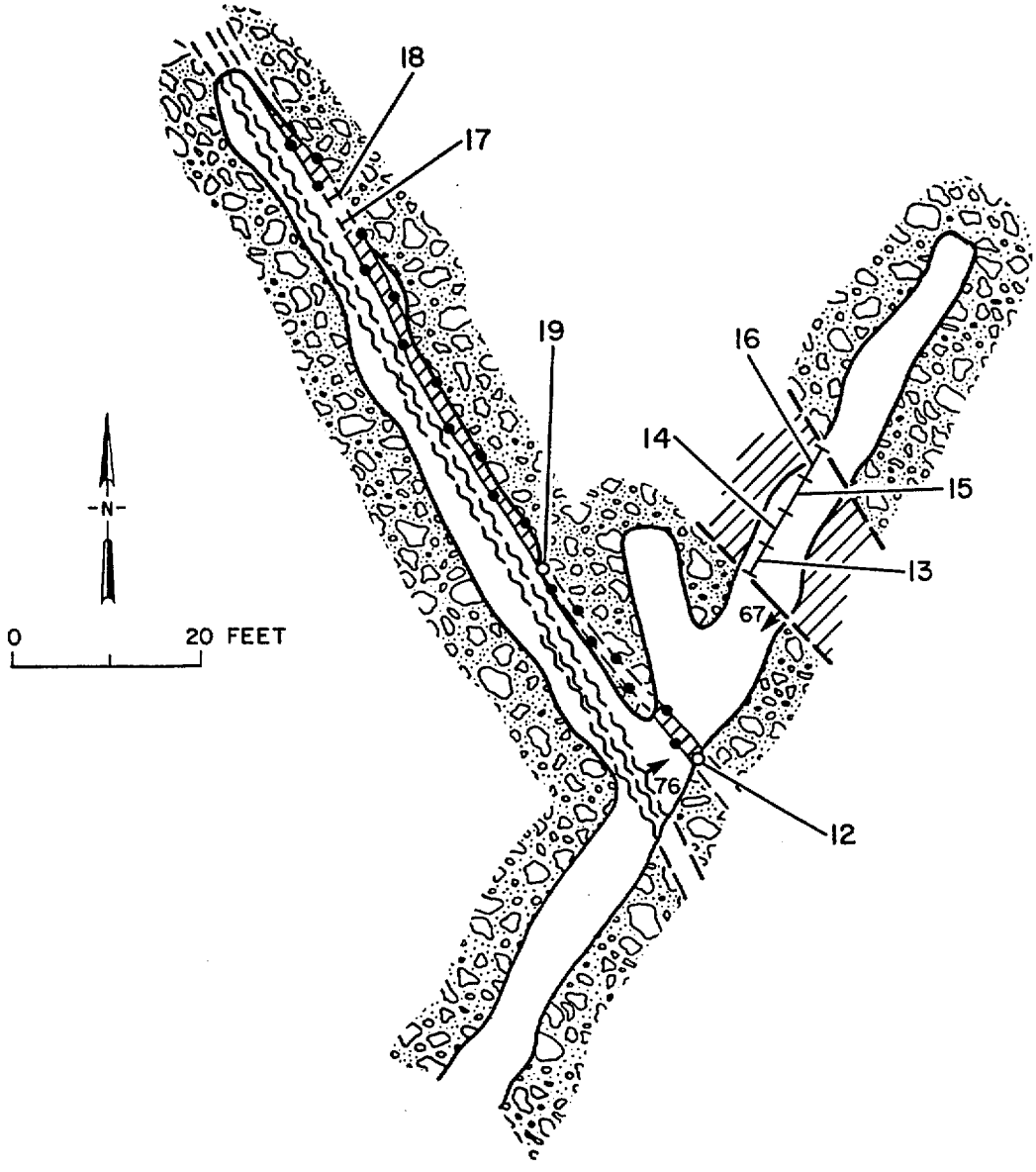


Figure 4.--Map showing sample localities 12-19.

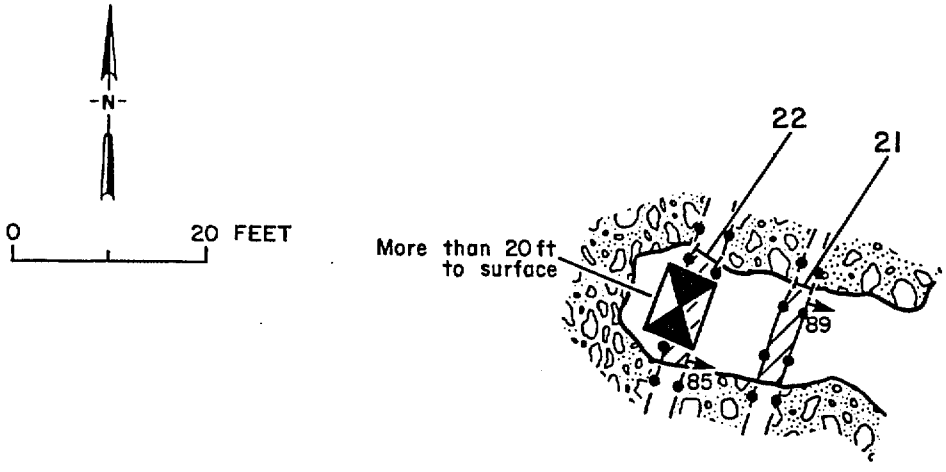


Figure 5.--Map showing sample localities 21-22.

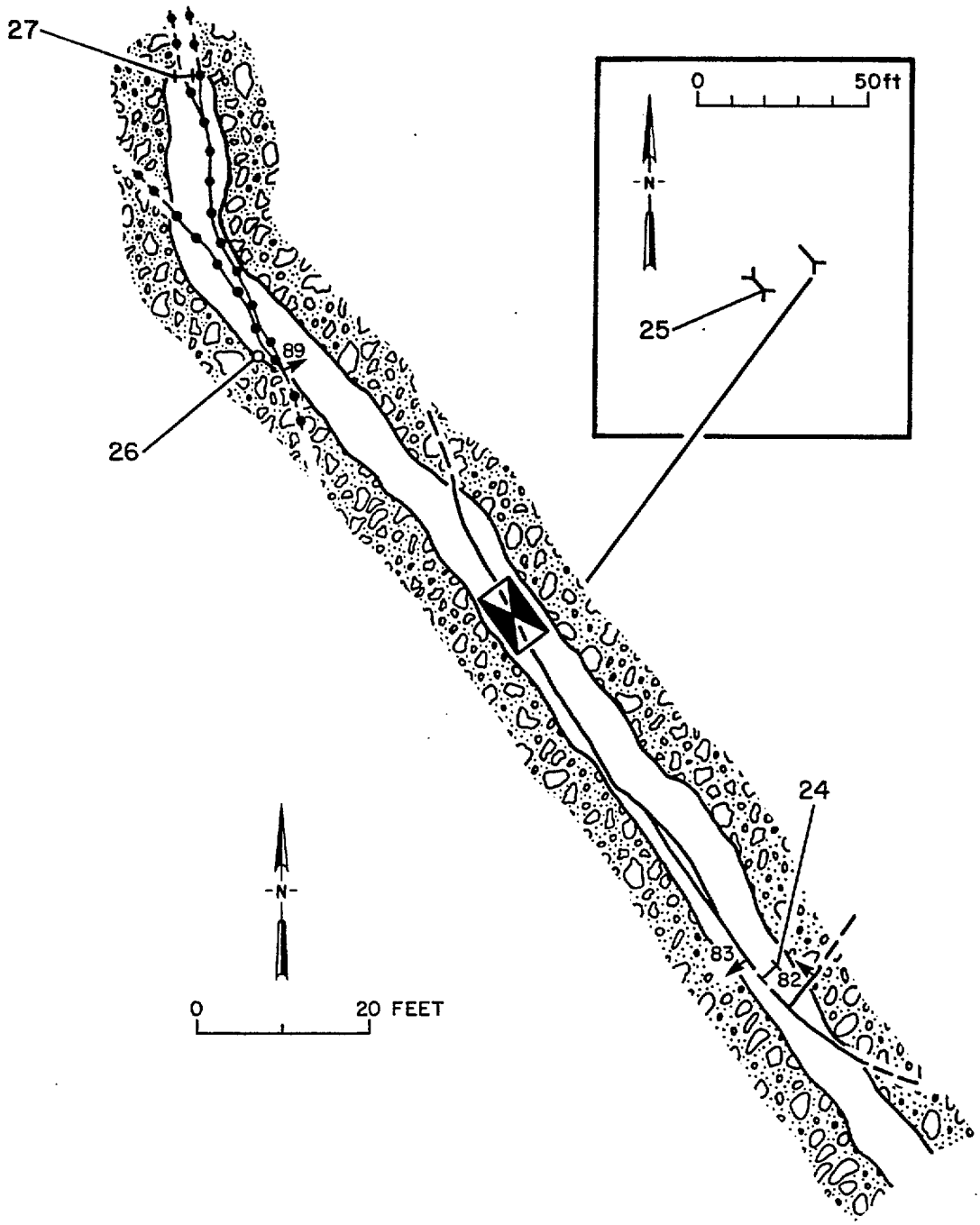


Figure 6.--Map showing sample localities 24-27.

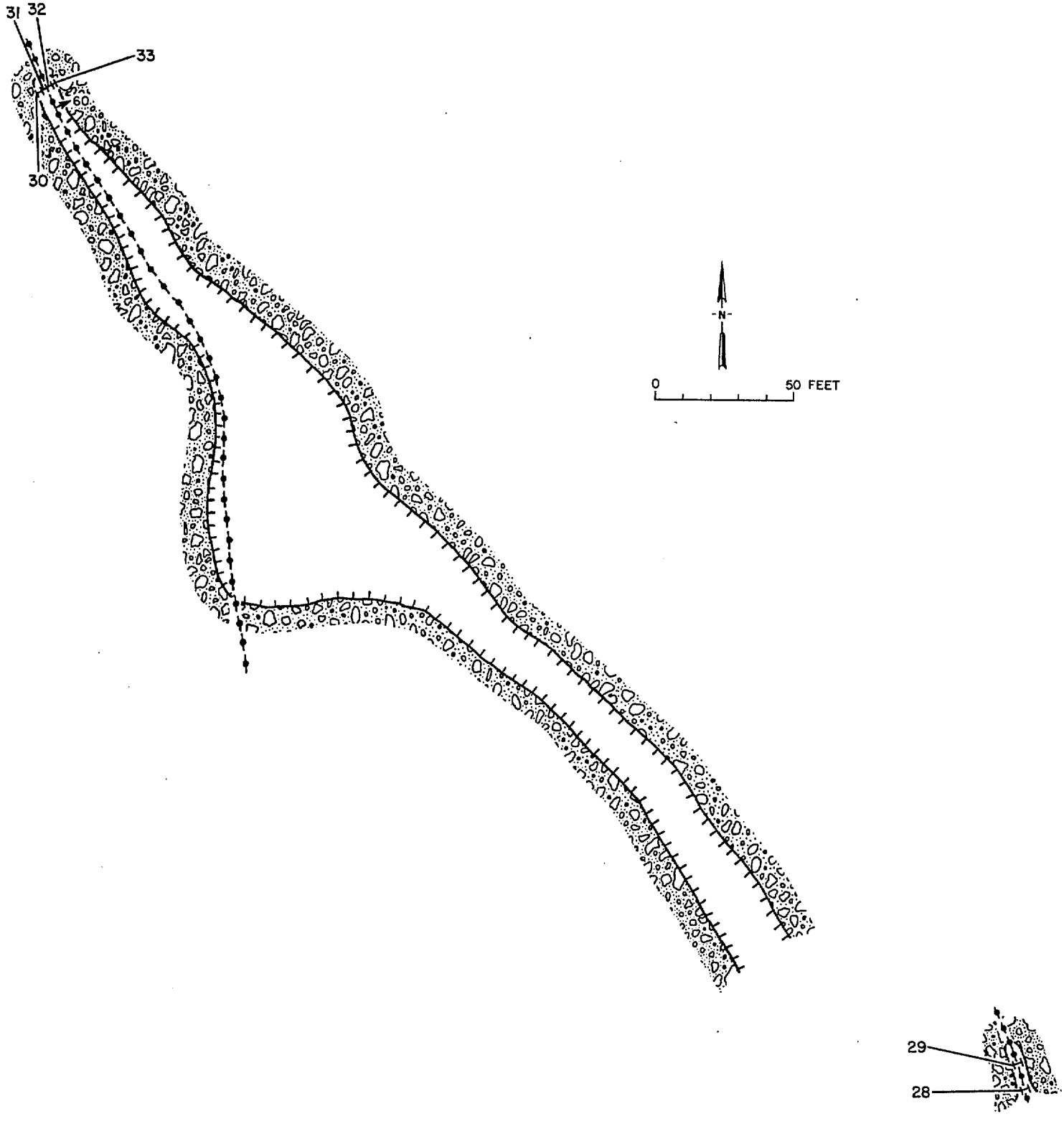


Figure 7.--Map showing sample localities 28-33.

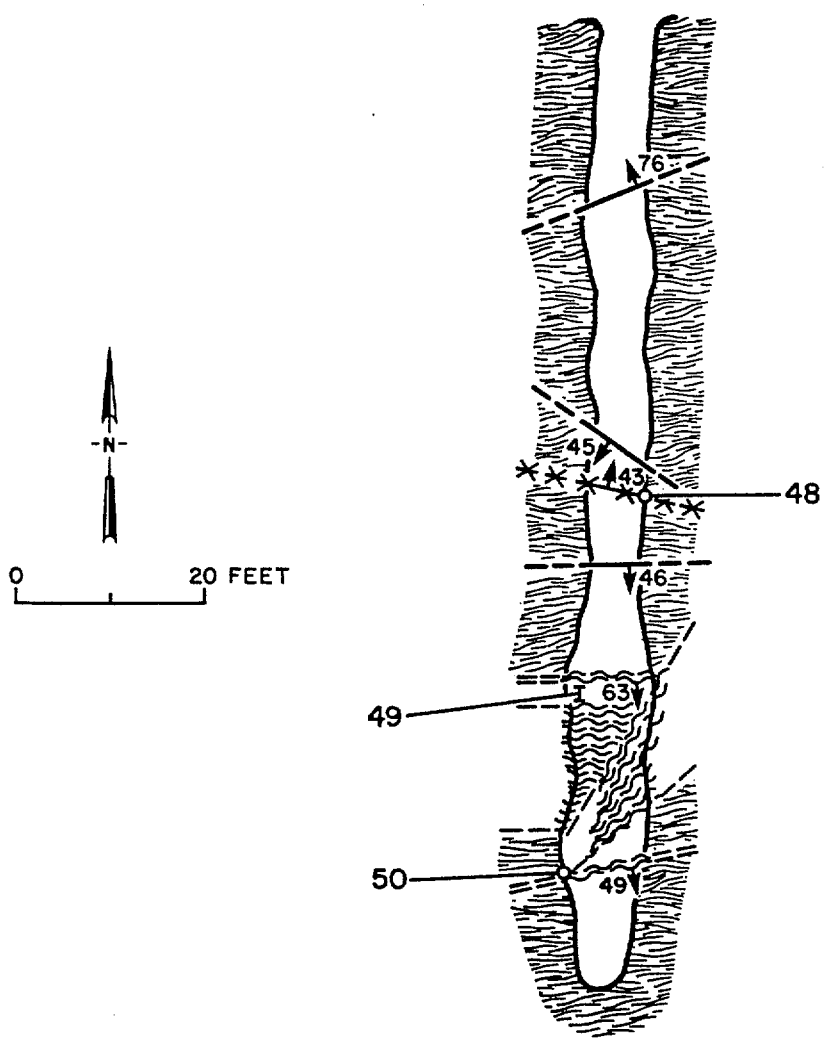


Figure 8.--Map showing sample localities 48-50.

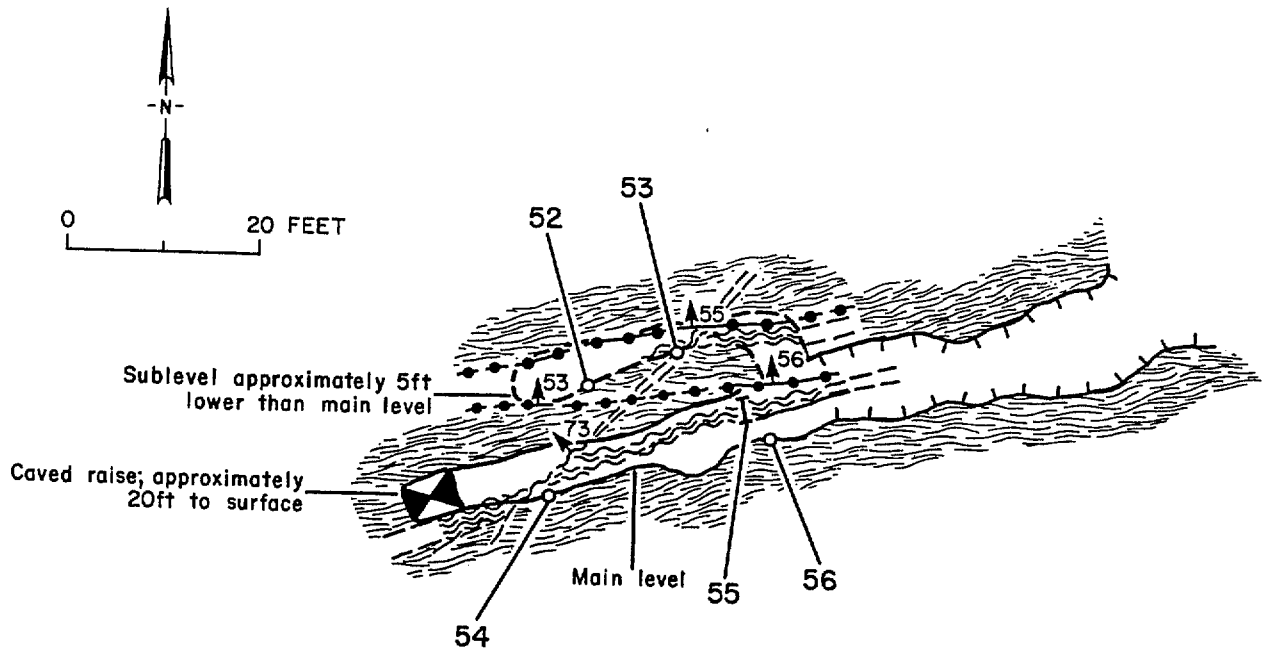


Figure 9.--Map showing sample localities 52-56.

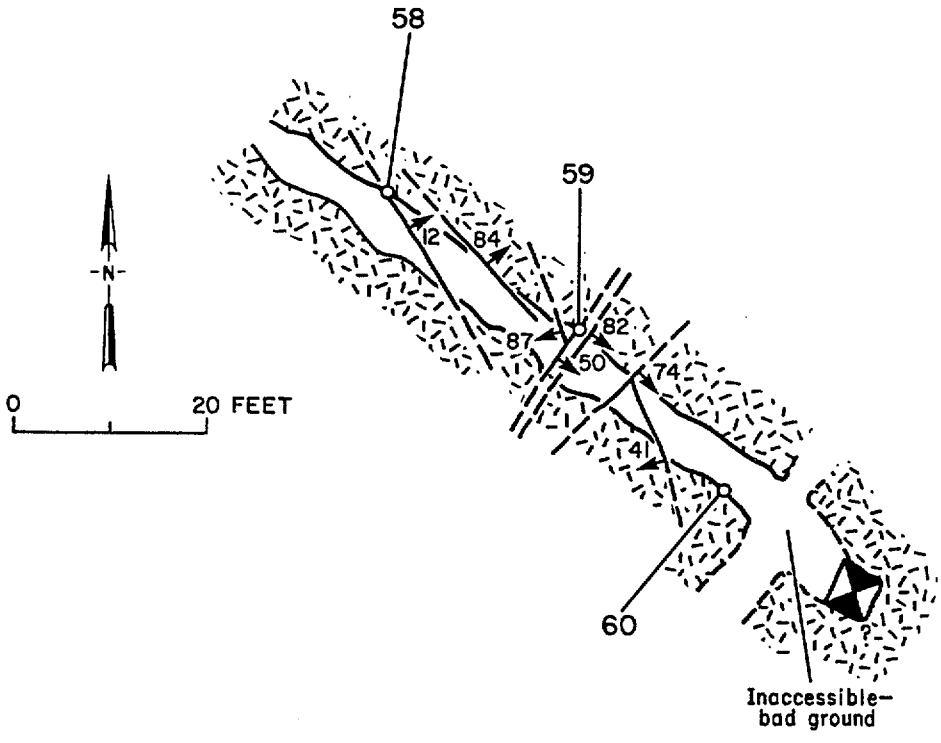


Figure 10.--Map showing sample localities 58-60.

Table 1.--Description of sample localities in and near the Arrastra Mountain and Peoples Canyon Wilderness Study Areas, La Paz, Mohave, and Yavapai Counties, Arizona

Sample No.	Name	Location	Commodity	Type of deposit	Development	Description
1- 3	Unnamed	Sec. 9, T. 11 N., R. 10 W.	U_3O_8	Strata-bound	Mines and prospects, inactive.	Pink to red siltstone and sandstone, fractured; sparse carnotite.
4- 5	Spring Mine.	Sec. 21, T. 11 N., R. 11 W.	MnO_2, U_3O_8	Strata-bound, vein.	Mines and prospects, inactive.	Red to brown conglomeratic sandstone; calcite.
6-35	Santa Maria.	Secs. 5-7, T. 11 N., R. 12 W.	MnO_2, U_3O_8	Vein, fault.	Mines and prospects, inactive.	MnO_2 veins in boulder conglomerate and volcanic breccia; abundant manganite(?), psilomelane(?), and calcite.
36-43	Masterson group.	Secs. 22, 26, 35, and 36, T. 12 N., R. 13 W.	U_3O_8	Strata-bound	Prospects	Disseminated U_3O_8 in sandstone, and siltstone; sparse carnotite(?).
44-57	Unnamed	Secs. 14 and 24, T. 13 N., R. 12 W.	None	Vein, fault.	Mines and prospects, inactive.	Fault and shear zones in granite and gneiss locally containing quartz veins and abundant gouge material; limonite and hematite.
58-60	Unnamed	Sec. 34, T. 13 N., R. 11 W.	None	None	Mine, inactive	Quartz stringers in fractured and jointed granite; minor hematite.
61-65	Button claims.	Sec. 11, T. 12 N. R. 11 W.	Au, Ag U_3O_8, MnO_2	Vein, fault	Mines and prospects, inactive.	Quartz veins in fractured and altered granite and gneiss; abundant hematite.
66-68	Dunlap Mine.	Sec. 36, T. 13 N., R. 11 W.	Au, Ag U_3O_8.	Fault	Mine and prospects, inactive.	Fault in fractured and altered granite; gouge and quartz; limonite and hematite.

Table 2.--Data for samples 1-68 taken in Arrastra Mountain and Peoples Canyon Wilderness Study Areas, La Paz, Mohave, and Yavapai Counties, Arizona

(Au, gold; Ag, silver; U_3O_8, uranium oxide; W, tungsten; Mn, manganese; ---, not detected; N.A., not analyzed; MnO_2, manganese oxide; Tr, trace; ppm, parts per million; <, less than; pct., percent)

Sample No.	Type	Length (feet)	Assay data Au oz/ton	Ag oz/ton	U_3O_8 ppm	Mn pct.	Description
1	Chip	2.2	---	0.1	1298	N.A.	Disseminated MnO_2 in pink to red, highly fractured siltstone containing red, brown, black, and white chert bands up to 1 in. wide; sparse carnotite; hematite and limonite.
2	Chip	1.7	Tr	---	1888	N.A.	Do.
3	Grab	6-ft grid.	---	---	2419	N.A.	Do.
4	Chip	2.5	---	---	3.3	10.2	Disseminated MnO_2 in hard, poorly sorted, red to brown sandstone; MnO_2 is podiform; calcite in fractures.
5	Chip	2.5	---	---	4.6	16.2	Do.
6	Chip	3.3	---	---	3.89	11.2	Fault between sandstone and pebble conglomerate; MnO_2 in fractures and disseminated in sandstone.
7	Chip	3.3	---	---	4.25	8.3	Do.
8	Chip	3.3	---	---	6.37	8.5	Fault between quartzite and conglomerate; sparse MnO_2.
9	Chip	2.0	---	---	7.55	26.9	MnO_2 vein in conglomerate.
10	Chip	1.0	---	.2	10.38	5.09	Do.
11	Chip	0.8	---	---	5.43	3.17	MnO_2 vein in sandstone containing disseminated MnO_2.
12	Chip	1.8	---	.1	4.13	7.16	MnO_2 vein in sandstone; MnO_2 and calcite stringers.
13	Chip	4.0	---	0.1	1.77	0.72	Fault zone in conglomerate; MnO_2 veinlets and pods; calcite and hematite.

Table 2.--Data for samples 1-68 taken in Arrastra Mountain and Peoples Canyon Wilderness Study Areas--Continued

Sample No.	Type	Length (feet)	Assay data Au oz/ton	Ag oz/ton	U_3O_8 ppm	Mn pct.	Description
14	Chip	4.0	---	---	2.01	.28	Do.
15	Chip	4.0	---	---	2.95	3.35	Do.
16	Chip	5.0	---	---	1.14	2.26	Do.
17	Chip	1.8	---	---	3.07	8.26	MnO_2 vein in cobble conglomerate; abundant calcite.
18	Chip	1.9	---	.1	0.93	.56	MnO_2 vein in red sandstone; MnO_2, calcite, and quartz in bands.
19	Chip	1.8	Tr	---	3.66	6.1	Fault in red boulder-conglomerate; MnO_2 veinlets; calcite and minor hematite.
20	Chip	1.4	---	.1	.63	1.27	MnO_2 vein in red volcanic breccia; calcite and quartz.
21	Chip	1.5	---	---	5.31	.05	MnO_2 vein in red boulder-conglomerate; calcite, quartz, and hematite.
22	Chip	2.0	---	---	.79	.04	Do.
23	Chip	1.8	---	---	2.36	22.7	Fault in red conglomerate; slickensides; calcite.
24	Chip	1.8	Tr	---	1.53	.13	Red boulder-conglomerate; calcite lined fractures.
25	Chip	1.7	---	---	1.53	3.75	MnO_2 vein in red boulder-conglomerate; calcite stringers.
26	Chip	1.0	---	0.1	1.3	5.8	Fault in red boulder-conglomerate, MnO_2 and calcite seams.
27	Chip	2.2	---	---	1.42	4.5	MnO_2 seam in cobble conglomerate; calcite.
28	Chip	0.6	---	---	.68	2.81	MnO_2 vein in red pebble-conglomerate; calcite.

Table 2.--Data for samples 1-68 taken in Arrastra Mountain and Peoples Canyon Wilderness Study Areas--Continued

Sample No.	Type	Length (feet)	Assay data Au oz/ton	Ag oz/ton	U_3O_8 ppm	Mn pct.	Description
29	Chip	1.2	Tr	---	1.65	16.5	MnO_2 vein in red pebble-conglomerate; calcite and minor limonite.
30	Chip	1.8	---	.1	2.12	1.85	MnO_2 and calcite bands in conglomerate.
31	Chip	3.8	---	---	3.07	4.03	Do.
32	Chip	1.1	---	---	5.78	6.75	MnO_2 vein in red conglomerate; vein is fractured, hard, vuggy, and mixed with calcite; minor limonite.
33	Chip	2.1	---	---	3.19	4.65	Brecciated sandstone with MnO_2 cement; calcite stringers.
34	Chip	3.2	---	---	2.36	4.68	MnO_2 vein in red pebble conglomerate; calcite bands.
35	Chip	2.3	---	---	1.42	2.45	Calcite and MnO_2-banded conglomerate; MnO_2 seams in vuggy calcite.
36	Chip	1.8	---	.1	7.67	N.A.	Limestone with black to white chert bands up to 1 in. wide; no visible mineralization.
37	Chip	2.5	---	0.1	7.2	N.A.	Limestone with black to white chert bands; sparse carnotite(?).
38	Chip	4.0	---	.1	8.26	N.A.	Gray to brown siltstone; friable.
39	Chip	4.0	---	---	10.74	N.A.	Gray to tan siltstone; soft; limonite along fractures.
40	Chip	2.8	---	---	7.55	N.A.	Interbedded shale and siltstone, gray to green; no visible mineralization.
41	Chip	4.0	---	.1	123.9	N.A.	Do.

Table 2.--Data for samples 1-68 taken in Arrastra Mountain and Peoples Canyon Wilderness Study Areas--Continued

Sample No.	Type	Length (feet)	Assay data Au oz/ton	Ag oz/ton	U_3O_8 ppm	Mn pct.	Description
42	Chip	2.0	---	---	9.2	N.A.	Shaly siltstone, reddish brown to green; no visible mineralization.
43	Chip	1.8	---	.1	18.88	N.A.	Shaly siltstone to sandstone, green; no visible mineralization.
44	Chip	0.8	---	---	3.4	N.A.	Clay gouge; minor limonite; adjacent to mafic dike; contained <5 ppm W.
45	Chip	2.2	Tr	---	8.5	N.A.	Weathered granite country rock; weathered biotite, weathered biotite, medium to coarse-grained; hematite staining; contained <5 ppm W.
46	Chip	1.6	Tr	---	9.2	N.A.	Do.
47	Chip	1.5	Tr	---	6.8	N.A.	Silicified, porphyritic granite along fault; minor limonite and hematite; magnetite; contained 6 ppm W.
48	Chip	0.5	---	.1	7.1	N.A.	Pegmatite dike in biotite schist; slickensides on hanging wall; fine-grained; contained <5 ppm W.
49	Chip	0.9	---	0 1	4.5	N.A.	Fault; clay gouge and brecciated schist; argillic alteration; contained <5 ppm W.
50	Chip	1.8	---	---	2.2	N.A.	Fault; sheared schist and clay gouge; minor limonite; biotite schist country rock; contained <5 ppm W.
51	Chip	2.8	0.25	0.3	2.5	N.A.	Massive shear zone; quartz along shearing planes; abundant clay; limonite; argillic alteration; contained 10 ppm W.
52	Chip	0.5	.17	---	1.4	N.A.	Quartz vein; limonite stain on fractures; blocky; schist country rock; contained 6 ppm W.

Table 2.--Data for samples 1-68 taken in Arrastra Mountain and Peoples Canyon Wilderness Study Areas--Continued

Sample No.	Type	Length (feet)	Assay data Au oz/ton	Ag oz/ton	U_3O_8 ppm	Mn pct.	Description
53	Chip	2.5	.01	---	2.8	N.A.	Fault; clay gouge and quartz pods; hematite; biotite schist country rock; contained 8 ppm W.
54	Chip	3.8	Tr	---	3.5	N.A.	Fault gouge; hematite and limonite; abundant clay; small fragments of schist in gouge; schist country rock; contained 6 ppm W.
55	Chip	0.9	.11	---	2.6	N.A.	Fault; minor clay gouge; small quartz veins; contained 6 ppm W.
56	Chip	1.2	Tr	---	3.5	N.A.	Do.
57	Chip	2.8	.17	---	2.9	N.A.	Bifurcating fault zone; biotite, clay, quartz, minor migmatite; biotite schist country rock; contained 8 ppm W.
58	Chip	0.8	Tr	---	1.8	0.07	Altered biotite granite; highly fractured and jointed; hematite coating along joints.
59	Chip	1.4	Tr	---	1.8	.03	Slightly altered biotite granite with quartz stringers up to 3 in. wide; hematite along joints.
60	Chip	1.2	Tr	---	1.8	.09	Altered biotite granite; highly fractured and jointed; 2-in.-wide quartz band; hematite along joints.
61	Chip	1.4	0.41	0.3	9.9	0.03	Fault in coarse grained granite; vuggy and iron stained quartz; dark red to brown; fault gouge; hematite.
62	Chip	1.9	Tr	---	7.3	.05	Quartz vein in sheared and altered granite; abundant hematite.
63	Grab	Select	.25	.3	1.0	.07	Vein quartz; milky, massive, vuggy; abundant hematite.
64	Chip	0.9	.19	.1	8.6	.08	Quartz vein in sheared and altered gneiss; quartz is milky, massive and vuggy; abundant hematite.

Table 2.--Data for samples 1-68 taken in Arrastra Mountain and Peoples Canyon Wilderness Study Areas--Continued

Sample No.	Type	Length (feet)	Assay data: Au oz/ton	Ag oz/ton	U_3O_8 ppm	Mn pct.	Description
65	Chip	0.9	.32	.3	2.2	.01	Do.
66	Chip	1.4	.01	---	13.0	N.A.	Brecciated and altered granite above fault; contained <5 ppm W.
67	Chip	1.1	Tr	---	4.6	N.A.	Brecciated and altered granite below fault; contained <5 ppm W.
68	Chip	0.8	1.60	.4	33.0	N.A.	Fault in granite; abundant gouge, quartz; limonite and hematite; contained 6 ppm W.

APPENDIX--Semiquantitative optical emission spectrographic analysis detection limits, U.S. Bureau of Mines, Reno Research Center

Element	Detection limit (percent)	Element	Detection limit (percent)
Ag	0.002	Mo	0.0001
Al	.001	Na	.3
As	.01	Nb	.007
Au	.002	Ni	.0005
B	.003	P	.7
Ba	.002	Pb	.001
Be	.0001	Pt	.0001
Bi	.01	Re	.0006
Ca	.05	Sb	.06
Cd	.0005	Sc	.0004
Co	.001	Si	.0006
Cr	.0003	Sn	.001
Cu	.0006	Sr	.0001
Fe	.0006	Ta	.02
Ga	.0002	Te	.04
K	2.0	Ti	.03
La	.01	V	.005
Li	.002	Zn	.0001
Mg	.0001	Zr	.003
Mn	.001	Y	.0009

These detection limits represent an ideal situation. In actual analyses, the detection limits vary with the composition of the material analysed. These numbers are to be used only as a guide.

Semiquantitative Spectrographic Analysis

	SAMPLE NUMBERS							
	1	2	3	4	5	6	7	8
ELEMENTS	CONCENTRATION, PERCENT							
AG	<.003	<.002	<.004	<.006	<.008	<.01	<.01	<.005
AL	>3.	>2.	1.	>4.	>3.	>3.	>4.	>4.
AS	<.1	<.009	<.07	<.08	<.08	<.3	<.07	<.08
AU	.006	<.004	<.003	<.004	<.003	<.005	<.005	<.003
B	.02	.01	.01	<.02	<.02	<.02	<.02	<.01
BA	.06	.03	.02	2.	>5.	>10.	>9.	>7.
BE	.0006	.0006	.0007	.0008	.0004	.003	.004	.003
BI	<.04	<.02	<.03	<.03	<.01	<.01	<.01	<.01
CA	.6	.6	1.	<2.	<3.	<.5	<.4	<2.
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.002	<.009	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
CR	.001	<.0009	.001	<.0008	<.0005	<.0003	<.0003	.007
CU	<.0006	<.0006	<.0006	<.0006	.009	<.0006	<.0006	.006
FE	2.	3.	2.	3.	2.	7.	9.	5.
GA	<.001	<.0002	<.0002	<.0007	<.001	<.001	<.0007	<.001
K	4.	3.	8.	>10.	10.	>10.	>10.	>10.
LA	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.002	<.002	<.002	<.002	<.002	<.002	<.002	<.004
MG	.3	.4	.4	<.03	<.001	<.0001	<.008	<.02
MN	.1	.07	.03	>10.	>10.	>10.	>10.	>10.
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.6	<.3	<.3	<1.	<.3	<.3	<.3	<.3
NB	<.009	<.008	<.007	<.009	<.007	<.007	<.008	<.007
NI	.002	.0009	.001	<.003	<.004	<.008	<.009	<.01
P	<.7	<.7	<.7	<.7	<.7	<.7	<.7	<.7
PB	<.006	<.003	<.002	.1	.4	.1	.1	.06
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0008	<.0006	<.0006	<.001	<.002	<.002	<.001	<.001
SB	<.06	<.06	<.06	<.1	<.1	<.2	<.3	<.2
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.005	<.002	<.002	<.004	<.003	<.02	<.03	<.008
SR	.01	.02	.03	.007	.01	.2	.09	.09
TA	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.08	<.04	<.05	<.04	<.04	<.04	<.05	<.04
TI	.1	<.07	<.05	.1	.1	<.06	.08	.2
V	.08	.09	.07	<.005	.01	.02	<.009	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.002	.004	.003	.1	.2	.06	.05	.1
ZR	.004	<.003	<.003	<.003	<.003	<.003	<.003	<.003

	SAMPLE NUMBERS							
	9	10	11	12	13	14	15	16
ELEMENTS	CONCENTRATION, PERCENT							
AG	<.006	<.01	<.005	<.01	<.01	<.0005	<.007	<.007
AL	.2	.4	1.	.3	>4.	>4.	.7	.2
AS	<.01	<.04	<.2	.6	<.009	<.02	.5	<.1
AU	<.002	<.005	<.003	<.005	<.002	<.002	<.003	<.004
B	<.003	<.01	<.008	<.01	<.006	.01	<.008	<.007
BA	>10.	>10.	>10.	>10.	>10.	>9.	>10.	>10.
BE	.005	.008	.005	.02	.004	.006	.02	.002
BI	<.01	<.01	<.01	<.01	<.02	<.02	<.01	<.01
CA	<.1	10.	>10.	10.	5.	5.	<5.	>10.
CD	<.001	<.0005	<.0005	<.004	<.0005	<.0005	<.002	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
CR	<.0003	<.0003	<.0004	<.0003	<.0004	<.0003	<.0003	<.0003
CU	<.001	<.001	<.0006	<.0009	<.0006	<.0006	<.0006	<.0006
FE	3.	7.	5.	10.	10.	10.	7.	6.
GA	<.0002	.002	<.0002	<.0007	<.0004	<.0002	<.0003	<.0005
K	<.7	<.6	3.	<1.	>10.	>10.	5.	<.6
LA	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.002	<.002	<.002	<.002	<.002	<.003	<.002	<.002
MG	<.3	<.001	<.06	<.0007	.2	.3	<.002	<.01
MN	>10.	>10.	>10.	>10.	>6.	>3.	>10.	>10.
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.3	<.3	<.3	<.3	<.3	<.3	<.3	<.3
NB	<.007	<.007	<.007	<.007	<.01	<.01	<.007	<.007
NI	<.002	<.004	<.002	<.005	<.005	<.003	<.002	<.002
P	<.7	<.7	<.7	<1.	<1.	<1.	<.7	<.7
PB	.1	.2	.01	.06	.02	<.008	.03	.2
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0007	<.002	<.0006	<.002	<.001	<.0006	<.0008	<.001
SB	<.06	<.2	<.08	<.2	<.1	<.2	<.1	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	2.	2.	>10.	>10.	>10.	>10.	>10.	4.
SN	<.001	<.01	<.006	<.03	<.01	<.002	<.009	<.008
SR	.2	.3	.09	.3	.03	.02	.2	.2
TA	<.02	<.02	<.02	<.02	<.02	<.03	<.02	<.02
TE	<.04	<.04	<.04	<.04	<.04	<.04	<.04	<.04
TI	<.03	<.03	<.04	<.03	.2	.1	<.03	<.03
V	<.005	<.006	<.005	<.005	<.005	<.005	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.1	.06	.008	.03	.02	.03	.06	.03
ZR	<.003	<.003	<.003	<.003	<.003	<.003	<.003	<.003

	SAMPLE NUMBERS							
	17	18	19	20	21	22	23	24
ELEMENTS	CONCENTRATION, PERCENT							
AG	<.007	<.002	<.005	<.005	<.005	<.004	<.004	<.002
AL	.09	>2.	.2	.2	.8	.7	.7	>3.
AS	<.2	.2	<.2	<.02	<.08	<.03	<.07	<.01
AU	<.004	<.002	<.002	<.002	<.002	<.002	<.002	<.002
B	<.008	<.006	<.006	<.004	<.005	<.003	<.006	<.008
BA	>10.	>10.	>10.	>10.	>10.	.7	>7.	.1
BE	.005	.03	.004	.002	.009	.0004	.002	.0004
BI	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
CA	>10.	10.	>10.	>10.	<3.	>10.	<3.	5.
CD	<.0005	<.0005	<.0006	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
CR	<.0003	<.0006	<.0003	<.0003	<.0003	<.0003	<.0003	<.0004
CU	<.0006	.003	<.0006	<.0006	<.0007	<.0006	<.0006	<.0006
FE	8.	6.	5.	2.	1.	.3	1.	3.
GA	<.0004	<.0003	<.0002	<.0002	<.0007	<.0002	<.0006	<.0002
K	<.6	6.	<.6	<.6	7.	<.6	>10.	>10.
LA	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.002	<.002	<.002	<.002	<.002	<.002	<.002	<.002
MG	<.0001	.06	<.04	<.01	<.1	<.03	<.09	.9
MN	>10.	>3.	>10.	>10.	>10.	>10.	>10.	.3
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.3	<.3	<.3	<.3	<.3	<.3	<.3	3.
NB	<.007	<.007	<.007	<.007	<.007	<.007	<.007	<.007
NI	<.003	<.0007	<.003	<.001	<.004	<.001	<.003	.002
P	<.7	<.7	<.7	<.7	<.7	<.7	<.7	<.7
PB	.03	.07	.03	.02	1.	.08	.1	<.002
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0009	<.0006	<.0006	<.0006	<.001	<.0006	<.0007	<.0006
SB	<.1	<.06	<.1	<.06	<.1	<.06	<.1	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	3.	>10.	5.	3.	3.	3.	>10.	>10.
SN	<.01	<.005	<.006	<.002	<.001	<.001	<.002	<.003
SR	.2	.2	.1	.05	.3	.04	.2	.003
TA	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.04	<.04	<.04	<.04	<.04	<.04	<.04
TI	<.03	<.03	<.03	<.03	<.03	<.03	<.03	<.07
V	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.03	.01	.01	.02	.2	.05	.1	.04
ZR	<.003	<.003	<.003	<.003	<.003	<.003	<.003	<.003

	SAMPLE NUMBERS							
	25	26	27	28	29	30	31	32
ELEMENTS	CONCENTRATION, PERCENT							
AG	<.006	<.004	<.003	<.002	<.009	<.003	<.006	<.002
AL	1.	>3.	>4.	>2.	>2.	.8	.1	.1
AS	<.06	<.05	<.06	<.03	<.009	<.03	<.04	<.02
AU	<.002	<.002	<.003	<.002	<.004	<.002	<.003	<.002
B	<.009	<.008	<.01	<.005	<.01	<.003	<.004	<.003
BA	2.	>5.	>6.	1.	>10.	.9	>8.	>8.
BE	.003	.0007	.002	.001	.01	.001	.002	.001
BI	<.01	<.01	<.02	<.01	<.01	<.01	<.01	<.01
CA	<4.	<1.	<5.	>10.	<6.	>10.	>10.	10.
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
CR	<.0003	<.0003	<.0006	<.0003	<.0003	<.0003	<.0003	<.0003
CU	<.002	<.001	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
FE	1.	3.	4.	2.	7.	.5	.07	1.
GA	<.0005	<.0002	<.0002	<.0002	<.001	<.0002	<.0003	<.0002
K	>10.	>10.	>10.	3.	6.	<.6	<.6	<.6
LA	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
LI	>.1	<.002	.007	<.002	<.002	<.002	<.002	<.002
MG	<.06	<.2	.3	<.006	<.008	.07	<.001	<.04
MN	>10.	>10.	>10.	>10.	>10.	>9.	>10.	>10.
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.3	<.5	2.	<.3	<.3	<.3	<.3	<.3
NB	<.007	<.007	<.01	<.007	<.007	<.007	<.007	<.007
NI	<.004	<.002	<.003	<.001	<.007	<.001	<.002	<.0008
P	<.7	<.7	<.7	<.7	<.7	<.7	<.7	<.7
PB	.07	.04	.05	<.003	.08	<.003	<.006	.008
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0008	<.0006	<.0006	<.0006	<.001	<.0006	<.0008	<.0006
SB	<.08	<.06	<.1	<.06	<.2	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	4.	5.	.5	2.
SN	<.001	<.003	<.004	<.001	<.02	<.001	<.003	<.0006
SR	.1	.04	.09	.03	.2	.02	.2	.1
TA	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.04	<.04	<.04	<.04	<.04	<.04	<.04
TI	<.04	<.06	.1	<.03	<.03	<.03	<.03	<.03
V	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.2	.05	.08	.01	.06	.04	.04	.03
ZR	<.003	<.003	<.003	<.003	<.003	<.003	<.003	<.003

	SAMPLE NUMBERS							
	33	34	35	36	37	38	39	40
ELEMENTS	CONCENTRATION, PERCENT							
AG	<.004	<.008	<.002	<.003	<.004	<.001	<.001	<.002
AL	.9	.3	.06	.8	.5	>4.	>4.	>4.
AS	<.06	<.06	<.02	<.03	<.02	<.05	<.02	<.05
AU	<.002	<.003	<.002	<.002	<.002	<.003	<.004	<.003
B	<.007	<.006	<.003	<.008	<.004	.02	.02	.01
BA	>10.	>10.	1.	.03	.01	.1	.1	.06
BE	.004	.004	.0007	<.0001	<.0001	<.0003	.0006	.0005
BI	<.01	<.01	<.01	<.01	<.01	<.02	<.03	<.02
CA	9.	>10.	>10.	10.	10.	10.	8.	10.
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
CR	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0005	<.0003
CU	<.0006	<.0006	<.0006	<.0006	<.0006	.0006	.0006	<.0006
FE	5.	1.	.6	1.	.4	5.	4.	3.
GA	<.0002	<.0008	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002
K	5.	<.6	<.6	<1.	4.	>10.	>10.	>10.
LA	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.002	<.002	<.002	>.1	>.09	.02	.02	>.07
MG	<.002	<.004	<.001	3.	>10.	2.	1.	1.
MN	>10.	>10.	>10.	.2	.06	.3	.2	.4
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.3	<.3	<.3	<.3	<.3	<.3	<.8	2.
NB	<.007	<.007	<.007	<.009	<.02	<.04	<.03	<.01
NI	<.003	<.003	<.0009	.0008	.001	<.0007	.0009	.001
P	<.7	<.7	<.7	<.7	<.7	<.7	<.7	<.7
PB	.06	.02	.03	<.002	<.002	<.004	<.006	<.003
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.001	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.1	<.07	<.06	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	2.	.5	>10.	>10.	>10.	>10.	>10.
SN	<.005	<.003	<.0008	<.002	<.0009	<.003	<.002	<.002
SR	.1	.2	.07	.02	.05	.02	.08	.005
TA	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.04	<.04	<.04	<.04	<.04	<.04	<.04
TI	<.03	<.03	<.03	<.03	<.03	.2	.2	.1
V	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.05	.02	.04	.001	<.0002	.008	.01	.007
ZR	<.003	<.003	<.003	<.003	<.003	<.003	<.003	<.003

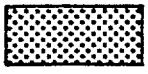
	SAMPLE NUMBERS							
	41	42	43	44	45	46	47	48
ELEMENTS	CONCENTRATION, PERCENT							
AG	<.003	<.003	<.0009	<.0005	<.0005	<.0005	<.0005	<.0005
AL	>4.	>5.	>5.	>4.	>4.	>4.	>4.	>4.
AS	<.08	<.009	<.06	<.02	<.02	<.02	.03	<.02
AU	<.003	.005	<.003	<.002	<.002	<.002	<.003	<.002
B	.02	.03	.02	.01	.02	.04	.01	.04
BA	.2	.2	.2	.07	.05	.08	.1	.6
BE	.0005	.0005	.0007	<.0002	<.0003	.0008	<.0003	.002
BI	<.02	<.03	<.02	<.02	<.03	<.03	<.03	<.06
CA	2.	4.	3.	.3	.4	.3	<.05	1.
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	.0007	.002
CO	<.001	<.001	<.001	<.001	<.001	<.03	<.001	<.04
CR	<.0003	<.0003	<.0003	<.0003	<.0003	<.0003	<.0004	<.0003
CU	<.0006	<.0006	<.0006	.002	.03	.05	.003	.08
FE	4.	5.	4.	3.	2.	2.	3.	2.
GA	<.0002	<.001	<.0003	<.0002	<.0002	<.0002	<.0002	<.0002
K	>10.	>10.	>10.	>10.	>10.	>10.	>10.	9.
LA	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
LI	>.1	>.05	>.1	<.002	<.002	.02	<.002	>.06
MG	2.	1.	1.	.4	.2	.2	.2	.8
MN	.4	.2	.08	.08	.09	.1	.3	.1
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.3	3.	1.	<.5	2.	<.3	<.9	5.
NB	<.007	<.03	<.02	<.009	<.01	<.007	<.01	<.02
NI	.001	.001	.0008	<.0006	<.0004	<.0005	.0008	.002
P	<.7	<.7	<.7	<.7	<.7	<.7	<.7	<.7
PB	<.004	<.006	<.003	<.003	<.004	.02	<.008	.05
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.001	<.003	<.002	<.001	<.0006	<.004	<.002	<.007
SR	.001	.008	.01	.0004	.001	.0004	.0004	.04
TA	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.04	<.04	<.04	<.04	<.04	<.04	<.04
TI	.2	.2	.1	<.03	<.03	<.03	<.05	<.03
V	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.03	.01	.01	.002	.003	.001	.002	.003
ZR	<.003	<.003	<.003	<.003	<.003	<.003	<.003	<.003

ELEMENTS	SAMPLE NUMBERS 49	50	55	56	58	59	60	61
	CONCENTRATION, PERCENT							
AG	<.0005	<.0005	<.0005	<.0005	<.002	<.003	<.001	<.004
AL	>4.	>3.	>4.	>3.	>5.	>4.	>4.	>4.
AS	<.01	<.01	<.01	<.01	<.05	<.07	<.04	<.06
AU	<.002	<.003	<.002	<.002	<.002	<.003	<.002	.02
B	.009	.01	.01	.01	<.006	.009	<.006	.009
BA	.07	.04	.2	.2	.4	.3	.3	.1
BE	.0005	.0004	<.0003	.0004	.0005	.0008	.0008	.0006
BI	<.02	<.2	<.02	<.02	<.04	<.07	<.03	<.04
CA	7.	9.	9.	3.	5.	3.	2.	.1
CD	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
CR	<.0003	.07	.001	<.0007	<.0005	.001	<.0003	<.0009
CU	.006	.01	.006	.001	<.0006	<.0006	<.0006	.02
FE	6.	6.	5.	4.	6.	2.	5.	5.
GA	<.0002	<.0002	<.0002	<.0002	<.0004	<.0003	<.0002	<.0003
K	6.	4.	>10.	10.	7.	>10.	>10.	8.
LA	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
LI	<.002	<.002	<.002	<.002	.005	<.002	<.002	<.002
MG	1.	2.	1.	.8	1.	.9	1.	.3
MN	.4	.6	.5	.7	.3	.1	.4	.1
MO	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
NA	<.6	<.6	<.3	<.3	3.	3.	3.	<.3
NB	<.02	<.05	<.008	<.007	<.05	<.04	<.03	<.02
NI	.001	.03	.003	.001	.0009	.001	.0008	.0009
P	<1.	<.7	<.7	<.7	<.7	<.7	<.7	<.7
PB	<.003	<.004	.01	.07	<.002	<.004	.008	.03
PD	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.08	<.06	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.	>10.	>10.	>10.
SN	<.007	<.007	<.004	<.001	<.002	<.002	<.001	<.004
SR	.02	.01	.003	.0002	.02	.006	.01	.005
TA	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.04	<.04	<.04	<.04	<.04	<.04	<.04
TI	.3	.1	.1	.1	.4	.1	.2	.2
V	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.02	.02	.01	.01	.01	.003	.01	.002
ZR	<.003	<.003	<.003	<.003	<.003	<.003	<.003	<.003

	SAMPLE NUMBERS				
	62	63	64	65	66
ELEMENTS	CONCENTRATION, PERCENT				
AG	<.002	<.004	<.003	<.003	<.0005
AL	>4.	.2	>4.	1.	>4.
AS	<.05	<.06	<.06	<.06	<.02
AU	<.002	<.003	<.003	<.002	<.003
B	<.005	.01	<.007	<.008	.01
BA	.1	.01	.2	.06	.2
BE	.0004	.0005	.0005	.0006	<.0003
BI	<.04	<.03	<.03	<.02	<.02
CA	.7	<.05	.4	<.05	2.
CD	<.0005	<.0005	<.0005	<.0005	<.0005
CO	<.001	<.001	<.001	<.001	<.001
CR	<.0003	.004	<.0006	.003	<.0003
CU	<.0006	<.0006	<.0006	<.0006	<.0006
FE	3.	3.	4.	2.	3.
GA	<.0002	<.0003	<.0002	<.0002	<.0002
K	>10.	<.6	>10.	3.	>10.
LA	<.01	<.01	<.01	<.01	<.01
LI	<.002	<.002	<.002	<.002	<.002
MG	1.	.001	.4	.06	.7
MN	.3	.3	.4	.03	.2
MO	<.0001	<.0001	<.0001	<.0001	<.0001
NA	1.	<.3	<.9	<.3	<1.
NB	<.01	<.007	<.02	<.007	<.007
NI	<.0007	.0008	<.0006	<.0006	.0009
P	<.7	<.7	<.7	<.7	<.7
PB	<.002	<.002	.06	.01	<.006
PD	<.0001	<.0001	<.0001	<.0001	<.0001
PT	<.0006	<.0006	<.0006	<.0006	<.0006
SB	<.06	<.06	<.06	<.06	<.06
SC	<.0004	<.0004	<.0004	<.0004	<.0004
SI	>10.	>10.	>10.	>10.	>10.
SN	<.001	.002	<.002	<.0009	<.003
SR	.002	.0002	.003	.003	.003
TA	<.02	<.02	<.02	<.02	<.02
TE	<.04	<.07	<.04	<.04	<.04
TI	.2	<.03	.3	<.07	.1
V	<.005	<.005	<.005	<.005	<.005
Y	<.0009	<.0009	<.0009	<.0009	<.0009
ZN	.009	.001	.006	.001	.003
ZR	.009	<.003	<.003	<.003	<.003

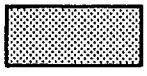
EXPLANATION OF SYMBOLS FOR PLATES 1 AND 2

APPROXIMATE BOUNDARIES OF THE ARRASTRA MOUNTAIN AND PEOPLES CANYON WILDERNESS STUDY AREAS

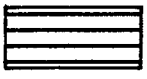


UNPATENTED PLACER CLAIMS

PATENTED MINING CLAIMS



UNPATENTED MINING CLAIMS



OIL AND GAS LEASES

OIL AND GAS LEASE APPLICATION

LOCALITY OF SAMPLED OUTCROP--Showing sample number

SURFACE OPENING--Showing sample number(s)

Surface excavation

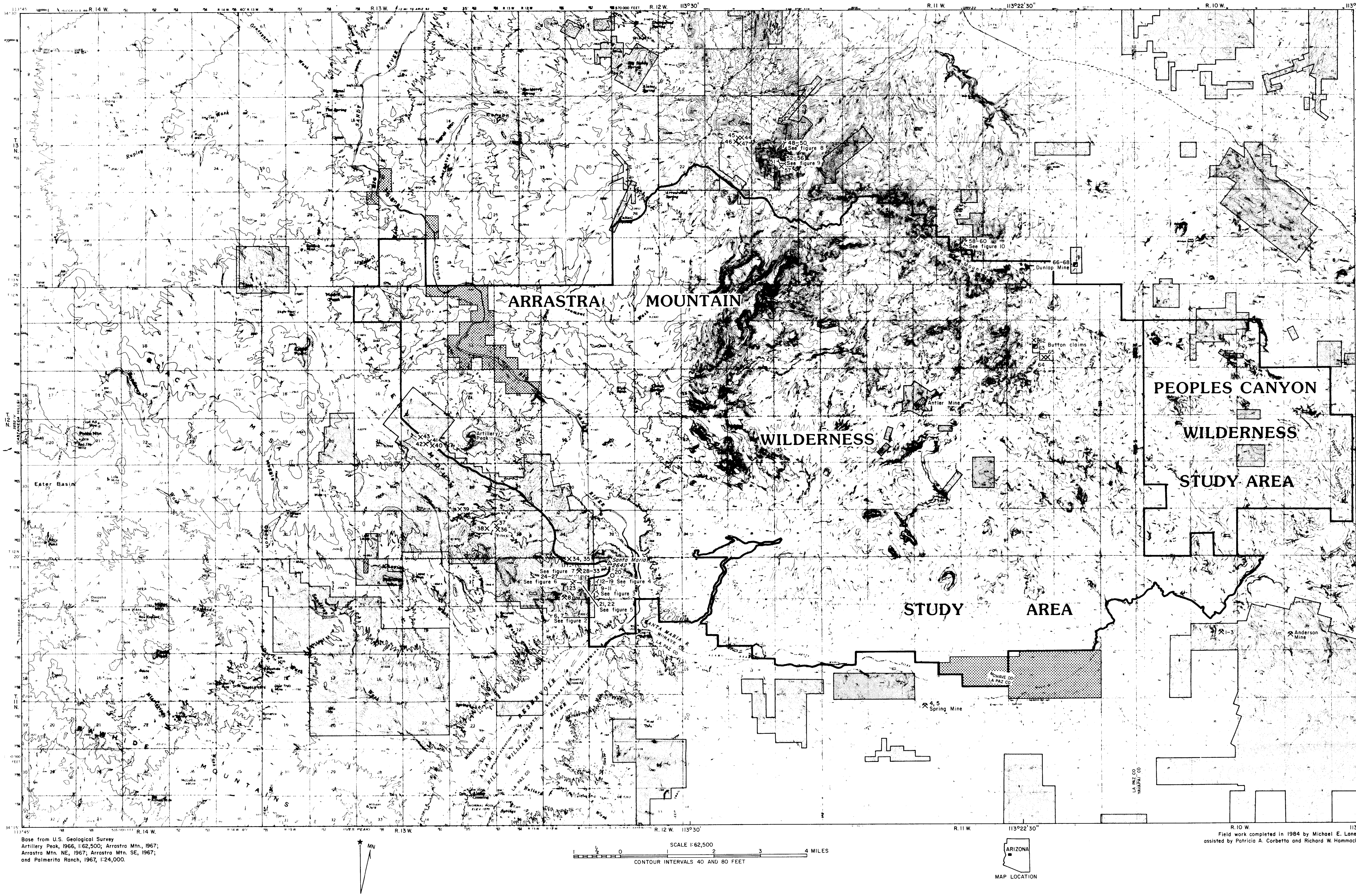
Adit

Prospect pit

Shaft

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

OPEN FILE REPORT
MLA 22-85
PLATE 1



MINE AND PROSPECT MAP OF THE ARRASTRA MOUNTAIN AND PEOPLES CANYON WILDERNESS STUDY AREAS, LA PAZ, MOHAVE, AND YAVAPAI COUNTIES, ARIZONA

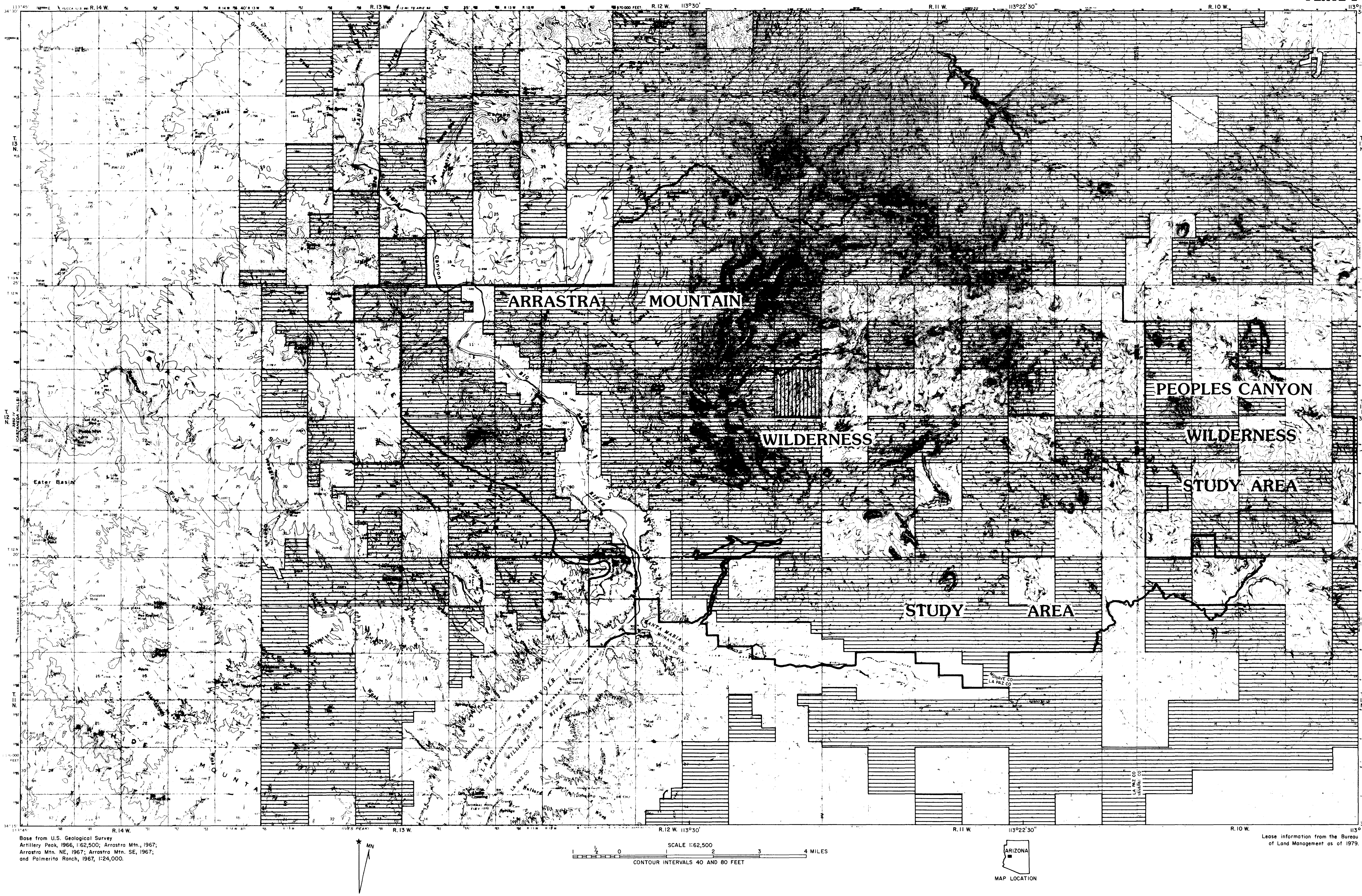
BY

MICHAEL E. LANE, U.S. BUREAU OF MINES

1985

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

OPEN FILE REPORT
MLA 22-85
PLATE 2



MAP SHOWING OIL AND GAS LEASES AND LEASE APPLICATION IN AND NEAR THE ARRASTRA MOUNTAIN AND PEOPLES CANYON WILDERNESS STUDY AREAS, LA PAZ, MOHAVE, AND YAVAPAI COUNTIES, ARIZONA

BY

MICHAEL E. LANE, U.S. BUREAU OF MINES

1985