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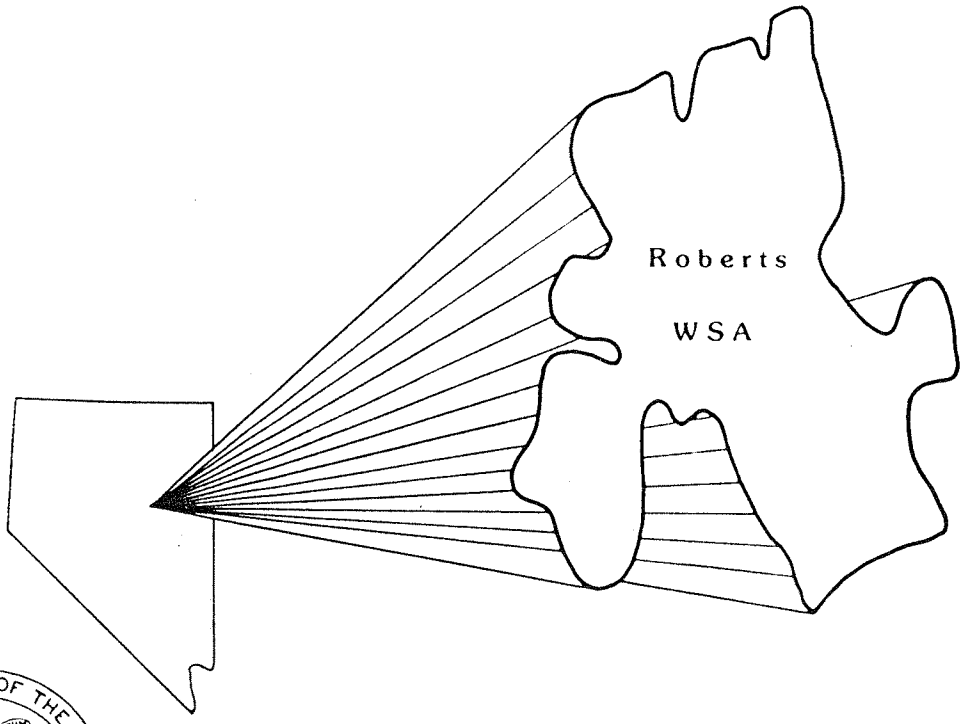
Mineral Land Assessment/1986
Open File Report

Mineral Resources of the Roberts Wilderness Study Area, Eureka County, Nevada



BUREAU OF MINES

UNITED STATES DEPARTMENT OF THE INTERIOR

MINERAL RESOURCES OF THE ROBERTS WILDERNESS STUDY AREA, EUREKA COUNTY, NEVADA

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

BUREAU OF MINES
Robert C. Horton, Director

PREFACE

The Federal Land Policy and Management Act (Public Law 94-579, October 21, 1976) requires the U.S. Geological Survey and U.S. Bureau of Mines to conduct mineral surveys on U.S. Bureau of Land Management administered land designated as Wilderness Study Areas " . . . to 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 Bureau of Mines mineral survey of the Roberts Wilderness Study Area (NV-060-541), Eureka County, NV.

This open-file report will be summarized in a joint report published by the U.S. Geological Survey. The data were gathered and interpreted by Bureau of Mines personnel from Western Field Operations Center, E. 360 Third Ave., Spokane, WA 99202. The report has been edited by members of the Branch of Mineral Land Assessment at the field center and reviewed at the Division of Mineral Land Assessment, Washington, DC.

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SUMMARY

The USBM (U.S. Bureau of Mines) studied mines, prospects, and mineralized sites in the Roberts WSA (Wilderness Study Area) in 1984. The 15,090-acre WSA, located 35 miles northwest of Eureka, NV, is underlain by alluvial deposits of Quaternary age, extrusive and intrusive volcanic rocks of Oligocene through Miocene age, and metasedimentary rocks of Cambrian through Permian age. The Roberts Mountain Thrust fault cuts through the WSA, dividing the metasedimentary rocks into upper and lower plate rock units.

One mine, the Kelley, which produced 397 tons of lead-zinc ore prior to 1940, and two prospects are within the WSA; no resources were identified. Exploration for precious metal deposits is presently being conducted in and adjacent to the WSA on large claim blocks. The study area contains six sites in and near these claim blocks that have anomalous gold and silver. Detailed exploration is needed to delineate resources. High purity silica rocks are present in the WSA. Barite, phosphate, oil shale, and vanadium occurrences just outside the WSA may extend into it, but no such occurrences were observed during the USBM study.

INTRODUCTION

A mineral resource study of the Roberts WSA (Wilderness Study Area) was conducted jointly by the USGS (U.S. Geological Survey) and the USBM (U.S. Bureau of Mines) to determine if mineral resources are present and to assess the potential for undiscovered resources. The USBM evaluated mines, prospects, and other mineralized sites during 1984. The USGS performed broader geological, geochemical, and geophysical studies.

Information from these mineral surveys relates to one aspect of the area's suitability for wilderness classification. Although the near-term goal is to provide data for land-use decisions, the long-term objective is to help ensure that the Nation has an adequate and dependable supply of minerals at reasonable cost.

Setting

The 15,090-acre WSA is in north-central Nevada, 35 mi (miles) by road northwest of Eureka, NV (fig. 1). Access to all sides of the study area is by numerous dirt roads (fig. 2).

The physiography of the area is typical of the Basin and Range province with north-south trending mountain ranges and broad valleys. Elevations range between 10,133 ft (feet) at Roberts Creek Mtn., and 6,400 ft at Birch Creek in the northeast corner of the study area. Vinini, Roberts, Willow, Birch, Kelley, and Pete Hanson Creeks are perennial streams. Vegetation consists of grass, sage, juniper, mountain mahogany, and pinyon pine. According to Missallati (1973), the climate is excellent for field work during late spring, summer, and early fall. During these seasons, mornings are cool and afternoon temperatures are

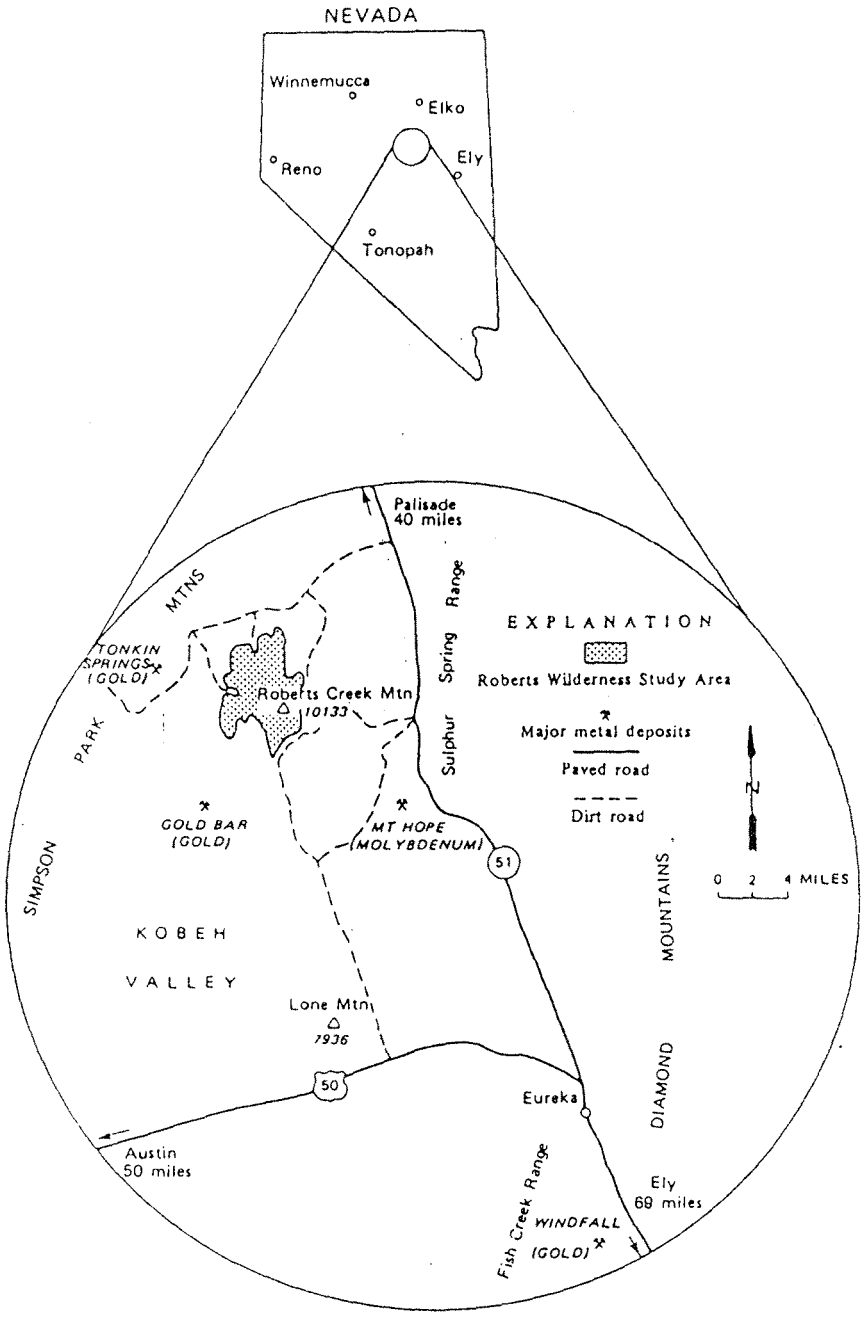


FIGURE 1. – General location of the Roberts Wilderness Study Area (NV-060-541); NV

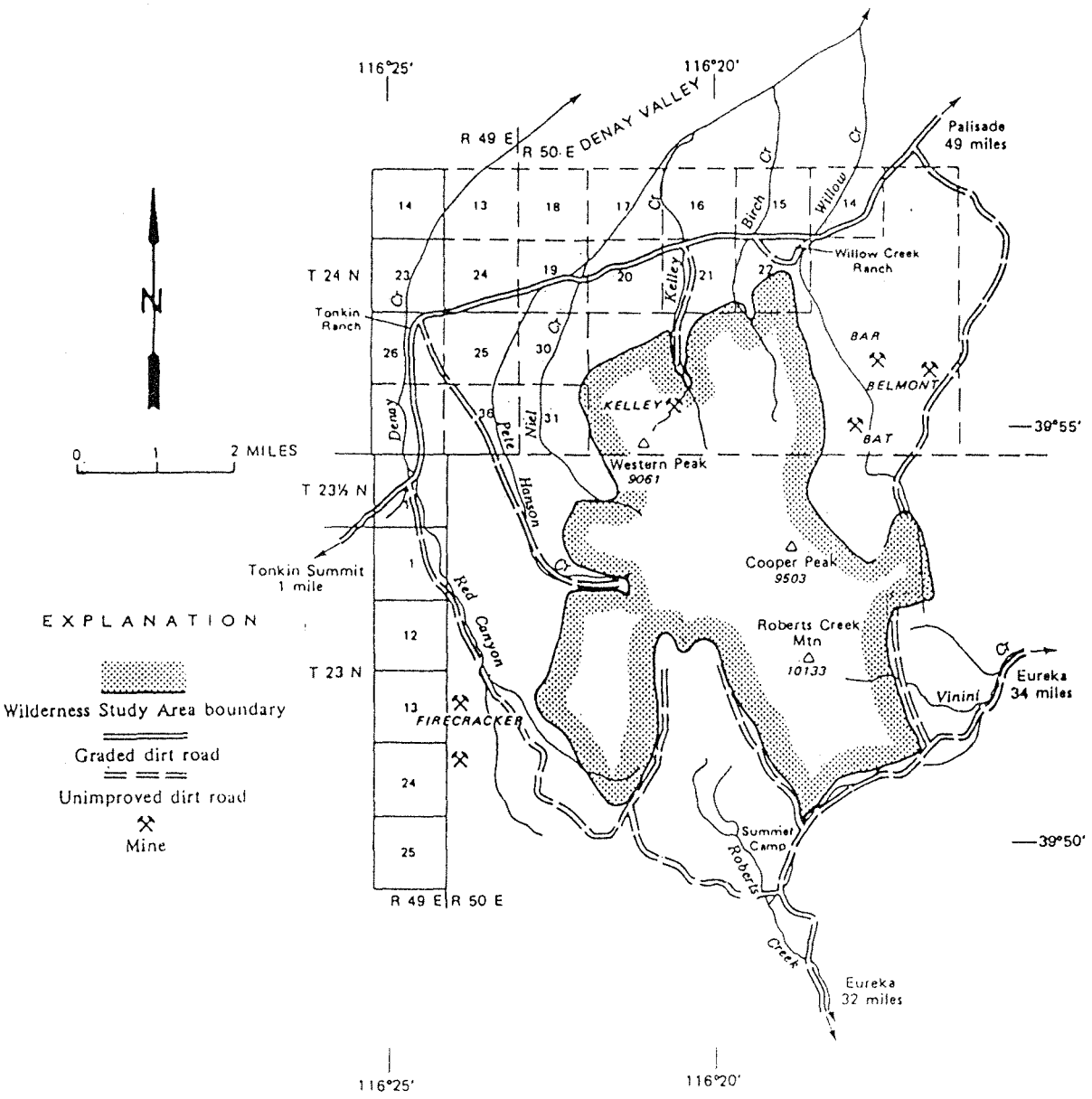


FIGURE 2. – Mines in and near the Roberts Wilderness Study Area (NV-060-541), NV

generally below 90 °F. The total rainfall is small, but short afternoon rain storms are common. Winter daily high temperatures average between 20 and 30 °F, while snow and frost may occur from September through June.

Previous Studies

Numerous reports have been published concerning the geology and/or mineral deposits in or near the study area.

Vanderburg (1938) reported on the mines in the Roberts Mountains. The economic geology of north central Nevada is discussed in four reports: Roberts (1964 and 1966), Roberts and others (1967 and 1971). Wagoner (1978) sampled stream sediments and Mitchell (1982) sampled rocks in the Roberts Mountains for the U.S. Department of Energy. A BLM (U.S. Bureau of Land Management) GEM (Geology-Energy-Minerals) report was done on the area (1983). Hardisty (1983) prepared a paper on the Tonkin Springs gold deposit.

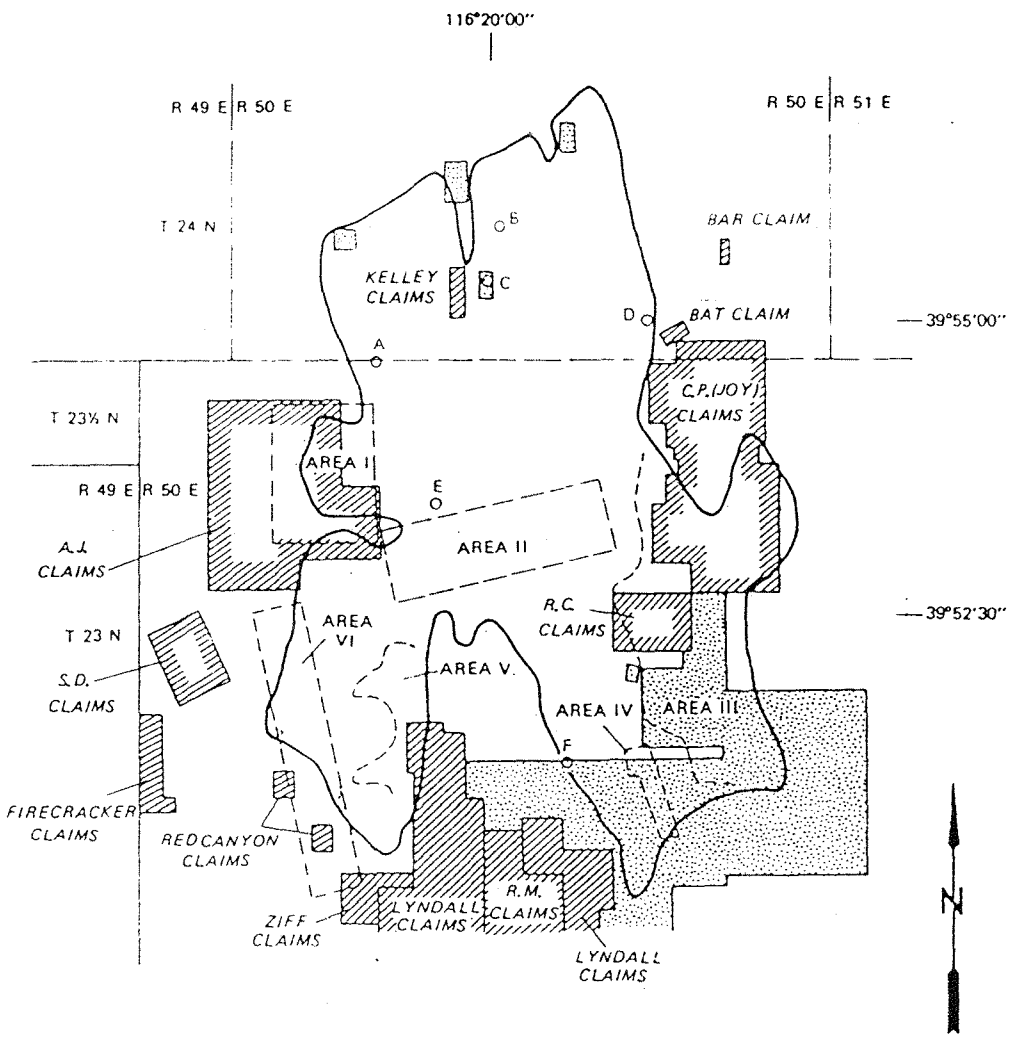
Philbin and others (1963) produced an aeromagnetic map of the Roberts Mountains. Mabey (1964) and Erwin and Bittleston (1977) produced gravity surveys encompassing Eureka County, NV. Geodata International, Inc. (1979), under contract by the U.S. Department of Energy, generated aerial radiometric and magnetic surveys which included the Roberts Mountains.

The earliest geologic mapping in the Roberts Mountains was done by Merriam (1940) and Merriam and Anderson (1942). Additional geologic work was done by Roberts and others (1958), Winterer and Murphy (1960), Winterer (1968), Nichols and Silberling (1977), and Dunham (1977). Murphy and others (1978) produced a geologic map of the Roberts Creek Mountain 15-minute quadrangle.

In addition to the above mentioned public information, private mining companies have done abundant work in or near the WSA. Companies holding active claims in or near the WSA (fig. 3), along with companies without claims, have supplied exploration information (sample data, geologic maps, and drill logs) to the USBM, much of it confidential.

Present Study

The USBM investigation consisted of pre-field research, field work, and report preparation during 1984 through 1986. Pre-field studies included a literature search, and an examination of Eureka County and BLM mining claim and mineral lease records. USBM, State of Nevada, and other mineral property files were searched and pertinent data compiled. Claim owners and lessees were contacted, when possible, for permission to examine properties and publish the results. Field studies included a search for all mines, prospects, and claims within the WSA. Those found were examined, sampled, and if warranted, mapped. Mines and prospects close to the area were also studied to determine if mineralized zones extended from them into the WSA, and to better understand mineral deposits of the region.



EXPLANATION

Wilderness Study Area boundary

Approximate location of active claims as of 9/15/84

CLAIM NAME	LOCATOR
Kelley	R.L. Gerish
Bat and Bar	L. Bisoni
C.P.	Newmont Exploration Ltd.

(in 1985 the C.P. claims were dropped by Newmont and restaked by ASARCO as the Joy claims)

R.M.	Newmont Exploration Ltd.
Lyndall	All Minerals Corp.
Ziff	Chris Johnson
Red Canyon	N.L. Baroid
Firecracker	C.R. Davis
S.D.	Galli Exploration Co.
A.J.	Nerco Minerals Co.
R.C.	Atlas Precious Metals

(R.C. claims were staked in June 1984 but as of 9/15/84 had not been filed at Eureka Co. courthouse. Actual claim block most likely is larger than shown on this map)

Inactive claims:
Areas historically claimed but not subdivided

(Source: Eureka County courthouse records, field observations, and company data)

Boundary of area (discussed in report)

Sites having anomalous gold and/or silver

FIGURE 3. – Unpatented claim status, and areas examined for precious metals resources in the Roberts Wilderness Study Area (NV-060-541), NV

Four hundred fifty-eight samples were taken in or near the WSA (see fig. 4). Samples were of three types: 1) chip - a regular series of rock fragments generally taken in a continuous line across a mineralized zone; 2) random chip - a collection of rock chips taken from many places on the surface of a mineralized zone; 3) grab - rock pieces taken unsystematically from a dump, stockpile, float (loose rock on the ground), or other loose material.

Samples were analyzed for gold and silver by combined fire assay-inductively coupled plasma analysis (detection limit of 0.007 ppm gold, 0.3 ppm silver). Lead and zinc were analyzed by atomic absorption (detection limits of 30 ppm and 5 ppm, respectively). Analyses for $BaSO_4$ and vanadium were acquired by x-ray diffraction methods (detection limits 0.02 pct and 200 ppm, respectively).

ACKNOWLEDGEMENTS

Several claimants were especially helpful. Messrs. Maynard and Lester Bisoni provided verbal reports concerning the Bat and Bar claims and the economic geology of the WSA in general. Mr. C. R. Davis supplied a written report on the Firecracker claims. Mr. Fred Hilton made available a report on the Lyndall claims and Mr. David Fanning provided a report on the SD claims. A report on the A. J. claims was supplied by Mr. Edward Flood and Mr. Judson Polikoff. Mr. Peter Vikre provided information on the Joy claims. Mr. Russell Hardisty provided verbal and written information on the economic geology of the WSA. Mr. Neil Brecheisen, BLM geologist, contributed helpful data on the working conditions, geology, and economic geology of the WSA.

GEOLOGIC SETTING

Rocks and Structures

The paramount geologic feature (fig. 5) in the Roberts Mountains (and Roberts WSA) is the Roberts Mountain Thrust (Mississippian age). According to Winterer (1968), the Roberts Mountain Thrust transported upper plate Ordovician eugeosynclinal rocks (Vinini Formation) 60 to 120 mi eastward where they now rest on lower plate Cambrian through Permian miogeosynclinal rocks. The WSA is composed of a core area of eastward dipping lower plate rocks. The west, east, and south fringes of the WSA are composed of upper plate rocks. Scattered patches of Oligocene through Miocene volcanic rocks cover the older rocks throughout the area. Numerous northwest-trending Miocene basalt dikes also cut the older rocks. Quaternary alluvium covers the northwest and northern borders of the WSA. Numerous late Tertiary, northerly-trending faults cut both upper and lower plate rocks.

Mineral Deposits

Seven types of mineral deposits are found in the Roberts Mountains. Two types are present in lower plate rocks (silica and lead-zinc); four types are present in upper plate rocks (barite, phosphate, oil shale, and vanadium); gold-silver mineralization can be found in either upper or lower plate rocks.

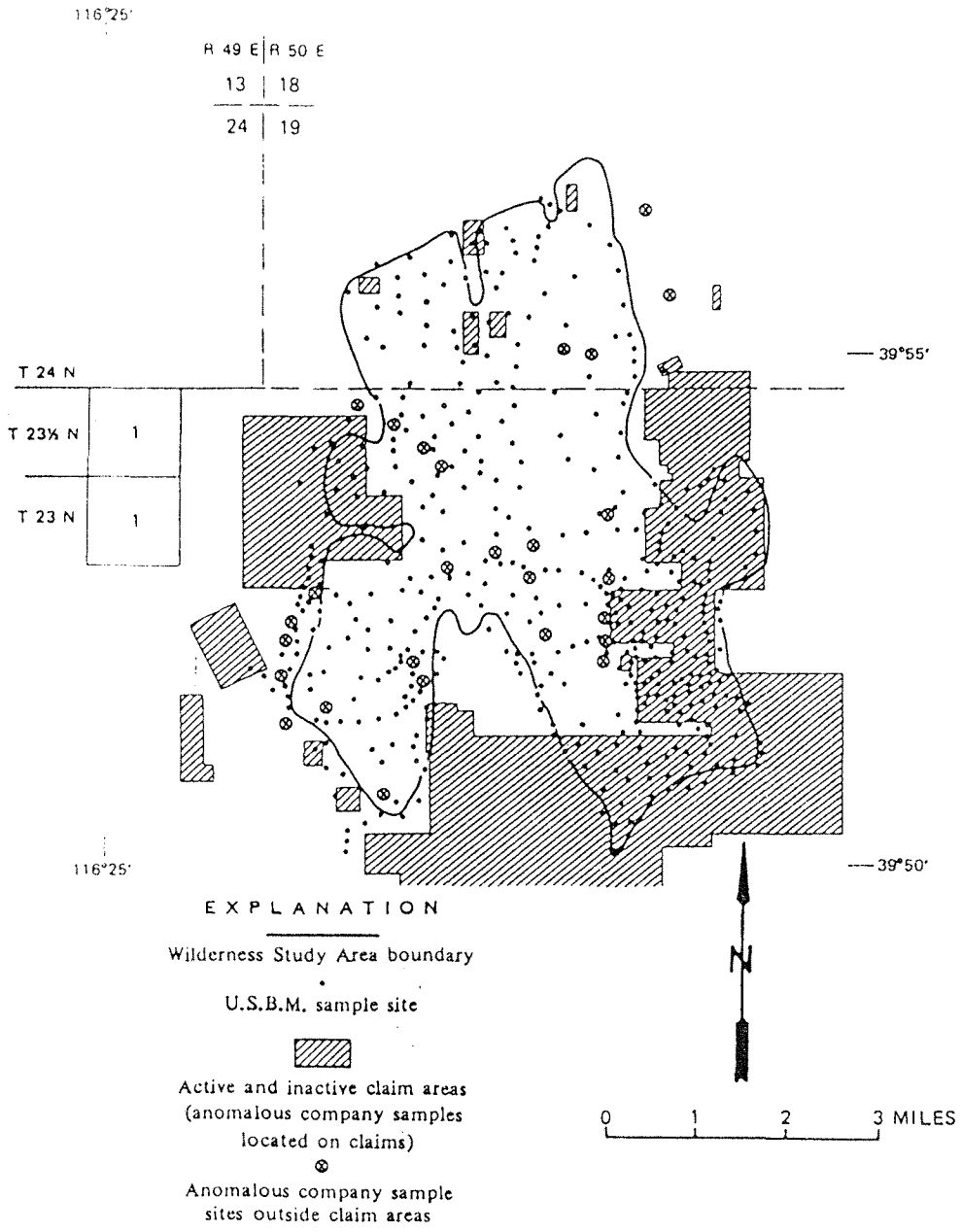


FIGURE 4. – USBM sample sites, Roberts Wilderness Study Area (NV-060-541), NV

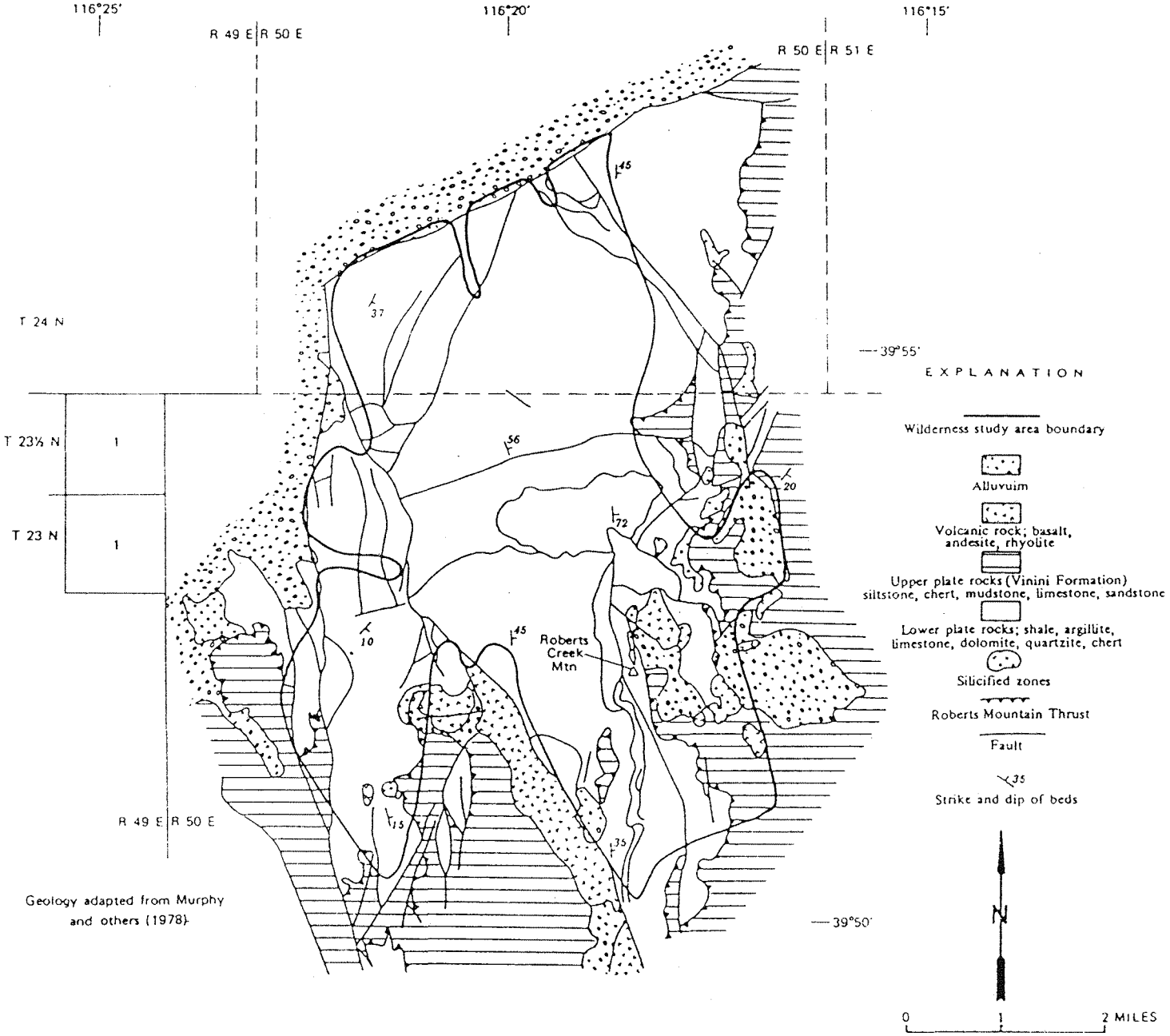


FIGURE 5. – Generalized geologic map of the Roberts Wilderness Study Area (NV- 060-541), NV

The silica deposits are located in the Ordovician Eureka Quartzite (Ketner, 1976). This 15-ft- to 1,000-ft-thick bed of 99 ppercent SiO_2 rock extends from Idaho to California. The lead-zinc mineralization (Kelley mine) was much younger (Mesozoic-Cenozoic Era) and of a hydrothermal nature.

The barite deposits are of the bedded type (Papke, 1984). Lenses of barite-rich mudstone-argillite are interbedded with fine-grained rocks of marine origin. Phosphate is present as isolated nodules in black carbonaceous shale (Rogers and others, 1970). Oil shale and vanadium-enriched sediments are found in kerogen-rich mudstone, siltstone, dolomite, and chert (Poole and Desborough, 1980).

The gold-silver mineralization was of a hydrothermal nature. The Roberts Mountains has undergone several periods of extensive faulting. Mineralized intrusive bodies, for example the Mount Hope stock 10 mi to the southeast, are present in the region. The faulting produced zones of weakness making large areas of rock susceptible to fluid migration. This combination of porous rock and nearby heat sources resulted in fluid movement and hydrothermal alteration of the enclosing rocks. Large areas of partially to totally silicified rock found in the Roberts Mountains are evidence of this strong hydrothermal activity.

MINES, PROSPECTS, AND MINERALIZED AREAS

Mining History

Prospecting in the area began in the early 1900's with the location of the Kelley and Belmont claims (fig. 2). According to Vanderburg (1938), 350 tons of rock were shipped from the Kelley mine during this time. The property laid idle until 1937 when 47 tons were mined from dumps. The 47 tons averaged 0.8 oz/ton silver, 9.6 percent lead, and 39.8 percent zinc. From the condition of the property in 1984, it appears that no work has been done since the late 1930's. From the 1930's until the early 1960's only small-scale prospecting (some minor vanadium exploration in the 1950's) was done in the Roberts Mountains. Since the early 1960's extensive precious metals exploration has been conducted in the Roberts Mountains. During the late 1970's and early 1980's extensive exploration for barite was done in the Roberts Mountains, resulting in development of the Bat, Bar, and Firecracker claims. Ten thousand tons were mined from the Bat and Bar claims (Lester Bisoni, personal commun., 1984), and several hundred tons from the Firecracker claims (C. R. Davis, personal commun., 1984). With the decline of oil prices and concomitant decrease in world-wide drilling activity in the 1980's, the demand for barite also decreased, resulting in closure of these mines.

The WSA lies in the Battle Mountain-Eureka mineral belt (Roberts, 1966) that includes the Battle Mountain, Lewis, Bullion, Gold Acres, Cortez, Roberts, Antelope, Mt. Hope, Lone Mountain, and Eureka mining districts. Part of the Antelope district is in the WSA. In the past few years, major metal deposits have been found within this belt. Included in these discoveries are the Mt. Hope molybdenum deposit (Tingley and

Smith, 1982), a gold deposit at Tonkin Springs (Hardisty, 1983), the Gold Bar deposit (Skillings Mining Review, 1984), and the Buckhorn gold-silver mine (Monroe, 1984). The Buckhorn mine is 20 mi northwest of the WSA.

Recently the Roberts Mountains has undergone extensive precious metals exploration. All of the active claims shown on figure 3 are for precious metals except the Bat, Bar, Firecracker, and Kelley claims. Sample data from six companies show that 128 anomalous gold samples (above 0.01 ppm gold) were taken throughout or very near the WSA. Geochemical anomalies are known to extend into the WSA in at least three places. Several of the companies indicated that they would stake claims in, or that their claim blocks would extend deeply into, the Roberts WSA if it was not being considered for wilderness classification. All of the companies contacted feel that the Roberts WSA has a very good chance of containing precious metals resources, and ASARCO's Joy claim group contains several million tons of ore-grade (gold) material (P. Vikre, personal commun., 1985).

Mineral Sites Examined

Because of past and ongoing interest in precious metals occurrences in the Roberts WSA, all active and inactive claim areas were examined by the USBM. The areas around anomalous company sample sites were also examined by the USBM; according to company geologists such areas would most likely be claimed if the Roberts WSA was not being considered for wilderness classification. Also examined were areas of hydrothermal alteration extending from claim areas and anomalous company sample sites.

Before discussing the mineral sites in detail, some background on disseminated gold-silver deposits is in order. According to Argall (1985) such deposits can be very low grade [0.015 tr oz/st (0.514 ppm gold)] and still be mined at a profit. Such deposits often yield very vague, and by past mining standards, inconsequential surface sample results. The original samples taken at the Alligator Ridge gold mine [according to Jayne (1985), the sixth largest gold producer in the state of Nevada], produced sample results all under 0.45 ppm gold (Klessig, 1984). Levinson (1974) states that the average gold and silver content of the earth's crust is 0.004 ppm and 0.07 ppm, respectively; these values are below USBM sample detection limits. For rock originally containing gold-silver values below USBM detection limits to acquire ore grade values, it must have been acted on by ore forming processes. When an area displays signs of having undergone ore forming processes (silicification and brecciation), and a high percentage of samples from the area assay above the detection limit (some samples many times above detection), it can logically be concluded that the area has been mineralized.

Six such areas of gold-silver mineralization (fig. 3) in the WSA are discussed individually below. Six additional sites containing anomalous precious metals are described in table 1. This table appears at the end of the section.

Area I

Area I is in the west central portion of the WSA, mostly within the A. J. claim block (fig. 3). The area is mainly underlain by lower plate dolomite. Most samples were from brecciated and/or silicified rock, but some samples of weakly altered dolomite have gold values above detection. Area I is cut by an extensive fault system, which may have served as a conduit for gold mineralization. Fifteen random chip and grab samples were taken (fig. 6); 20 percent of the samples assayed no gold and silver, 73 percent of the samples had gold above the detection limit, and 7 percent of the samples had gold and silver above the detection limit. One sample (0.335 ppm gold) is near the cutoff grade of present day mining operations.

Area II

Area II is in the central portion of the WSA, located in an area of company anomalous samples linking the A. J. and C. P. claim blocks (fig. 3). The area is underlain by lower plate limestones, dolomites, and cherts. Most samples were from brecciated and/or silicified rock, but a few samples of fresh-looking rock had values above detection limits. Murphy and others (1978) indicate a major northeast-trending fault zone cuts across Area II; most of the anomalous values appear to be associated with this fault zone. Sixteen random chip or grab samples were taken (fig. 6); 31 percent of the samples assayed no gold and silver, 31 percent had gold above the detection limit, and 38 percent had both gold and silver above the detection limit. One sample (0.326 ppm gold) is near the cutoff grade of present day mining operations, and one sample (0.818 ppm gold) is of ore grade.

Area III

Area III is on the eastern edge of the WSA, mostly within the C. P. and R. C. claim blocks (fig. 3). Area III is predominantly a large area of partly to completely silicified rock lying on the east flank of Roberts Creek Mountain (fig. 7). All samples were random chip or grab from both upper and lower plate rocks (except three samples from volcanic rocks). Most samples were from brecciated and/or silicified rock roughly aligned along the Roberts Mountain thrust system. Of the one hundred and thirty-eight samples taken (fig. 8), 36 percent contained no gold and silver, 11 percent had gold above the detection limit, 41 percent had silver above the detection limit, and 12 percent had gold and silver above the detection limit. Two samples (0.280 and 0.292 ppm gold) are near the cut-off grade of present day mining operations.

Several locations in Area III have anomalous precious metal values that warrant further work. The most promising location is situated in the east-central portion of Area III. Here a zone of very strongly silicified rock is at the intersection of the major northeast-trending fault zone of Area II, and the Roberts Mountain Thrust. In this area three samples had gold above ten times the detection limit (0.071, 0.101, 0.107 ppm) and four samples had silver above ten times the detection limit (4.339, 4.615, 6.331, and 9.756 ppm).

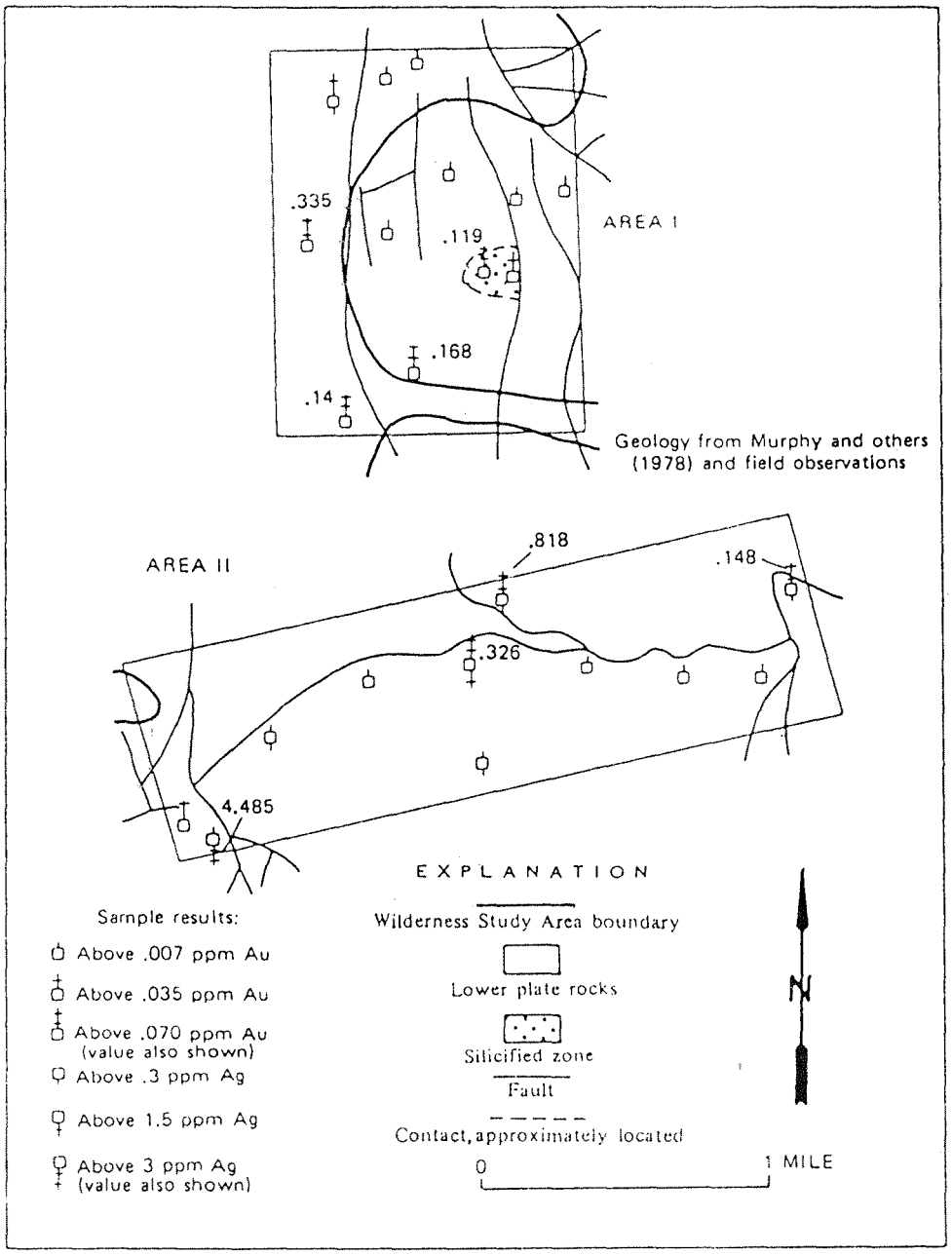


FIGURE 6. – Areas I and II, sample data

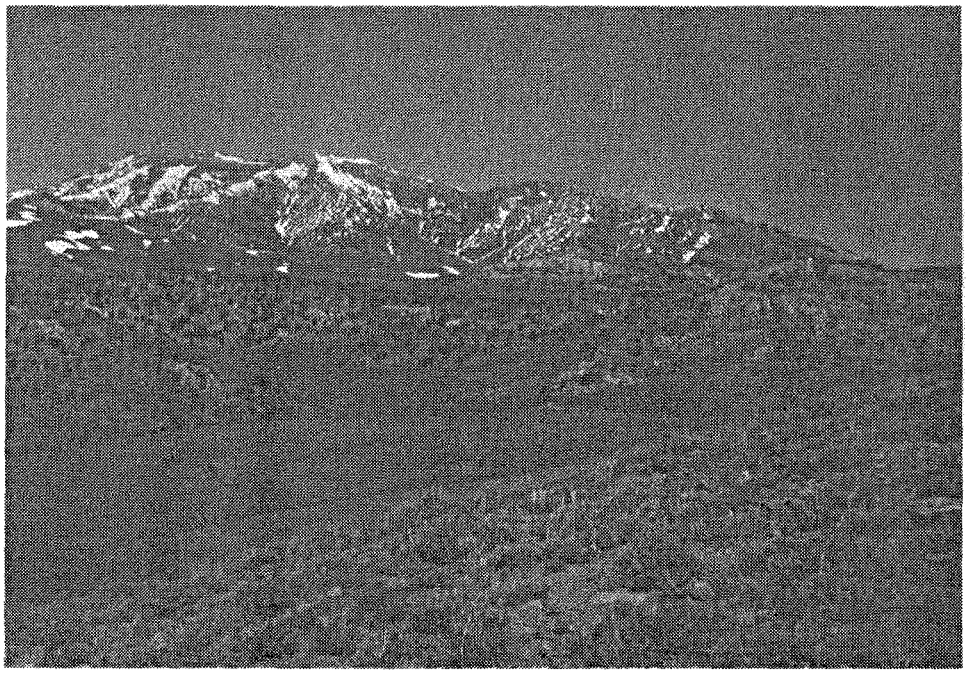


FIGURE 7.--Roberts Creek Mountain (10,133 ft) in Area III, viewed toward the east.

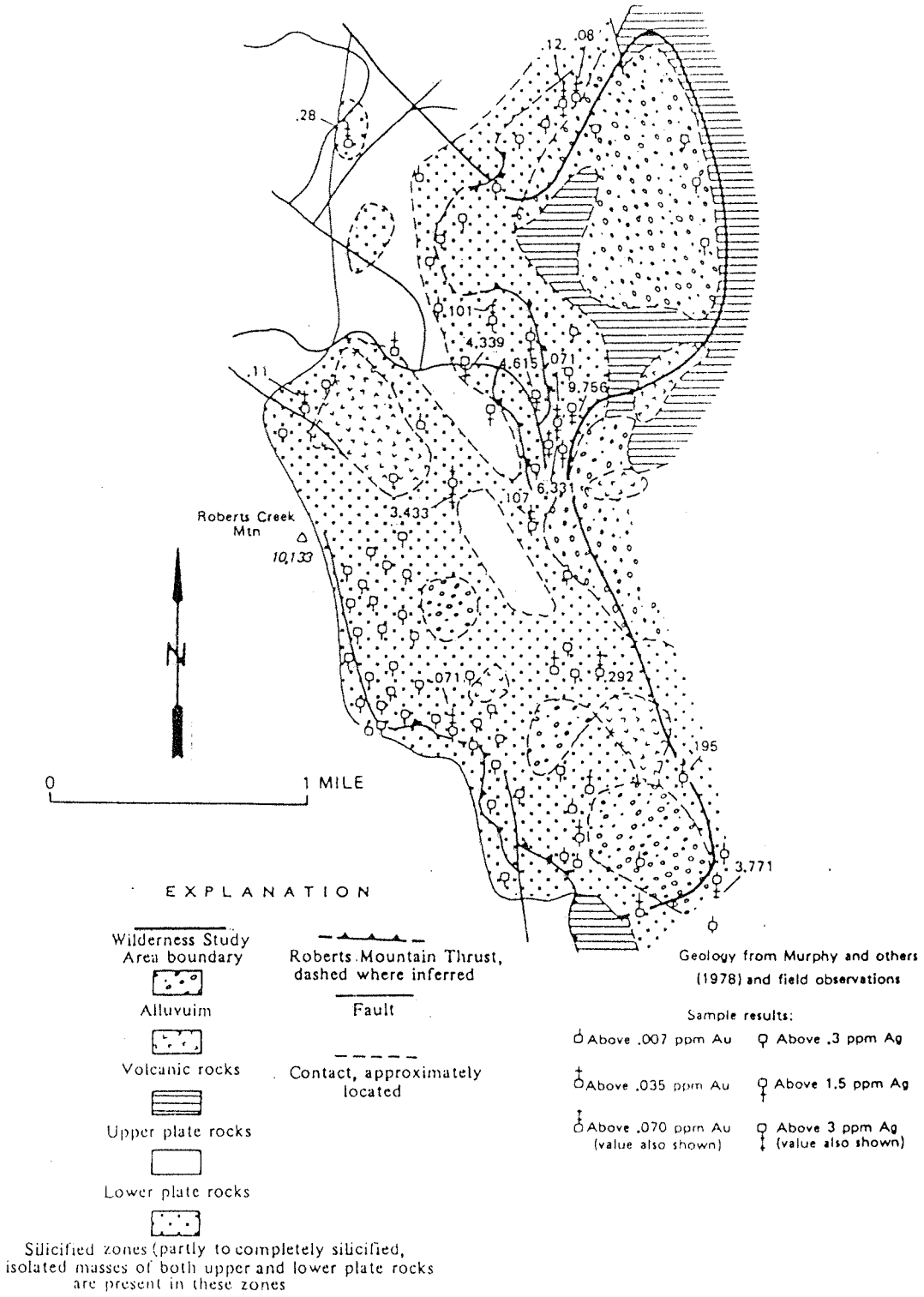


FIGURE 8. – Area III, sample data

Area IV

Area IV is in the southeast portion of the WSA, between the R. C. and Lyndall claim blocks (fig. 3). This anomalous area is very subtle (no silicification or iron oxides). The rock is tan-gray dolomite, with minor calcite veining and weak alteration present in some samples, Murphy and others (1978) indicate several faults cross the anomalous zone. Seven random chip samples were taken (fig. 9) and all contained gold above the detection limit. One sample (0.25 ppm gold) is near the cut-off grade of present day mining operations.

Area V

Area V is in the southwest portion of the WSA, just west of the Lyndall claim block (fig. 3). The area is composed mainly of partly to completely silicified rock which roughly bounds the Roberts Mountain thrust system. Twenty-six random chip or grab samples were taken (fig. 9); 58 percent contained no gold and silver, 23 percent had gold above detection, 15 percent had silver above detection, and 4 percent had both gold and silver above the detection limit. None of the samples assayed near the cut-off grade of present day mining operations. Area V in places appears to be just as intensely altered as Area III, but contains none of the high gold-silver values of Area III. This may mean that Area V is not as mineralized as Area III, or it may mean that not enough samples were taken in Area V to uncover the higher grade portions of the mineralized zone.

Area VI

Area VI is in the southwest portion of the WSA, just outside the A. J., Red Canyon, S. D., and Ziff claims (fig. 3). It is underlain by lower plate limestone or dolomite and upper plate shale. No large areas of silicified rock are present in Area VI (as in Areas III and V). Brecciation and silicification were confined to northwest-trending fault zones. Twenty-nine random chip or grab samples were taken (fig. 9); 28 percent contained no gold and silver, 24 percent had gold above the detection limit, 34 percent had silver above the detection limit, and 14 percent had both gold and silver above the detection limit. One sample (0.275 ppm gold) is near the cutoff grade of present day mining operations.

Kelley Mine

Workings on the Kelley 1-4 claims consist of five adits, estimated to total 260 ft, and three pits (fig. 10). According to Murphy and others (1978), the workings are in lower plate limestone and dolomite, dipping 30°-40° E., which have been intruded by numerous north-northwest trending basalt dikes. A major reverse fault (N. 20° E.) follows West Fork Kelley Creek.

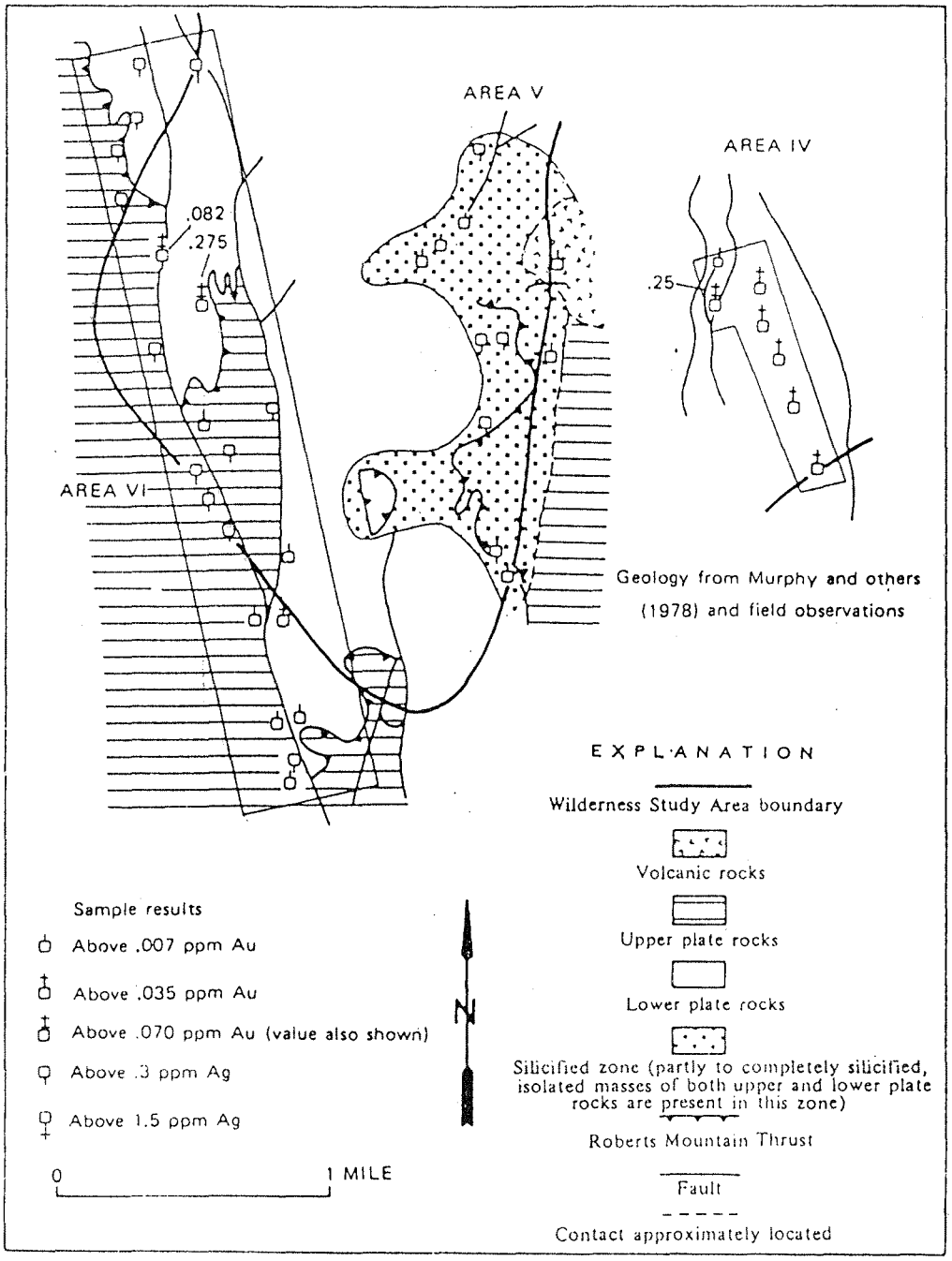


FIGURE 9. – Areas IV, V, and VI, sample data

Mineralization was apparently confined to either a single shear zone that has been offset by later cross faults or a series of parallel shear zones. The irregular, discontinuous zones strike N. 5°E. to N. 10° W., dip 40° E. to 50° W., and average 2.8 ft thick. They contain a variable mixture of sphalerite, galena, calcite, quartz, and barite. Samples from the zones average 0.02 ppm gold, 8.02 ppm silver, 2.13 pct lead, and 3.85 pct zinc. Analyses and descriptions for all Kelley mine samples are in the unnumbered table accompanying figure 10. If the mineralization was related to basalt intrusion, major deposits are unlikely. If it was related to hydrothermal fluids moving along the reverse fault, the exposed deposits may indicate that other hidden, possibly economic, deposits exist nearby.

Other Commodities

Silica (high purity quartzite, 99 percent SiO_2) is present in huge amounts in lower plate rocks in the WSA (Ketner, 1976), but the remote location of the WSA makes mining of this commodity very unlikely.

Barite, phosphate, oil shale, and vanadium are present in upper plate rocks in the Roberts Mountains (Rogers and others, 1970; Poole and Desborough, 1980; Papke, 1984), but only a small portion of the WSA is underlain by these rocks. Upper plate rocks in the WSA were examined for these commodities, but no workings or significantly mineralized rocks were found.

The northern and eastern fringes of the WSA are under oil and gas lease. No other mineral leases are present in the WSA.

APPRAISAL OF MINERAL RESOURCES

Three types of mineral deposits are present in the WSA; silica, lead-zinc, and gold-silver.

Millions of tons of 99 percent SiO_2 Eureka Quartzite are present in the WSA; but, the same formation outcrops from Idaho to California, at locations much closer to markets than the quartzite in the WSA. Mining of silica will not take place in the WSA in the foreseeable future.

A small deposit of lead-zinc minerals is present at the Kelley mine. A brief economic analysis shows that operating costs for an underground mine would be $54 per ton (shrinkage stopes, 4 ft mining width). Capital, development, milling, and smelting costs would be additional. The exposed deposits are obviously too small and low grade ($31 per ton value at June 1985 prices and 90 percent mill recovery) to be economic. The above economic analysis is based on the assumption that greater than 100,000 tons of sample average grade material is present. Such a tonnage was not observed by USBM personnel. The Kelley deposit is far too small and low grade to be mined in the foreseeable future.

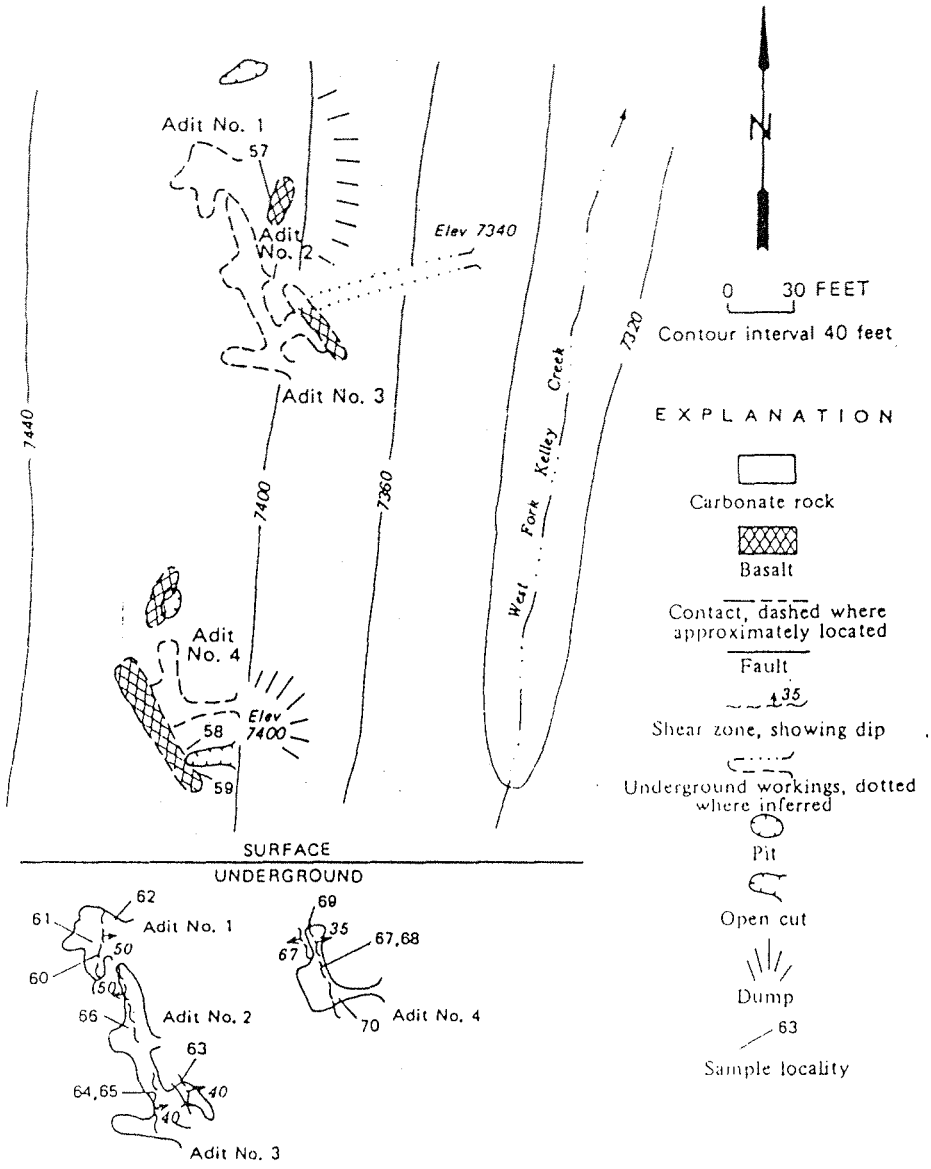


FIGURE 10. – Kelley mine

Data for samples shown on figure 10.
(N, none detected)

Sample No.	Type	Length (ft)	Description	Gold ppm	Silver ppm	Lead pct	Zinc pct	$BaSO_4$ pct
			Shear zone samples					
60	Chip	4.4	Shear zone: partly oxidized broken carbonate rock, galena, barite crystals----------	0.017	22.62	6.7	10.8	18.5
63	do--	3.0	Shear zone: partly oxidized, galena, sphalerite, barite----------	N	3.16	1.04	4.2	19.1
64	do--	3.0	Shear zone: mostly black oxide in a white quartz matrix----------	N	.43	.055	.242	.09
66	do--	1.5	do----------	.085	13.89	2.86	4.0	6.5
67	do--	2.3	Shear zone: brecciated carbonate rock---------	N	N	.016	.018	.03
			Hanging wall samples					
62	do--	2.0	Hanging wall: brecciated carbonate rock-------	N	.87	.187	.96	.25
70	do--	3.0	do----------	N	1.22	.135	1.4	N
			Footwall samples					
61	do--	4.0	Footwall: carbonate rock with minor calcite stringers----------	N	3.9	.88	2.04	1.68
65	do--	3.0	Footwall: silicified carbonate----------	N	.49	.042	.057	.08

Data for samples shown in figure 10--Continued

Sample No.	Type	Length (ft)	Description	Gold ppm	Silver ppm	Lead pct	Zinc pct	$BaSO_4$ pct
			Footwall samples--Continued					
68	Chip	4.0	Footwall: fractured carbonate rock, minor calcite stringers----------	N	N	0.004	0.004	N
59	do--	2.0	Basalt dike: black, fine-grained----------	N	N	.012	.079	.09
			Basalt-carbonate contact samples					
57	Chip	2.0	Basalt-carbonate rock contact: fractured, minor calcite veins----------	0.012	N	.013	.1	.21
58	do--	1.0	Basalt-carbonate rock contact: brecciated carbonate rock, strong iron oxide boxwork texture, fine-grained galena and sphalerite----	.046	16.54	1.33	9.2	N
69	do--	1.0	Basalt-carbonate rock contact: fractured, silicified carbonate rock----------	N	N	.007	.004	N

TABLE 1.--Sites having anomalous gold and/or silver in the Roberts Wilderness Study Area

Location, figure 3	Name	Summary	Workings	Resource and sample data
A	Mineralized outcrop	Gray-brown dolomite has moderate calcite veins, and iron-oxide staining on fracture surfaces.	None.	One random chip sample: 0.124 ppm gold, no silver detected.
B	Mineralized outcrop	Light gray, fractured, sugary dolomite has minor calcite veins.	None.	One random chip sample: 0.056 ppm gold, 0.73 ppm silver.
C	East Fork Kelley Creek prospect	A 1- to 4-ft-thick silicified shear zone in dolomite strikes N. 50°-80° E. and dips near vertical. Red-yellow iron-oxide stained fracture surfaces.	One 35-ft-long adit bearing N. 50° E. and one 10-ft diameter, 3-ft-deep pit.	Three chip samples taken across adit back: one had 0.008 ppm gold. One chip sample in pit: no gold or silver detected.
D	Mineralized outcrop	Silicified, dark red breccia zone strikes northwest in carbonate rock. It is irregular in shape and 10 to 20 ft thick.	None.	One random chip sample: 0.069 ppm gold, 0.52 ppm silver.
E	Prospect	Basin contains large area of sugar-textured dolomite, much of which has light to heavy iron oxide stain. Some areas are brecciated and silicified.	One hundred fifty-ft long, 10-ft-wide bulldozer cut, trending N. 60° W.	One random chip in trench: 0.033 ppm gold, no silver detected. One random chip from an outcrop: 0.041 ppm gold, no silver detected.
F	Mineralized outcrop	Twenty-ft-thick zone of totally silicified Vinini Formation breccia strikes N. 35° W., 90°.	None.	Two random chip samples taken 1,000 ft apart on the zone: 0.065 and 0.018 ppm gold, 1.254 and 1.295 ppm silver.

Gold and silver appear to be the only mineral commodities which may be mined in the foreseeable future in the WSA. USBM studies outlined six areas (fig. 3) where gold and silver resources may occur. These areas show visible signs of having undergone ore-forming processes (silicification and brecciation). High percentages of samples are anomalous in gold and/or silver, with some gold values approaching and, in one case, exceeding present day mining cut-off grade limits. Area III, located on the east side of the WSA, has the best indications of resources. Area III has the largest zone of altered rock, the greatest number of anomalous samples, and is right on trend with similiar altered rock located just northeast of the WSA (Joy claims). P. Vikre (personal commun., 1985) states that the Joy claim group contains several million tons of ore-grade (gold) material.

No deposits of barite, phosphate, oil shale, or vanadium were observed in the WSA by USBM personnel; but future mining of such deposits immediately adjacent to the WSA may impact the WSA.

RECOMMENDATIONS FOR FURTHER WORK

Because disseminated gold-silver deposits are very nebulous in outline (in many cases mineralized rock is visibly very similiar to barren material), the only way to precisely pinpoint resource locations is to take a great number (many times that taken during the present USBM effort) of surface and underground (drill) samples.

All six sites discussed in this report should be resampled at a much closer sample spacing. The area around the trench in sec. 4, T. 23 N., R. 50 E. (E on fig. 3) and the mineralized outcrop in sec. 14, T. 23 N., R. 50 E. (F on fig. 3) should also be resampled at a much closer sample spacing. Any anomalous areas outlined by this second phase of sampling would need to be explored by reverse circulation drilling to fully delineate resources.

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