

UNITED STATES DEPARTMENT OF THE INTERIOR  
(BUREAU OF MINES)

MINERAL-RESOURCE POTENTIAL OF THE PARIA PLATEAU  
WILDERNESS STUDY AREA, COCONINO COUNTY, ARIZONA

By  
Michael E. Lane

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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 conducted 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 Areas

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 resource potential. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a mineral survey of the Paria Plateau Wilderness Study Area\*, Coconino County, Arizona.

\*Originally done as the Navajo Application, Arizona, Study Area pursuant to an agreement between IFOC-DFO-MLA dated 1/29/80.

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COCONINO COUNTY, ARIZONA

By Michael E. Lane, U.S. Bureau of Mines

INTRODUCTION

The 124,428 acres (50,376 ha) making up the Paria Plateau study area is in Coconino County in northern Arizona (fig. 1). The eastern boundary is southwest of Lake Powell, about 12 air miles (19 km) west of Page, Arizona. The area ranges from the Arizona-Utah state line to a few miles north of Highway 89A. Its southern boundary being Vermilion Cliffs Natural Area, the study area is bordered on the east by Paria Canyon Primitive Area and the north by the primitive area and Utah-Arizona state line (pl. 1). Sloping gently northward, the plateau is severed by Kaibab (Buckskin) Gulch and Paria Canyon.

Little vegetation other than juniper characterizes the area. Temperatures reach in excess of 100° F in summer and drop to subfreezing in winter months. Precipitation is minimal during most months.

Most mining activity has been for uranium in the Chinle Formation along Vermilion Cliffs, adjacent to the study area. The largest of the few mines in the area is the Sun Valley Mine located southwest of Cliff Dwellers Lodge (pl. 1). A few scattered prospects are in Paria Canyon, in the northern portion of House Rock Valley, and adjacent to Highway 89A. The only known current activity is some sporadic exploration at the Sun Valley Mine, about 2 miles (3.2 km) south of the study area.

In addition to the uranium activity, prospecting and mineral-resource investigations were conducted for gold and mercury occurrences in a mudstone

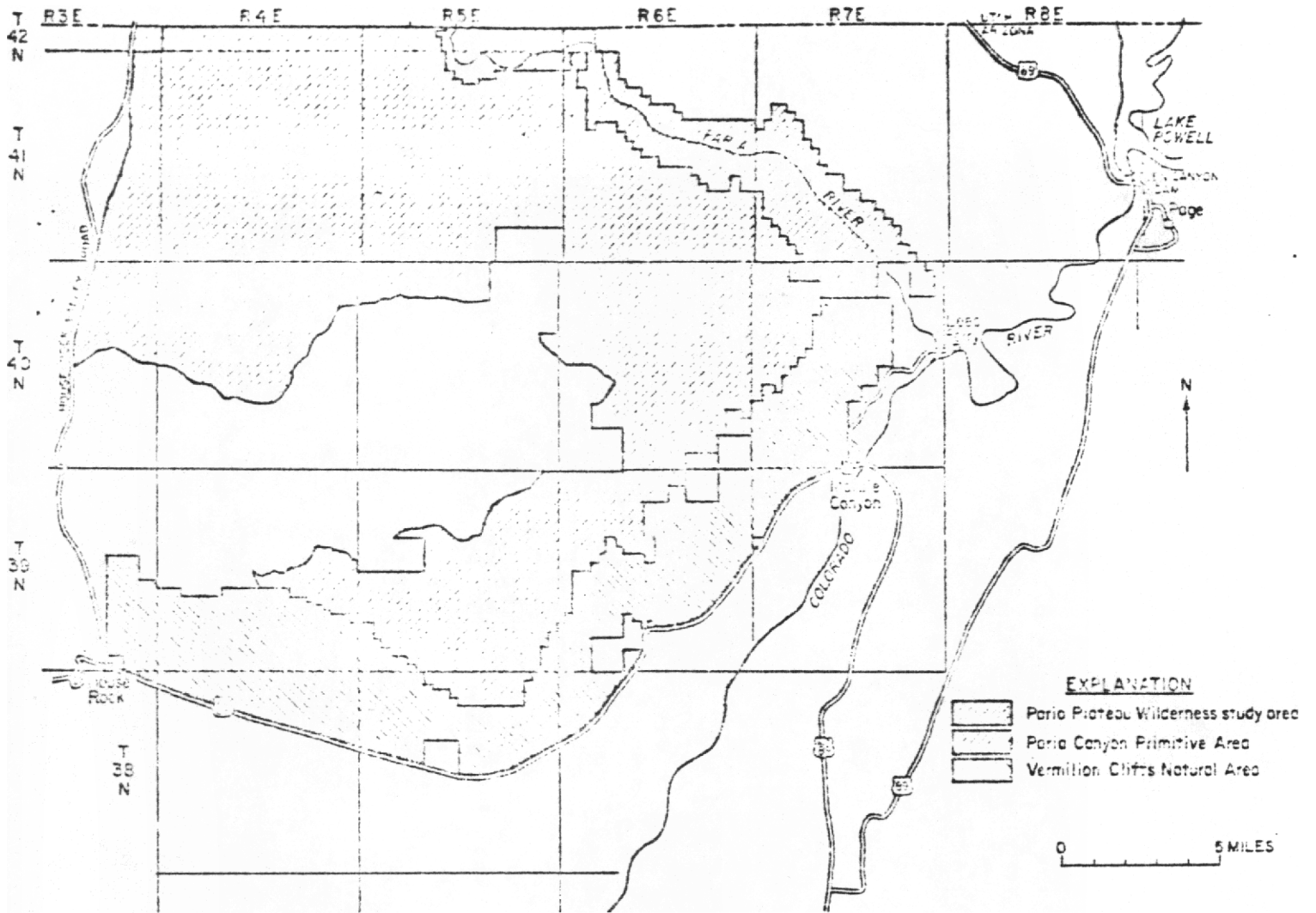


Figure 1.--Paria Plateau Wilderness Study Area

unit of the Chinle Formation (Phoenix, 1963). These investigations suggested that gold and possibly mercury occur in minute, but widespread quantities in the Paria Canyon-Lees Ferry area.

No economically viable occurrences of gold or mercury were detected in this investigation.

## MINING DISTRICTS AND MINERALIZED AREAS

### Mining Districts and Claims

No formal mining district is recognized in the study area. Mineral-resource literature and courthouse records of mining claims refer frequently to Paria Canyon, Vermilion Cliffs, and Lees Ferry.

Many claims were once located near the area on outcrops of the Chinle Formation in House Rock Valley, Vermilion Cliffs, and for about 10 mi (16 km) up Paria Canyon from Lees Ferry.

### Past and Present Mining Activity and Production

#### El Pequito Mine

The El Pequito mine is about 2 miles (3.2 km) west of Lees Ferry in the NW 1/4 sec. 14, T. 40 N., R. 7 E., (pl. 1, samples 3-16), on the eastern edge of the study area at the base of the Vermilion Cliffs.

The mine lies in the Shinarump Conglomerate along the contact with the underlying Moenkopi Formation. Mineralization occurs in a stream channel in the Shinarump which is composed of poorly sorted conglomerate interbedded with sandstone, siltstone, and mudstone with local carbonaceous wood fragments. Pebbles and sand grains in the channel are coated with ore minerals which locally impregnate mudstone. The channel is most likely an offshoot of a larger channel. The Moenkopi is bleached adjacent to the Shinarump contact (Phoenix, 1963).

Phoenix also reports the occurrence of pyrite, chalcopyrite and uraninite in calcite veinlets. During the field investigation no pyrite or chalcopyrite was seen.

#### Sam Prospect

The Sam prospect is a 27-foot (8.2-m) adit in SE 1/4 sec. 2, T. 39 N., R. 6 E., (pl. 1, samples 17-18), about 2 miles (3.2 km) northwest of Cliff Dwellers Lodge on the southside of Badger Canyon.

The adit is in the Petrified Forest member of the Chinle formation, a gray-to-purple unit which weathers to slopes and rounded knobs. The rock is interbedded siltstone and mudstones. Two samples were taken: one sample, a 2.5-ft (0.76-m) chip, contained 0.337 percent  $U_3O_8$ , 0.14 percent vanadium, and 5.6 parts per million (ppm) mercury; the other sample, a 5.0-ft (1.5-m) chip, contained 0.026 percent  $U_3O_8$  and 0.007 percent vanadium.

#### Jasper Mine

The Jasper (Maggie) mine, a 40-foot (12.2-m) adit, is in the SW 1/4 sec. 27, T. 39 N., R. 6 E., (pl. 1, samples 19-23), about 300 feet (91 m) north of U.S. 89A about 1/4 mile (0.4 km) east of Cliff Dwellers Lodge.

The adit was driven N. 6° E. in poorly sorted Shinarump conglomerate composed of rounded quartzite pebbles and quartz sand. Siltstone is interbedded with mudstone on the walls near the floor. Minor copper staining is evident at the Moenkopi-Shinarump contact. The mudstone and siltstone comprises the lower 29 inches (74 cm) of the wall, and conglomerate the upper 36 inches (91 cm). Sample 19, taken in the mudstone and siltstone, contained 0.018 percent  $U_3O_8$ , and sample 20, taken directly above in the conglomerate, contained no  $U_3O_8$ . Two samples were taken 10 feet (3.1 m) from the portal on the east wall. Sample 21, taken above the siltstone in the lower portion of the wall in indurated conglomerate, contained 0.019 percent  $U_3O_8$ .



Sample 22, taken above sample 21, in poorly consolidated conglomerate, contained 0.135 percent  $U_3O_8$ . The conglomerate was composed of poorly sorted quartz and quartzite pebbles, small siltstone lenses, and minor copper staining. Sample 23, taken outside the adit, adjacent to the portal, in the Moenkopi just below the contact, assayed 0.085 percent  $U_3O_8$ .

#### Sun Valley Mine

The Sun Valley uranium mine is approximately 3 miles (4.8 km) southwest of Cliff Dwellers Lodge and about 1 mile (1.6 km) north of U.S. Highway 89A, (pl. 1, samples 24-47). The mine lies near the southeastern boundary in the southernmost portion of the study area.

At the time of this study, the mine was owned and operated by Intermountain Exploration Co. The immediate area is covered by unpatented claims. Some claims are near Soap Creek (McGregor, 1977).

The mine was started in 1954 during a period of intense uranium exploration in the area. An inclined shaft was sunk on a Shinarump outcrop to develop a small ore deposit. Several hundred tons of uranium ore averaging 0.28 percent  $U_3O_8$  was shipped before the shaft was filled with mud from a flash flood. Later, a vertical shaft was sunk but there was no further production (Wyman, 1970). A drift driven off the shaft connected with the old, sand-filled workings.

The mine is situated on the Shinarump-Moenkopi contact where uranium occurs in a U-shaped Shinarump stream channel. Mineralization is irregular; the highest  $U_3O_8$  content is 0.216 percent (sample 41) located in the old workings (pl. 1).

Four samples contained between 2 and 26 ppm rhenium, quantities not considered economically significant under present conditions.

Intermountain Exploration Company has done some drilling to determine possible extent of mineralization. According to company files, drilling has produced values as high as 1.6 percent  $U_3O_8$  in one hole; several holes have more than 0.2 percent.

A potential orebody exists in the Sun Valley mine area, but with extant data its relationship to the study area cannot be determined.

#### Red Wing Prospect

The Red Wing prospect consists of two adits, 43 feet (13 m) and 55 feet (17 m) long, in sec. 3, T. 40 N., R. 7 E., (pl. 1, samples 72-76). The prospect is in Paria Canyon about 4 miles (6.4 km) upstream from Lees Ferry. The adits were driven in the lower Shinarump and upper Moenkopi along the contact. The Shinarump is trashy stream channel material composed of sandstone, siltstone and carbonaceous material. The Moenkopi at this location is typical maroon-colored siltstone with bleached areas.

Geiger-counter readings were very irregular.

#### ASSESSMENT OF MINERAL-RESOURCE POTENTIAL

The Paria Plateau study area has low potential for uranium. Occurring in the Chinle Formation, isolated uranium deposits are scattered along Vermilion Cliffs. It is possible that these type deposits could underlie Paria Plateau. However, they would be at considerable depth and would be difficult to locate.

Samples from several of the investigated areas contained significant amounts of  $U_3O_8$ . Mineral occurrence is irregular and usually in the lower Shinarump adjacent to the Moenkopi, as indicated by sample assays.

Gold-mercury potential is low. A large part of the Chinle Formation is gold-bearing but the grade is very low and would be at great depths. (Bush and Lane, 1980)

Oil and gas potential is hard to determine. According to Bush and Lane (1980), deeply-buried stratigraphic traps in low pressure provinces would be the most likely possibility for deposits. The potential is considered low.

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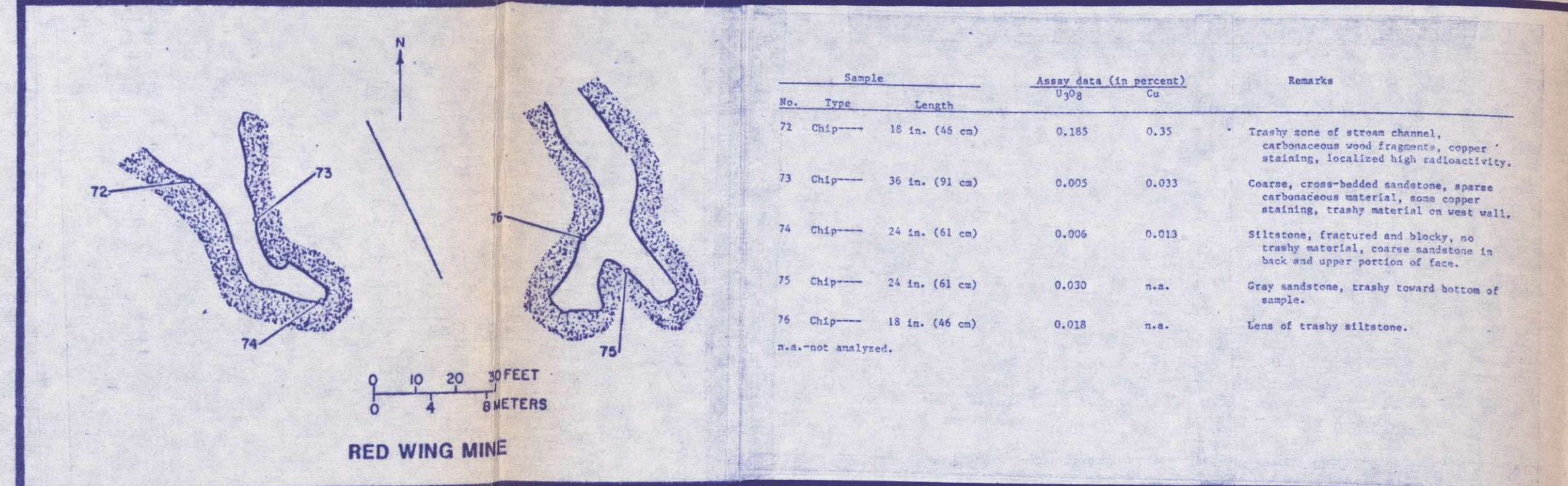


Table 1 - Historical Summary of the Paria Plateau Wilderness Study Area

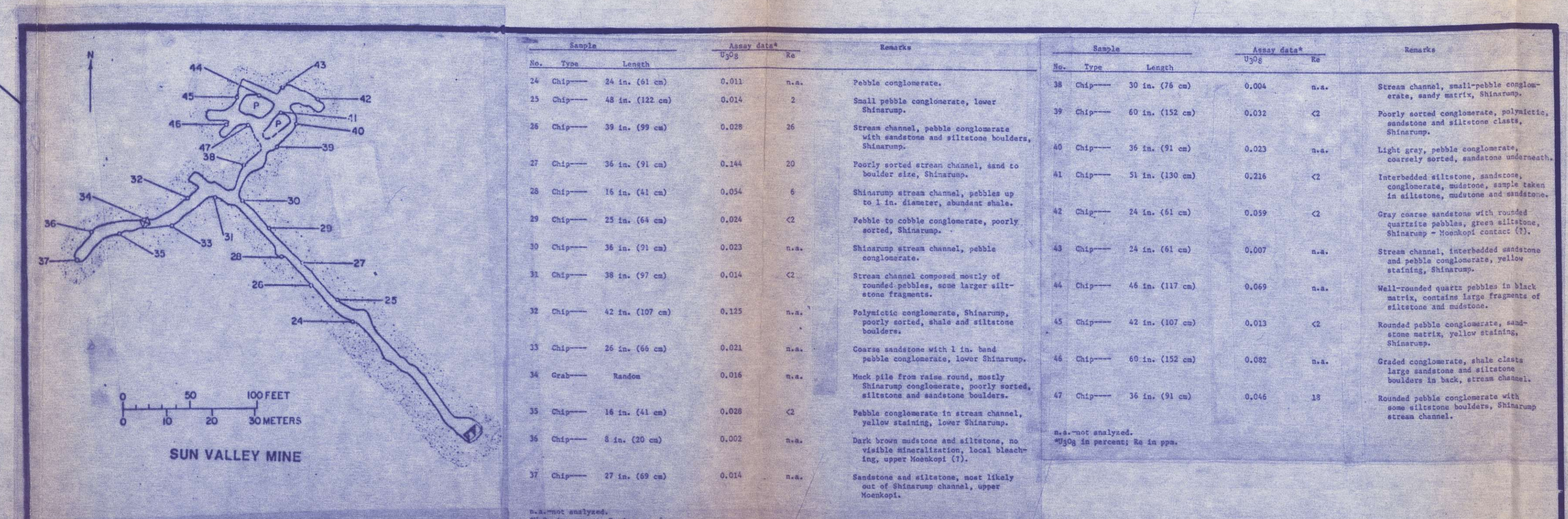
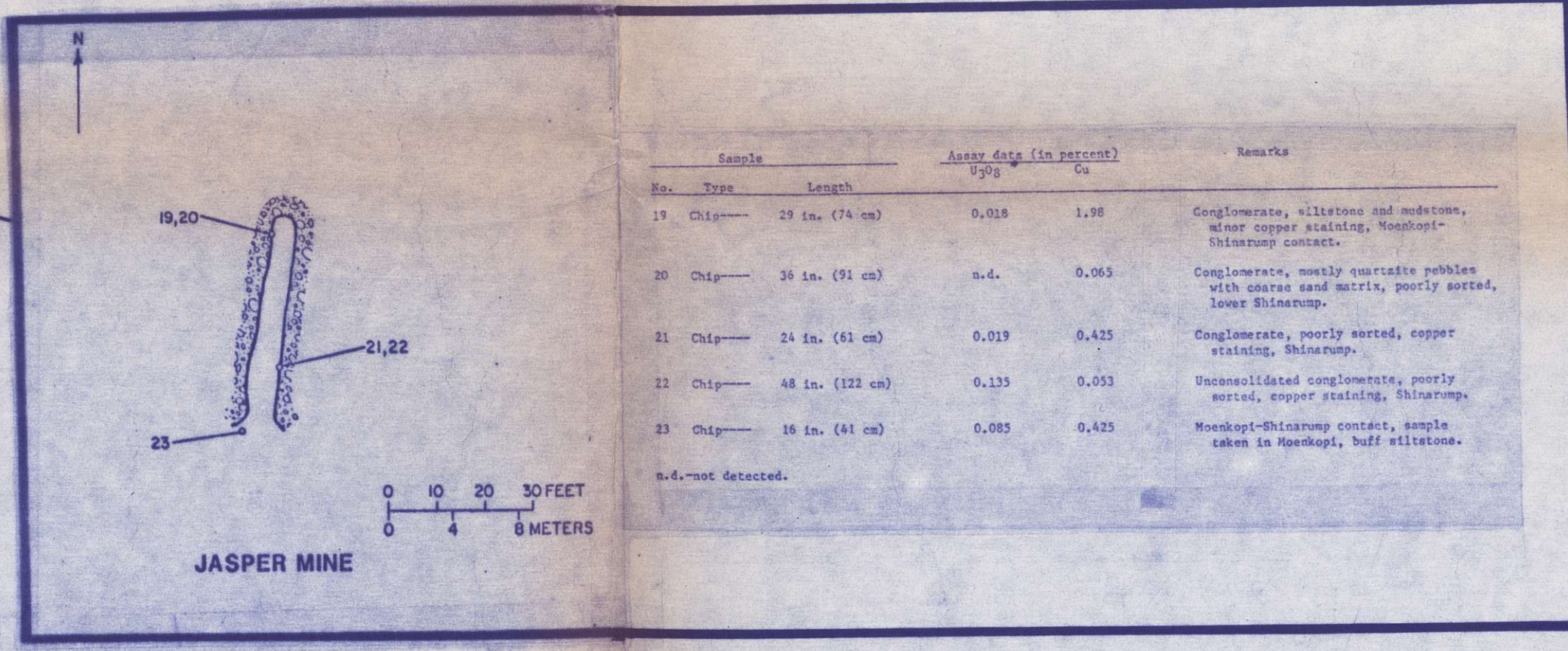
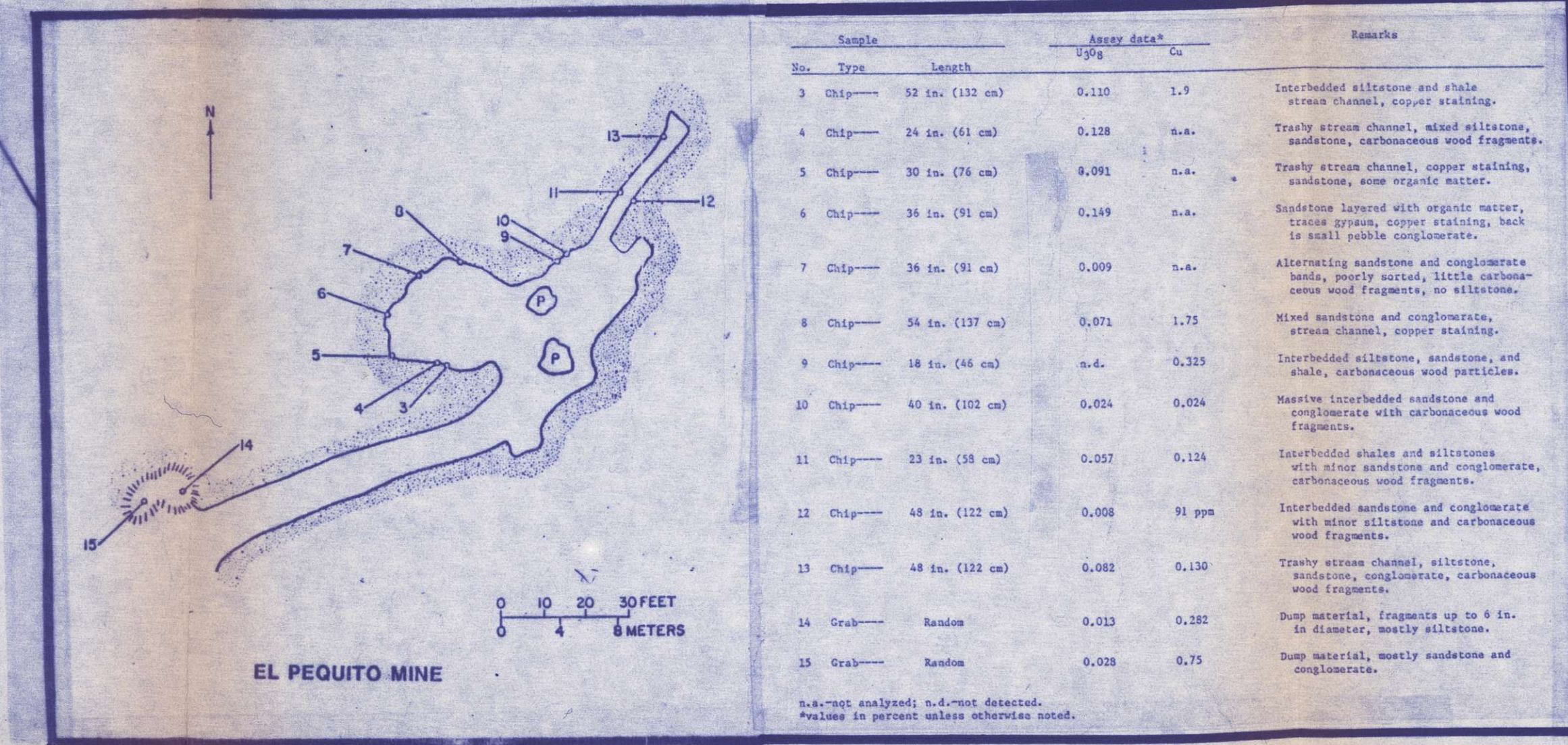
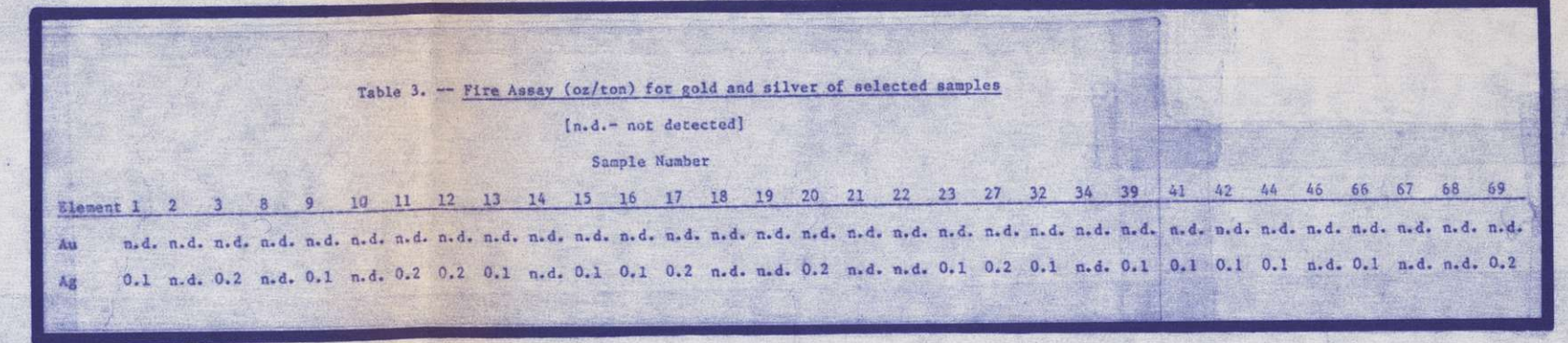
Sample No.	Depth	Length	Sample Size (lb)	Grade (%)	Remarks
1	18 in.	100 ft	0.100	0.10	Sample from upper channel, upper section, containing high concentrations of arsenic, antimony, and bismuth. Also contains small amounts of lead, copper, and zinc.
2	24 in.	100 ft	0.100	0.10	Sample from middle section, containing arsenic, antimony, and bismuth. Also contains small amounts of lead, copper, and zinc.
3	30 in.	100 ft	0.100	0.10	Sample from lower section, containing arsenic, antimony, and bismuth. Also contains small amounts of lead, copper, and zinc.

Table 2 - Summary of the Paria Plateau Wilderness Study Area

Sample No.	Depth	Length	Sample Size (lb)	Grade (%)	Remarks
4	18 in.	100 ft	0.100	0.10	Sample from upper channel, upper section, containing high concentrations of arsenic, antimony, and bismuth. Also contains small amounts of lead, copper, and zinc.
5	24 in.	100 ft	0.100	0.10	Sample from middle section, containing arsenic, antimony, and bismuth. Also contains small amounts of lead, copper, and zinc.
6	30 in.	100 ft	0.100	0.10	Sample from lower section, containing arsenic, antimony, and bismuth. Also contains small amounts of lead, copper, and zinc.

McGregor, D. R., 1977, unpublished report, Intermountain Exploration Company.

Phonetic, L. A., 1963, Geology of the Lees Ferry area, Coconino County, Arizona, U.S. Geological Survey Bulletin 1137, 86 p.



MAP EXPLANATION  
UNPATENTED MINING CLAIMS  
SHINARUMP CONGLOMERATE  
SHINARUMP STREAM CHANNEL  
TRASHY STREAM CHANNEL (SHINARUMP)  
SAMPLE LOCALITY SHOWING NUMBER  
Prospect pit  
Adit  
Trench  
Rise  
Pillar  
Stockpile  
Outcrop sample location  
SHAFT  
APPROXIMATE BOUNDARY OF PARIA CANYON PRIMITIVE AREA  
APPROXIMATE BOUNDARY OF VERMILION CLIFFS NATURAL AREA  
APPROXIMATE BOUNDARY OF PARIA PLATEAU WILDERNESS STUDY AREA  
APPROXIMATE BOUNDARY OF VERMILION CLIFFS-PARIA CANYON STUDY AREA

Base from U.S. Geological Survey  
Emmet Wash, 1954; House Rock  
Springs, 1954; Jacob Lake, 1936-53;  
Lone Ferry, 1954; Niyola Butte,  
1953; Paria Plateau, 1954;  
Paria, 1954; Tenet Wash, 1954;  
Telegraph Flat, 1954

Scale 1:62,500  
CONTOUR INTERVAL 50 FEET

Sampling and surveys done by Michael Lane  
with assistance from Russ McLean, Alan Hiecki,  
and Tom Kluge.

MINES AND PROSPECTS MAP OF THE PARIA PLATEAU WILDERNESS STUDY AREA  
COCONINO COUNTY, ARIZONA  
BY MICHAEL E. LANE, U. S. BUREAU OF MINES  
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