

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

**Mineral investigation of the Hells Gate Roadless
Area, Gila County, Arizona:**

U.S. Bureau of Mines Mineral Land Assessment
MLA 139-82
1982

By
McColly, R.A.

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.

*Copy to Teresa's office
10/8/82*

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FOREWORD

The U.S. Bureau of Mines and U.S. Geological Survey jointly conduct mineral surveys of land which in the U.S. Forest Service Second Roadless Area Review and Evaluation (RARE II) program have been designated for further planning. These evaluations are used in the RARE II program which conforms with the Multiple-Use Sustained-Yield Act of 1960 (74 Stat. 215; 16 U.S.C. 528-531), the Forest and Rangeland Renewable Resources Planning Act of 1974 (88 Stat. 476, as amended; 16 U.S.C. 1601 note), and the National Forest Management Act of 1976 (90 Stat. 2949; 16 U.S.C. 1600 note). Reports on these surveys provide the President, Congress, the U.S. Forest Service, and the general public with information essential for determining the suitability of land for inclusion in the National Wilderness Preservation System.

This report is on the Hells Gate Roadless Area (3-021), Gila County, Arizona.

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MINERAL INVESTIGATION OF THE HELLS GATE ROADLESS AREA,
GILA COUNTY, ARIZONA

By Robert A. McColly, U.S. Bureau of Mines

INTRODUCTION

Field examinations of known mineral deposits near the Hells Gate Roadless Area were conducted by the U.S. Bureau of Mines during March and April, 1981 and 1982 (fig. 1). These studies, which included reconnaissance of all mines, prospects, and mineralized areas inside, or within a mile, of the roadless area boundary, were part of a joint mineral resource appraisal made in cooperation with the U.S. Geological Survey. In addition, several properties 2 to 5 mi from the area were visited to obtain information useful in identifying similar occurrences inside the area.

During the investigation, a total of 38 samples were taken for analysis. Selected samples were analyzed spectrographically for 42 elements, and all samples were fire-assayed for gold and silver. Additional analyses were made when other metals or barite were seen or suspected. The results of all analyses are available for public inspection at the Bureau of Mines, Intermountain Field Operations Center, Denver Federal Center, Denver, Colorado 80225.

Location, size, and geographic setting

The Hells Gate Roadless Area lies near Payson in northwestern Gila County Arizona, about 95 mi northeast of Phoenix. The 30,400-acre area is south of the Mogollon Rim in the Tonto National Forest, forming an irregular 3 to 5 mi wide strip along Tonto Creek from Forest Road 405 to Gisela, a distance of about 15 mi.

Topography is rough and mountainous. Tonto Creek canyon and the side-canyons joining it are lined with steep cliffs. Elevations range from 6,000 ft near the Mogollon Rim to 3,000 ft along Tonto Creek near Gisela.

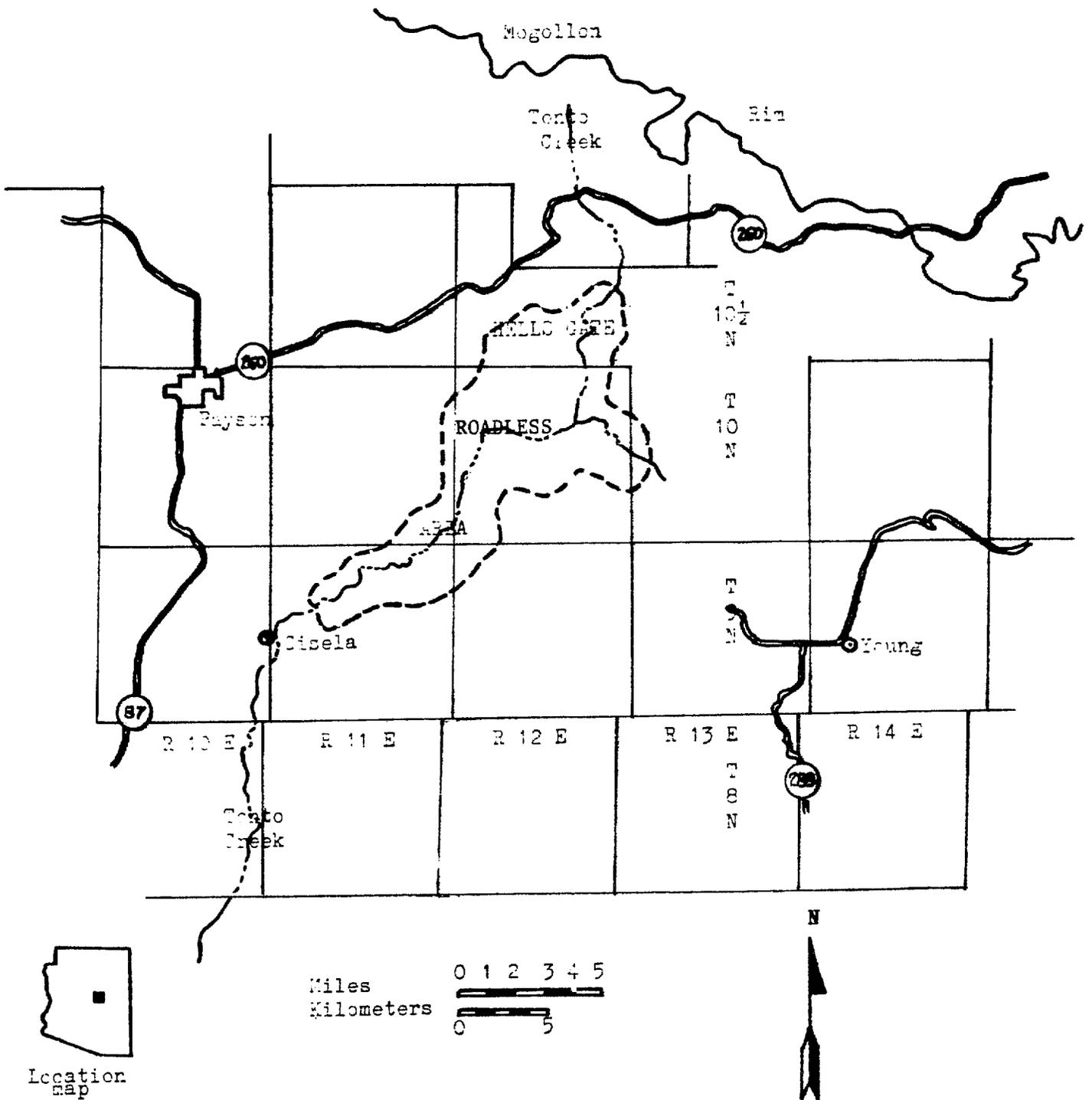


Figure 1.-Index map of Hells Gate Roadless Area, Gila County, Arizona.

From Payson, Gisela, and Young, jeep trails and Forest Service roads provide access to numerous points along the area perimeter. A few jeep trails extend short distances into the area, but generally access within the area is only by foot, horse, or helicopter.

Mining activity

The roadless area has no history of mining or mineral production, and no active claims, mines, or prospects were found inside the area boundaries. Some prospecting is indicated, based upon a review of mining claim records in the Gila County courthouse. Approximately 50 mining claims were found with descriptions that could place them within the area, but many descriptions are vague or even contradictory. Most of these claims were filed before the early 1930's, and none more recently than the 1950's. Bureau of Land Management records show no mineral leases, permits, or mining claims active in the area as of September 1982.

MINING DISTRICTS AND MINERALIZED AREAS

Parts of the Green Valley (Payson), and the Spring Creek (Young), mining districts extend into the Hells Gate Roadless Area, but none of the recorded mineral production from either district can be attributed to the area. Mine workings at the Gisela (Spook) barite deposit, and in Bearhide Canyon provide the only evidence of mining within 2 mi of the area. Several properties within a 5-mi radius include occurrences of agate, amethyst, barite, beryllium, copper, gold, iron, the rare-earth mineral xenotime (yttrium phosphate), silver, and uranium. The known deposits of iron, uranium, and yttrium, however, are related to geologic units not found in the area; and though favorable host rocks for the remaining minerals occur within the area, evidence to support the actual existence of such occurrences is tentative or lacking.

Gisela (Spook) barite deposit

A barite vein, 2 to 4 ft wide in granite, was exposed for over 100 ft along a ridge-top in the NW1/4, sec. 7, T. 9 N., R. 11 E., 2 mi west of the area (pl 1). The deposit is well known, production has occurred as recently as 1981, and is described by Stewart and Pfister (1960, p. 15-16) who cite values of 93.6 percent BaSO₄, 3.7 percent SiO₂, and 0.5 percent FeO₃, with a specific gravity of 4.29. When visited in April 1982, the vein had been totally covered with earth and dump material, and the site rehabilitated and seeded. Only small pieces of barite float could be found where the mine had been. Some of these were collected for assay (table 2, sample 34). Stewart and Pfister (1960, p. 12) considered this vein as one of a system of sub-parallel fractures containing barite that extends south of Payson for about 15 mi. As mapped by Conway (1976), the structure containing barite at the Spook deposit continues southeastward for at least 2 mi, extending into the area. No barite was found along the projection of this structure, however, within a half-mile of the pit.

Bearhide Canyon prospects

Two water-filled shafts and a few shallow surface workings occur in sec. 24, T. 10-1/2 N., R. 12 E., along a 1/2-mi stretch of Bearhide Canyon just north of the area. None of the workings appeared to have been active recently. Fourteen Bureau of Mines samples (table 2, samples 3-16) gave assay values up to 0.117 ounce gold and 1.9 ounce silver per ton. Minor amounts of azurite and malachite were found on some of the dumps, but neither was observed in place. Mineralization is associated with quartz veins and masses occurring in granite. There is no record of production from mines in this vicinity, and based on observation, production, if any, was small. Though irregular, the veins appear to be near vertical, with an average strike of about N 35° W.

Therefore, the veins do not project into the roadless area either along strike or down dip.

Iron, uranium, and yttrium prospects

A review of the literature disclosed that iron, uranium, and yttrium prospects near the Hells Gate Roadless Area are found in host-rocks which are absent within the area. In this category are the Christopher Mountain hematite deposit in sec. 36, T. 11 N., R. 12 E., (Harrer, 1964, p. 30); the Promontory Butte uranium prospect in sec. 24, T. 11 N., R. 12 E., (Scarborough, 1981, p. 184); and the Diamond Butte xenotime (yttrium phosphate) occurrence in sec. 3, T. 9 N., R. 12 E., (Gastil, 1954, p. 280).

Other prospects

Several other prospects outside of the area were found and examined, most with scant development work, and generally providing little pertinent information on potential mineral deposits in the area. Included in this group are the Agate Mountain agate - amethyst occurrence in sec. 20, T. 10 N., R. 11 E., (Phillips, 1973, p. 1); the Baronite barite prospect in sec. 15, T. 10 N., R. 11 E., (Stewart and Pfister, 1960, p. 18-19); the Bread Pan Canyon beryllium prospect in sec. 23, T. 9 N., R. 12 E., (Smith, 1962, p. 1); the Royal Flush (Bishop's Knoll) copper prospect in sec. 36, T. 10 N., R. 10 E., (Lausen and Wilson, 1925, p. 41); the Soldier Camp Creek copper prospects in secs. 25 and 36 T. 9 N., R. 11 E., and sec. 6, T. 8 N., R. 12 E.; placer and vein gold deposits in Gold Gulch and Board Cabin Draw in secs. 2, 11, and 12, T. 9 N., R. 12 E.; and a silver prospect near Mud Springs in sec. 36, T. 11 N., R. 11 E., (tables 1 and 2). None of these extend into the roadless area; neither are any similar deposits known to occur within the roadless area.

CONCLUSIONS

U.S. Bureau of Mines studies of the Hells Gate Roadless Area identified no mineral occurrences within the area.

REFERENCES

- Conway, C. M., 1976, Petrology, structure, and evolution of a Precambrian volcanic and plutonic complex, Tonto Basin, Gila County, Arizona (Ph. D dissertation): California Institute of Technology, Pasadena, 460p.
- Gastil, G. R., 1954, An occurrence of authigenic xenotime: Journal of Sedimentary Petrology v. 24, no. 4, p. 280-81.
- Harrer, C. M., 1964, Reconnaissance of iron resources in Arizona: U.S. Bureau of Mines IC 8236, 204p.
- Lausen, C., and Wilson, E. D., 1925, Gold and copper deposits near Payson, Arizona: University of Arizona, Arizona Bureau of Mines Bulletin 120, 44 p.
- Phillips, K. A., 1973, Mine report-Beauty 1-7 claims group; Unpublished open-file report, Arizona Department of Mineral Resources, 1 p.
- Scarborough, R. B., 1981, Radioactive occurrences and uranium production in Arizona: University of Arizona, Arizona Bureau of Geology and Mineral Technology, 297p.
- Smith, L. A., 1962, Mine report-Scorpion beryllium mine: Unpublished open-file report, Arizona Department of Mineral Resources, 2p.
- Stewart, L. A., and Pfister, A. J., 1960, Barite deposits of Arizona: U.S. Bureau of Mines RI 5651, 89p.

Table 1.-Mineral deposits near the Hells Gate Roadless Area, Gila County, Arizona

[Sample numbers correspond with sample localities shown on pl. 1]

Sample number(s) table 2	Mine or prospect name and location	Mineral or commodity and grade	Host rock and other geologic features controlling mineralization	Development and production	Reference
-	Agate Mountain prospect SE1/4, sec. 20, (unsurveyed) T. 10 N., R. 11 E.	Agate, amethyst.	Quartz vein, strike N 50-60° W, dip 70-80° N, exposed over 3,000-4,000 ft.	Shallow cut and trenches, production small, if any.	Phillips, 1973, p. 1.
-	Baronite prospect NW1/4, sec. 15 and NE1/4, sec. 16, (unsurveyed) T. 10 N., R. 11 E.	Barite, grade unknown.	Granite, NW striking fractures up to 1 ft wide.	None, none	Stewart and Pfister, 1960, p. 18-19.
3-16	Bearhide Canyon prospects NW1/4, sec. 24, (unsurveyed) T. 10-1/2 N., R. 12 E.	Copper, 0-0.8 pct; gold, 0-0.117 oz/ton; silver, 0-1.9 oz/ton.	Quartz veins, fractures in granite, strike N 35° W, dip 90°.	Two water-filled shafts, other small pits and cuts, production small, if any.	None

Table 1.-Mineral deposits near the Hells Gate Roadless Area, Gila County, Arizona-Continued

Sample number(s) table 2	Mine or prospect name and location	Mineral or commodity and grade	Host rock and other geologic features controlling mineralization	Development and production	Reference
-	Board Cabin Draw-Gold Gulch prospects secs. 2, 11, 12, T. 9 N., R. 12 E.	Gold, grade unknown.	Quartz veins in metamorphic rocks, gold placer deposits.	Numerous small pits and cuts. Production unknown, probably small.	None
-	Bread Pan Canyon prospect secs. 13, 14, 26-28, 33, 34, T. 9 N., R. 12 E.	Beryllium, 0.14-0.25 BeO, ave. 0.19.	40-50 ft wide, NW trending shear zone in schist, 7,000-8,000 ft long.	Surface sampling, four 500-ft, diamond-drill holes. No production.	Smith, 1962, p. 1.
-	Christopher Mountain hematite deposit SE1/4, sec. 36, (unsurveyed) T. 11 N., R. 12 E.	Iron, grade unknown.	Limestone, contact zone with diabase.	None, none.	Harrer, 1964, p. 30.
-	Diamond Butte rare-earth occurrence SE1/4, sec. 3, (unsurveyed) T. 9 N., R. 12 E.	Xenotime (yttrium phosphate), grade unknown.	Quartzite, other geologic controls unknown.	None, none.	Gastil, 1954, p. 280.

Table 1.-Mineral deposits near the Hells Gate Roadless Area, Gila County, Arizona-Continued

Sample number(s) table 2	Mine or prospect name and location	Mineral or commodity and grade	Host rock and other geologic features controlling mineralization	Development and production	Reference
34	Gisela (Spook) deposit NW1/4, sec. 7, (unsurveyed) T. 9 N., R. 11 E.	Barite, 46.5-93.6 pct BaSO ₄ ; 3.7 pct SiO ₂ ; 0.5 pct FeO ₃ .	NW striking vein in granite, exposed over 2,000 ft.	Open pit, or cut along vein for over 100 ft. Site now buried and reclaimed. Production unknown.	Stewart and Pfister, 1960, p. 12.
17-20	Mud Springs (Hidden Valley) prospect NW1/2, sec. 36, (unsurveyed) T. 11 N., R. 12 E.	Silver, 0.5-2.9 oz/ton.	Shear zone in granite along contact with aplite(?) dike.	Open cut with flooded pit or small shaft. Production unknown.	None
-	Promontory Butte prospect N1/2, sec. 24, T. 11 N., R. 12 E.	Uranium, grade unknown.	Shale, red beds, conglomerate.	Two open-cuts, several thousand feet of diamond drilling. Under 500 tons of ore produced.	Scarborough, 1981, p. 184.

Table 1.-Mineral deposits near the Hells Gate Roadless Area, Gila County, Arizona-Continued

Sample number(s) table 2	Mine or prospect name and location	Mineral or commodity and grade	Host rock and other geologic features controlling mineralization	Development and production	Reference
-	Royal Flush (Bishop Knoll) prospect NE1/4, sec. 36, T. 10 N., R. 10 E., and NW1/4, sec. 31, T. 10 N., R. 11 E.	Copper, grade unknown.	Fracture zones and contacts in schist and diorite where cut by basic dikes.	One shaft, several adits, minor surface workings. Production unknown.	Lausen and Wilson, 1925, p. 41.
36-38	Soldier-Camp Creek prospect, secs. 25, 36, (unsurveyed) T. 9 N., R. 11 E., sec. 6, T. 8 N., R. 12 E.	Copper, 0- 6.4 pct silver, 0-1.6 oz/ ton.	Schist and conglomerate, other geologic controls unknown.	Three separate sites, four shafts, three adits, one open cut, other minor workings. Pro- duction unknown.	None

Table 2.-Sample information and assay data summary

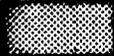
[Pan. con., panned concentrate; St. sed., stream sediment; NA, not applicable; -, not detected (detection limits, gold-0.005 oz/ton, silver-0.2 oz/ton)]

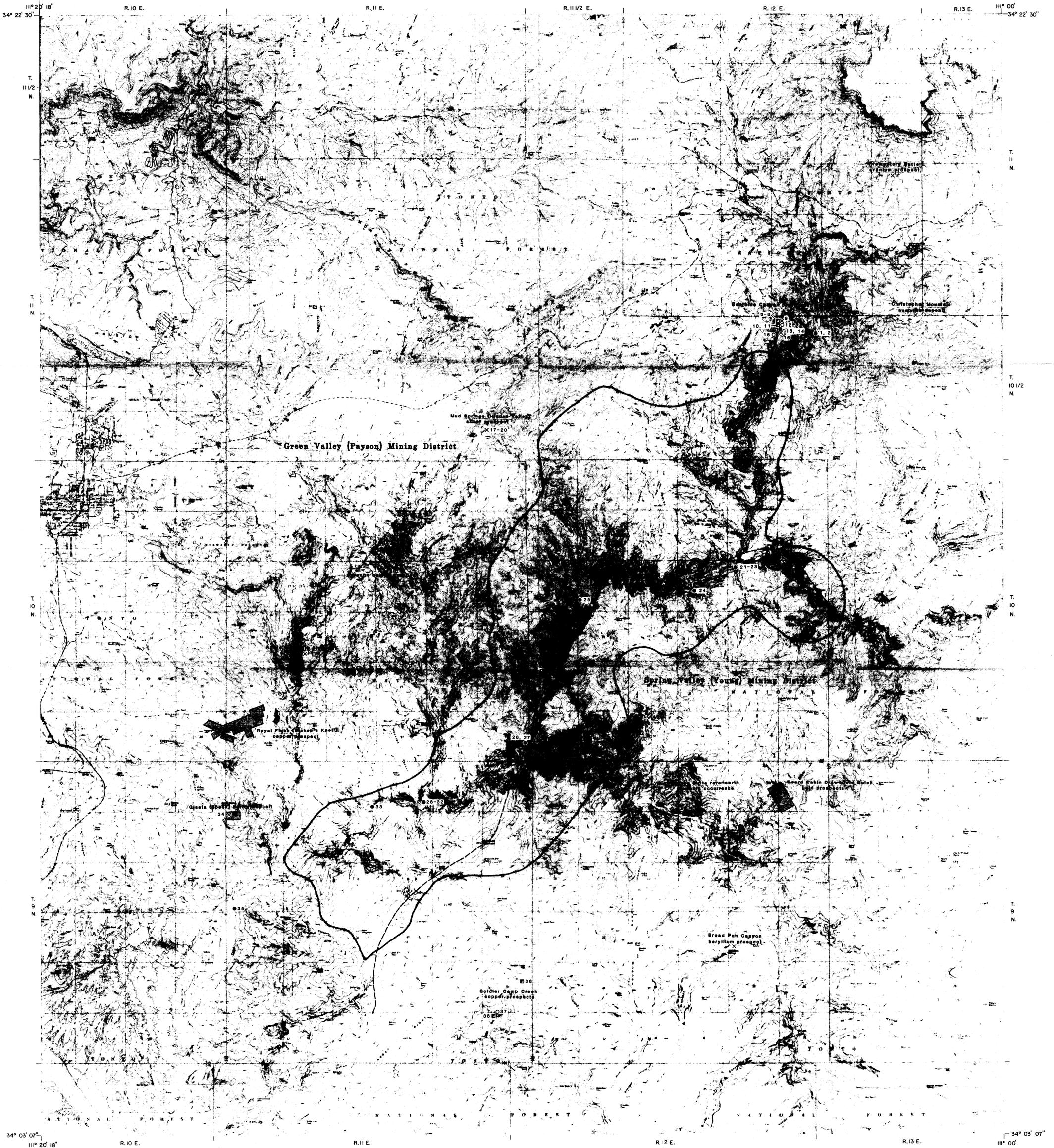
No.	Sample Type	Width	Location	Gold oz/ton	Silver oz/ton	Other percent
1	Pan. con.	NA	St. sed.	-	-	-
2	Pan. con.	NA	St. sed.	-	-	-
3	Grab	NA	Dump	0.117	0.9	-
4	Chip	1.0 ft	Shaft collar	0.006	0.3	-
5	Chip	8.0 ft	Outcrop	-	-	-
6	Grid	NA	Dump	-	-	-
7	Grab	NA	Stock pile	0.024	-	-
8	Grid	NA	Dump	0.018	-	-
9	Chip	6.0 ft	Open cut	-	-	-
10	Chip	1.5 ft	Shaft collar	-	-	-
11	Chip	5.0 ft	Shaft collar	0.006	0.6	-
12	Chip	8.5 ft	Quartz outcrop	-	-	-
13	Pan. con.	NA	St. sed.	-	-	-
14	Pan. con.	NA	St. sed.	-	-	-
15	Chip	NA	Quartz outcrop	-	0.3	-
16	Grab	NA	Dump	-	1.9	0.8 copper
17	Chip	1.0 ft	Pit	-	2.9	-
18	Chip	0.7 ft	Pit	-	0.7	-
19	Chip	3.0 ft	Pit	-	1.1	-
20	Chip	6.0 ft	Pit	-	0.5	-
21	Pan. con.	NA	St. sed.	-	-	-
22	Pan. con.	NA	St. sed.	-	-	-

Table 2.-Sample information and assay data summary-Continued

No.	Sample Type	Width	Location	Gold oz/ton	Silver oz/ton	Other percent
23	Pan. con.	NA	St. sed.	-	-	-
24	Pan. con.	NA	St. sed.	-	-	-
25	Pan. con.	NA	St. sed.	-	-	-
26	Pan. con.	NA	St. sed.	-	-	-
27	Pan. con.	NA	St. sed.	-	-	-
28	Pan. con.	NA	St. sed.	-	-	-
29	Pan. con.	NA	St. sed.	-	-	-
30	Pan. con.	NA	St. sed.	-	-	-
31	Pan. con.	NA	St. sed.	-	-	-
32	Pan. con.	NA	St. sed.	-	-	-
33	Pan. con.	NA	St. sed.	-	-	-
34	Grab	NA	Float	-	-	46.5 BaSO ₄
35	Pan. con.	NA	St. sed.	-	-	-
36	Grab	NA	Dump	-	0.3	0.1 copper
37	Chip	NA	Outcrop	-	-	-
38	Grab	NA	Stock pile	-	1.6	6.4 copper

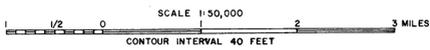
EXPLANATION OF SYMBOLS FOR MINE AND PROSPECT MAP

-  APPROXIMATE BOUNDARY OF THE HELLS GATE ROADLESS AREA
-  APPROXIMATE BOUNDARY OF MINING DISTRICT
-  UNPATENTED MINING CLAIMS
-  12 LOCALITY OF SAMPLED OUTCROP--Showing sample number
-  1,2 LOCALITY OF PAN CONCENTRATE SAMPLE--Showing sample number
- SURFACE OPENINGS--Showing sample locality number; symbols may represent more than one working
-  34 Mine
-  9 Prospect pit or trench
-  38 Shaft



Base map from U. S. Geological Survey
 Buzzard Roost Mesa, 1972; Diamond Butte, 1973;
 Diamond Point, 1973; Gila, 1972; McDonald Mountain, 1973;
 Payson North, 1973; Payson South, 1973;
 Promontory Butte, 1973; Sheep Basin Mountain, 1972.

Field work 1981 and 1982,
 assisted by Carl Almquist.



MINE AND PROSPECT MAP OF THE HELLS GATE ROADLESS AREA, GILA COUNTY, ARIZONA

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