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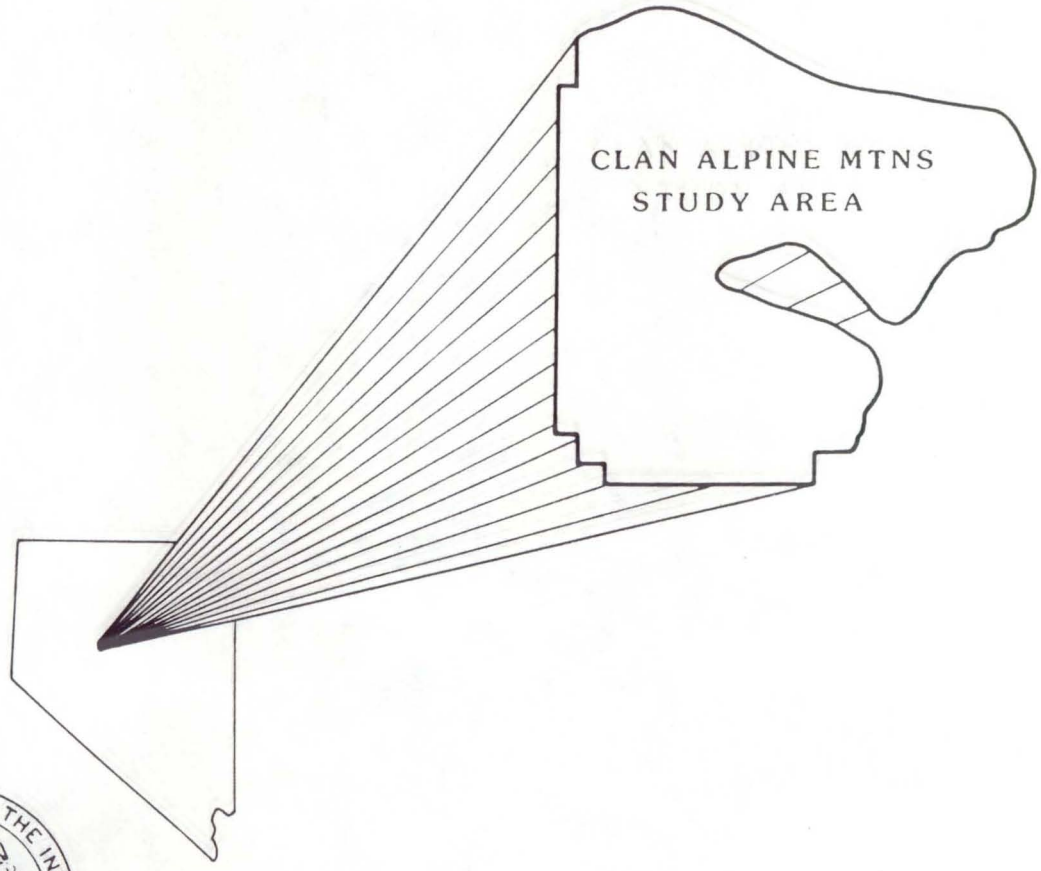
Open File Report

Mineral Resources of the Clan Alpine Mountains Study Area, Churchill County, Nevada



BUREAU OF MINES

UNITED STATES DEPARTMENT OF THE INTERIOR

MINERAL RESOURCES OF THE CLAN ALPINE MOUNTAINS STUDY AREA, CHURCHILL COUNTY, NEVADA

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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 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 a portion of the Clan Alpine Mountains Wilderness Study Area (NV-030-102), Churchill 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 Avenue, 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

In 1985 the U.S. Bureau of Mines conducted a mineral survey of 68,458 acres of the Clan Alpine Mountains Wilderness Study Area (NV-030-102) which covers 196,128 acres in Churchill County, NV. Most of the area studied is underlain by Tertiary volcanic rocks. In the northeast corner of the study area, an upthrown block of Triassic sedimentary rocks partially extends into the area. The study area is probably part of a large eroded caldera.

No major mines or active claims are within the study area. Field investigations included examination of workings in Starr Canyon, historical and recent mining activity near the mouth of Florence Canyon, other mining claims, and anomalous zones delineated by data from Great Basin GEM Joint Venture studies. No mineral resources were identified, but sample results indicate one significant mineralized zone situated along a northwest trend between the head of Starr Canyon and the head of Cherry Creek may contain precious metal resources. Further investigation of this zone is warranted.

INTRODUCTION

This report describes the USBM (U.S. Bureau of Mines) portion of a cooperative study with the USGS (U.S. Geological Survey) conducted to evaluate mineral resources and potential of the Clan Alpine Mountains study area at the request of the BLM (U.S. Bureau of Land Management). The USBM examines individual mines, prospects, claims, and mineralized zones, and evaluates identified mineral and energy resources. The USGS evaluates potential for undiscovered resources based on areal geological, geochemical, and geophysical surveys. Results of the investigation will be used to help determine the suitability of the study area for inclusion into the National Wilderness Preservation System. Although the immediate goal of this and other USBM mineral surveys is to provide data for the President, Congress, government agencies, and the public for land-use decisions, the long-term objective is to ensure the Nation has an adequate and dependable supply of minerals at a reasonable cost.

Setting

The USBM studied the southern portion of the Clan Alpine Mountains WSA (Wilderness Study Area) which is in the eastern part of Churchill County, NV, within the southern portion of the Clan Alpine Mountains (fig. 1). The study encompassed 68,458 acres of the 196,128-acre WSA (fig. 2). Elevations range from about 4,000 ft (feet) along the western range front to 9,966 ft at the summit of Mount Augusta. The east and west sides are accessible year-round, but snowfall may restrict access to the northern, southern, and interior sections of the WSA. Vegetation includes pinon pine, juniper, and sagebrush; grass is restricted to higher elevations.

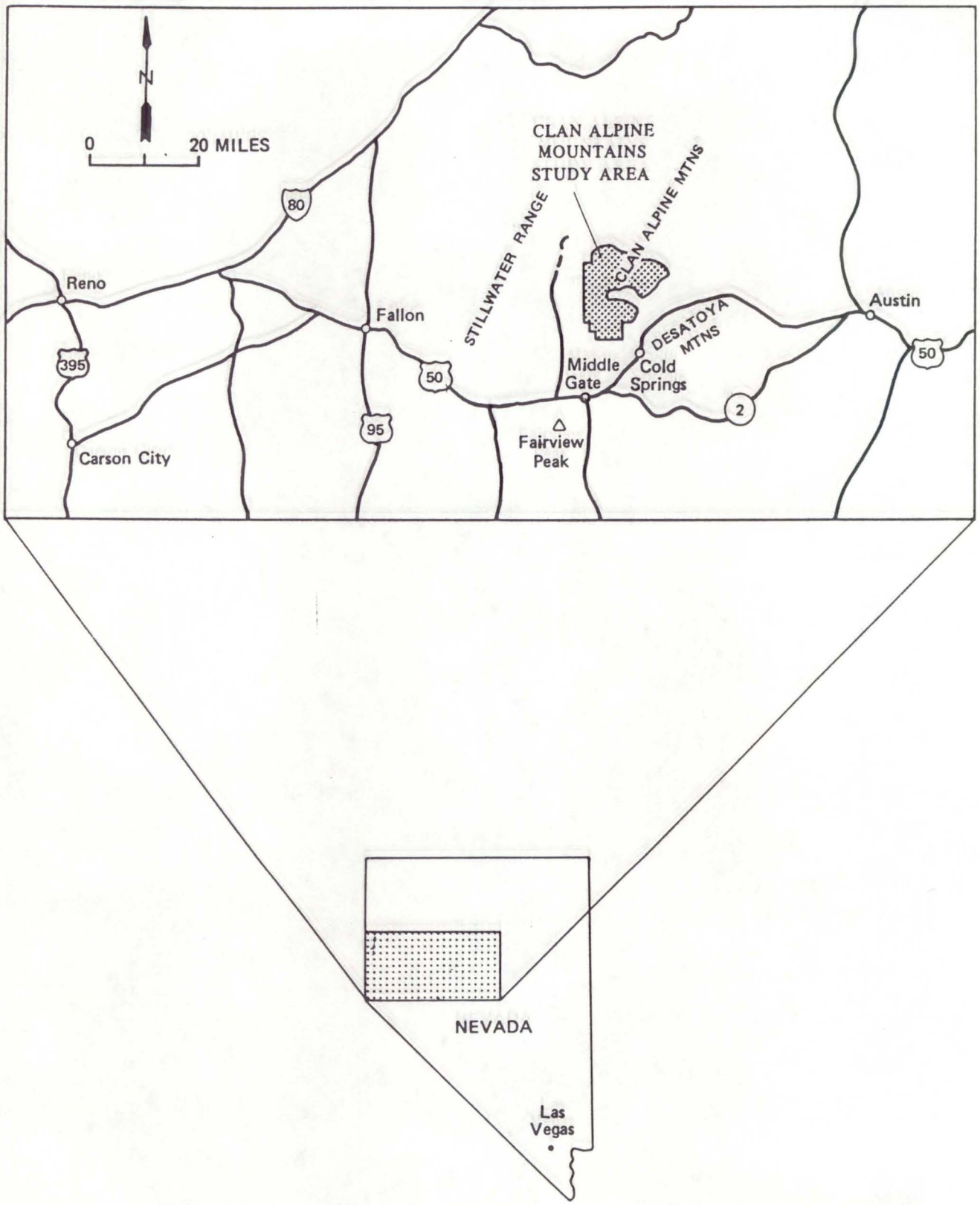

FIGURE 1. – Location of the Clan Alpine Mountains study area, Churchill County, NV

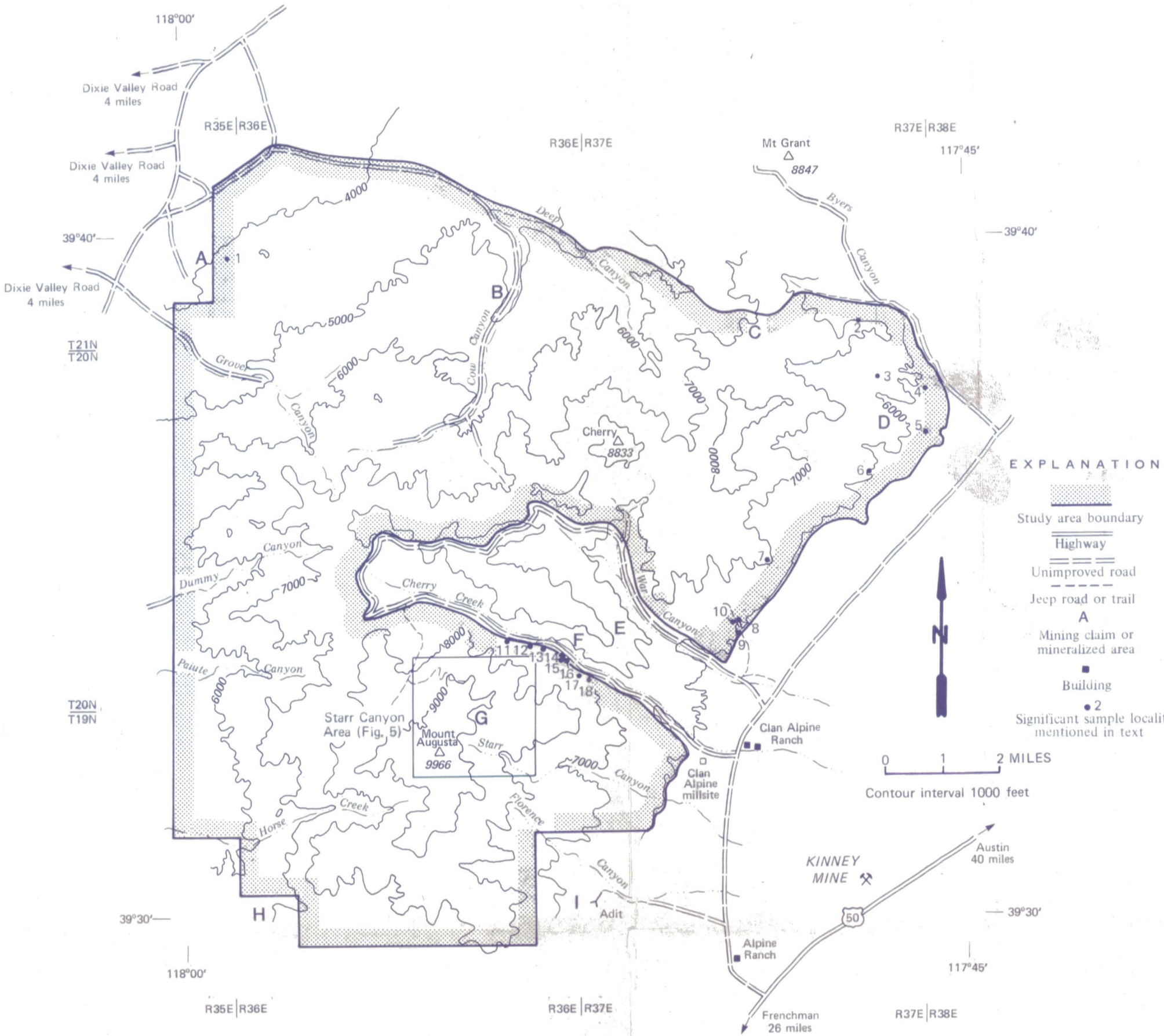

FIGURE 2.– Mines, prospects and selected sample sites of the Clan Alpine Mountains study area, Churchill County, NV

TABLE 1.--Selected sample results from prospects and mineralized areas in the Clan Alpine Mountains study area

Sample			Analyses	
No. (fig. 2)	Type	Description	Gold (ppm)	Silver (ppm)
1	Chip--	Gray-purple, silicified rhyolite----------	0.102	1.822
2	do----	Milky quartz and silicified breccia--------	.107	1.819
3	do----	White, bleached, silicified rhyolite breccia----------	.073	1.729
5	do----	Silicified rhyolite breccia----------	.021	2.104
6	do----	Breccia in fault zone; N. 70° W., 90°------	.120	.64
11	do----	Breccia in fault zone; N. 70° W., 90°------	.211	1.158
12	do----	Rhyolite breccia zone; N. 20° E., 80° SE.--	.047	1.477
13	do----	Rhyolite breccia zone; N. 30° E., 90°------	.032	.927
14	do----	Silicified rhyolite breccia; 50 ft thick, trends east-west----------	.036	1.049
15	do----	do----------	.041	2.209
16	do----	Fault 0.1-0.7 ft wide; N. 70° W., 65° NE.--	.039	.859
17	do----	Buff aplite(?) with disseminated pyrite----	.069	1.597
18	do----	Silicified rhyolite in fault zone; N. 20° E., 90°----------	.038	6.153

Previous Studies

Geology and mineral resources of Churchill County and central Nevada are discussed by Vanderburg (1940) and Willden and Speed (1974). Results of geochemical studies of the Clan Alpine Mountains are provided by Great Basin GEM Joint Venture (1983b). A history of mining in Churchill County is summarized by Vanderburg (1940). Geology of the southern Clan Alpine Mountains is reported by Riehle and others (1972). A reconnaissance of mining districts in the Carson Sink area is described by Schrader (1947).

Present Study

Prefield investigations included library research for pertinent literature, a search of BLM and Churchill County records for claim locations, and an examination of USBM production records. Claim owners were contacted for additional information and for permission to examine and publish data on their properties. The USBM MILS (Mineral Industries Location System) was also searched for property locations within the area studied.

Field work, conducted during May and June of 1985, included searching for and examining all mineral properties and areas of indicated mineralization identified in the prefield study. Ground and aerial reconnaissance of the entire study area was also performed to locate unknown claims, prospects, or mineralized areas. All sites found were sampled and, if warranted, mapped.

Chip samples were taken either across a mineralized structure or taken intermittently in areas of alteration or disseminated mineralization. Grab samples were taken selectively at sites where no outcrops were available or from mine dumps.

A total of 198 rock samples were taken within the area studied. Selected rock samples were analyzed for uranium, and all rock samples were analyzed for gold and silver by an inductively coupled plasma, atomic absorption, or other quantitative method. Detection limits for gold and silver were 0.007 and 0.3 ppm (part per million), respectively. All uranium analytical results were above detection limits. Most samples were submitted for semiquantitative spectrographic analysis for 40 elements 1/ to detect unusual amounts of unsuspected elements.

1/ Aluminum, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, calcium, chromium, cobalt, copper, gallium, gold, iron, lanthanum, lead, lithium, magnesium, manganese, molybdenum, nickel, niobium, palladium, phosphorous, platinum, potassium, scandium, silicon, silver, sodium, strontium, tantalum, tellurium, tin, titanium, vanadium, yttrium, zinc, zirconium.

Petrographic samples were analyzed for rock type, petrogenesis, alteration assemblages, and various other qualitative data. Samples thought to contain zeolites were analyzed by x-ray diffraction. Significant sample analysis results are listed in tables 1 and 2 and are discussed within the text, and the locations of the sites are shown on figure 2 or 5. Other sample data are available in the Clan Alpine Mountains WSA project file at the USBM, Western Field Operations Center, E. 360 Third Ave., Spokane, WA 99202.

ACKNOWLEDGEMENTS

USBM physical scientist David Benjamin assisted with prefield and field work. Appreciation is also extended to USBM supervisory physical scientist Nicholas T. Zilka who assisted with part of the field work and to Mr. P. A. Patnoude for facilitating a base camp at Cold Springs, NV.

GEOLOGIC SETTING

The Clan Alpine Mountains are within the Basin and Range physiographic province, which is characterized by northeast-trending, fault-bounded mountain ranges and valleys. The study area is at the southern end of the Clan Alpine Mountains, within an upthrown fault block. Fault scarps along the eastern margin of the Stillwater Range and along the eastern range front of Fairview Peak (fig. 1) reflect regional vertical displacement as recently as 1954.

The entire study area is probably part of a large eroded caldera structure (Riehle and others, 1972, p. 1383). Because this type of environment is known to host some base and precious metal deposits in Nevada (McKee, 1979, p. 210; Sillitoe and Bonham, 1984; Worthington and others, 1980), and this study identified mineralized sites possibly of this origin, a more detailed description of the geologic setting (mostly from Riehle and others, 1972) follows.

The Clan Alpine Mountains are comprised predominantly of two contemporaneous, but distinct, Tertiary rhyolitic sequences, separated by an upthrown block of Triassic siltstone and shale (fig. 3). The northern sequence consists of fairly uniform, well-stratified ash-flow sheets, up to 1,600 ft thick, ranging in age from 22 to 30 m.y. (million years). The southern sequence of similar age, comprising most of the area of this study, includes rhyolitic tuffs, flows, and domes up to 16,000 ft thick. The difference in thickness and geologic complexity between the southern and the northern sequences suggests that the southern sequence probably originated from local sources and was deposited in a depressional environment. A northwest-trending fault near Byers Canyon (fig. 3) is probably the northern wall of the caldera-like depression that separates the north and south sequences. The north-south dimensions of the inferred caldera may exceed 12 mi based on the continuity of thick tuffaceous rocks at Cherry Valley. Additionally, age and structural features of rocks in the Desatoya Mountains are similar to those in the study area, suggesting that the volcano-tectonic environment of the southern sequence probably extended further to the east.

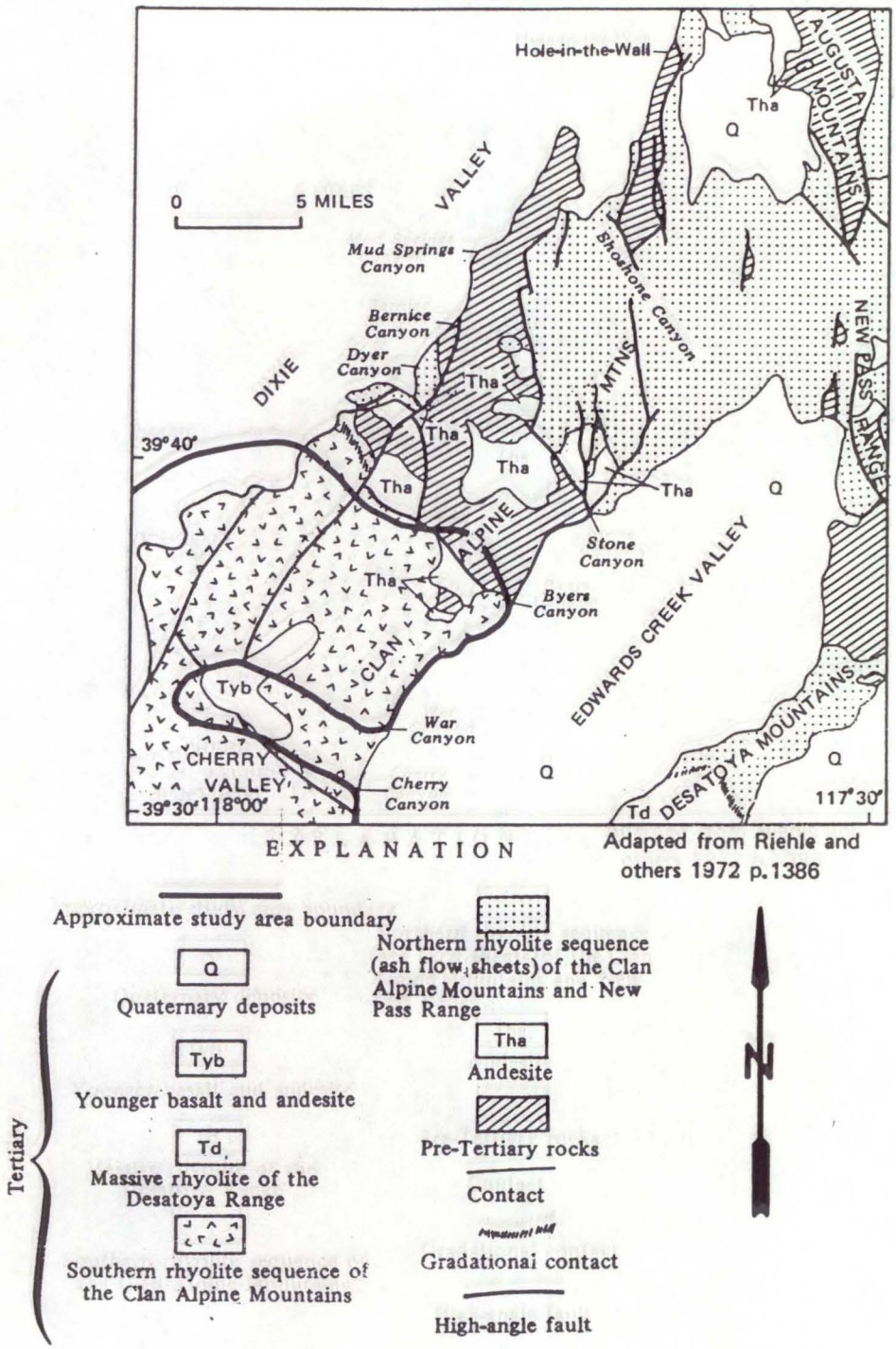

FIGURE 3. – Generalized geologic map of the Clan Alpine Mountains, showing the distribution of southern and northern rhyolite sequences

Riehle and others (1972) subdivided the southern sequence into eight mappable units consisting of a basal andesite that predates the evolution of the volcanic center, five rhyolite units that constitute the bulk of the caldera-forming episode, a younger rhyolitic tuff, and more recent basalt and andesite flows (fig. 4). Deposits hosted by the Tertiary, caldera-related units occur in and near the study area. These include quartz veins in rhyodacite in Florence Canyon, and veins and disseminations in Starr Canyon, along Cherry Creek, and near Byers Canyon. These latter occurrences are discussed in greater detail in later sections.

Part of an upthrown block of Triassic siltstone and shale, estimated to have a stratigraphic thickness of 20,000 ft (Willden and Speed, 1974, p. 44), extends into the northeast corner of the study area. No significant mineral deposits were identified.

Skarn type deposits, hosted by Mesozoic sediments in contact with Cretaceous intrusive rocks, occur at the Tungsten Mountain mine and the Crescent Canyon deposits north of the study area. The Nevada Gold Group, located north of the study area in Stone Canyon, is also hosted by Mesozoic rocks, occurring as a quartz-calcite vein along a granodiorite dike (Willden and Speed, 1974, p. 60). These types of relationships are not known to exist within the study area.

MINING HISTORY

Prospecting in Churchill County began about 1860 following the discovery of the Comstock Lode in western Nevada. Although this discovery motivated a great deal of prospecting, no important deposits were discovered in the county until the Fairview mine, south of U.S. Highway 50 near Middle Gate, in 1905, and the Wonder mine, near the southwest corner of the study area, in 1906 (Vanderburg, 1940, p. 10).

Prior to the Fairview and Wonder discoveries, numerous mining districts were established within the Clan Alpine Mountains. Of these, only the Alpine (Clan Alpine) district is inside the study area. This district was created in 1864 as a result of the discovery of silver in the vicinity of Florence Canyon. In 1866, in support of this mining activity, the Silver Lode Mining Co. built a 10-stamp mill at the mouth of Cherry Creek (Clan Alpine Canyon). Mining in the area was short-lived, however, and the mill was abandoned within a few years. Total production from the mill was small, probably less than a few thousand dollars in gold and silver ore (Vanderberg, 1940, p. 15). Stone remnants of the mill buildings are still standing today (1985) (fig. 2). Subsequent mining within the district has been small-scale and sporadic, but deposits in lower Florence Canyon continue to sustain mining interest.

Other districts of importance near the study area and within the Clan Alpine Range include the Bernice district to the north, established about 1880, and the Wonder district to the southwest.

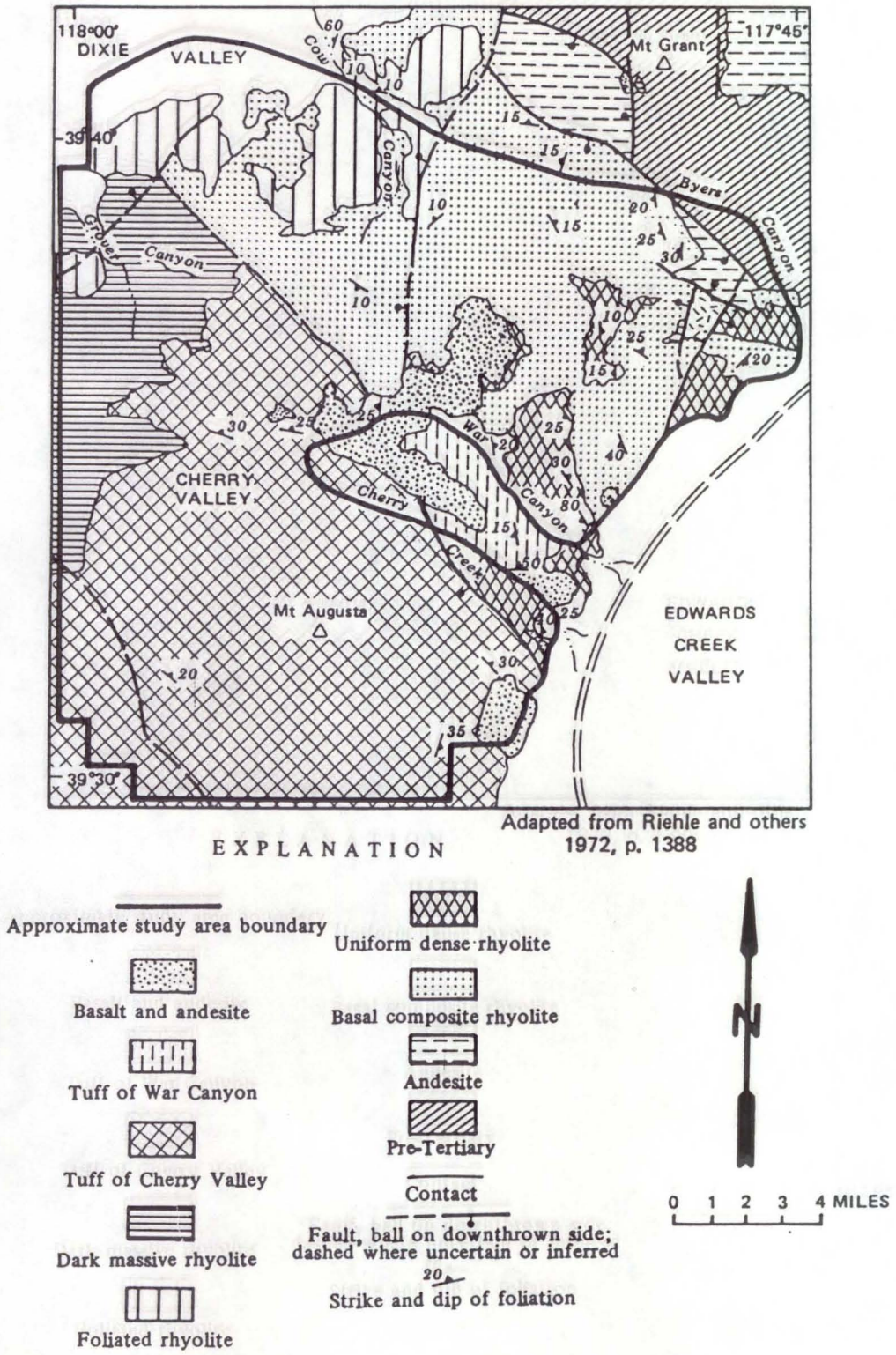

FIGURE 4. – Geologic map showing the distribution of Tertiary units, southern Clan Alpine Mountains

BLM mining records indicate that two areas within (fig. 2, B, C), two areas adjacent (fig. 2, E, H), and one area straddling the study area boundary (fig. 2, I) are under active or recent (1982) claims. Historical claim groups identified from Churchill County records include one totally within the WSA (fig. 2, G and fig. 5) and one straddling the study area boundary (fig. 2, A).

MINES, PROSPECTS, AND MINERALIZED AREAS

Starr Canyon Group

Churchill County mining records indicate a group of claims was located in 1907 by C.W. Kinney near the head of Starr Canyon (fig. 5). No current (1985) claims are known on the property. In an unpublished report on the Alpine mining district, Schrader (1947, p. 328) (field work performed from 1911-1920) described a group of workings, collectively named the Nevada Lincoln mine, located ". . . in the upper part of Clan Alpine Canyon 4 miles from its mouth, near the site of the Clan Alpine Mill. . . ." Because of the similarity of the Kinney claims in Starr Canyon to the Nevada Lincoln mine described in Clan Alpine Canyon (Cherry Creek), it is presumed that the Starr Canyon Group (Kinney claims) is the same as the Nevada Lincoln mine described by Schrader. Access to the workings within Starr Canyon is extremely difficult due to the lack of roads or trails within the canyon.

According to Schrader (1947, p. 328), the property was worked by Charles Kinney intermittently from about 1875 until it was acquired by the Nevada Lincoln Mining Company of Reno, NV, in 1915. Total production is unknown but assumed to be small, most of which was treated at the Clan Alpine Mill. In 1878-1879, Kinney is reported to have shipped six tons of gold and silver ore, mined from a 60-ft shaft, to Virginia City, NV, netting $80.00 per ton.

Field work during this study identified a 2-mi-long by 0.5-mi-wide zone of altered volcanic and minor intrusive rocks extending northwest from the head of Starr Canyon to the Williams prospect (Schrader, 1947, p. 330) near the head of Cherry Creek (fig. 5). Lithology includes rhyodacite, tuffaceous rocks, a small basalt cap, and minor intrusive rocks near workings in Starr Canyon. The entire zone is characterized by argillic and silicic alteration, crisscrossing iron-oxide-filled veinlets, and northeast-trending quartz veins. One petrographic sample of rhyodacite taken near the caved adit contained argillic and sericitic alteration of feldspars, limonite-stained crosscutting quartz veinlets, and occasional grains of adularia.

Workings near the head of Starr Canyon include four pits, one shaft, and two adits. The upper adit trends N. 70° E. for about 55 ft along a quartz-filled shear zone. The lower adit is caved at the portal but may be the same working described by Schrader (1947, p. 330) as a 600-ft crosscut tunnel. Workings further to the north and northwest include a 10-ft, S. 30° W. trending adit, one pit, two trenches, and a 500-ft-long bulldozer cut (probably the Williams prospect, from Schrader, 1947, p. 330).

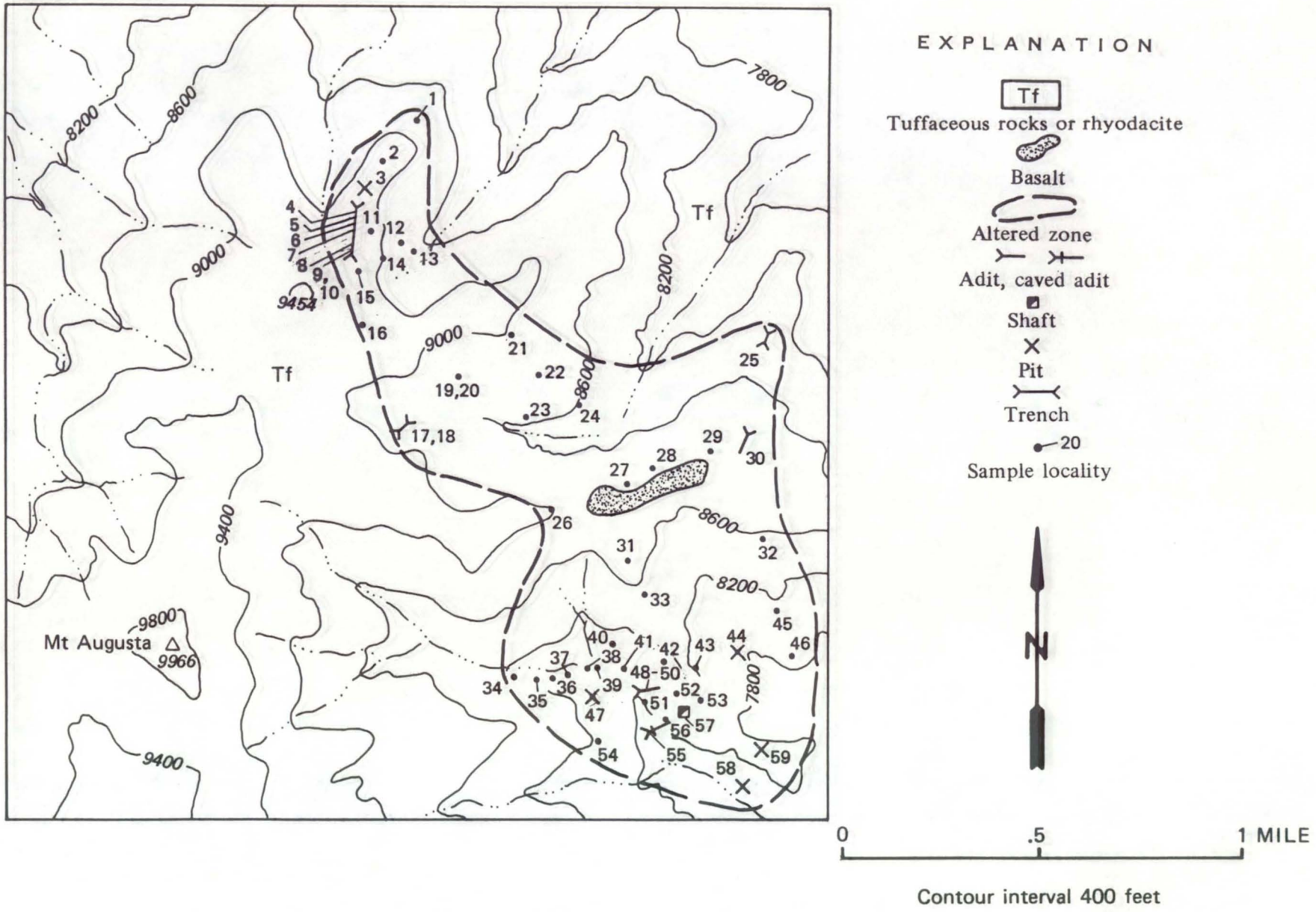

FIGURE 5. – Starr Canyon mineralized area within the Clan Alpine Mountains study area, NV

Table 2.--Sample results from the Starr Canyon area

[N, none detected]

Sample			Analyses	
No. (fig. 5)	Type	Description	Gold (ppm)	Silver (ppm)
1	Grab--	Gray-buff, iron oxide stained lapilli tuff.	N	0.57
2	Chip--	Iron oxide filled fault zone, 0.7-0.8 ft wide, east-west 90°----------	N	1.21
3	do----	Iron oxide filled fault 0.3 ft wide, N. 70° E., 40° W.----------	0.038	2.383
4	do----	Gray-buff, iron oxide stained tuff with manganese oxide on fractures----------	.017	.878
5	do----	do----------	.023	5.897
6	do----	do----------	N	2.581
7	do----	Unaltered zone of lapilli tuff----------	N	.36
8	do----	Gray-buff, iron oxide stained tuff with manganese oxide on fractures----------	.019	1.56
9	Grab--	Brown, manganese oxide stained gossan------	.031	15.37
10	do----	Gray-buff, iron oxide stained tuff with manganese oxide on fractures----------	.026	1.885
11	Chip--	Light blue lapilli tuff with argillized fragments and silicified matrix----------	N	.62
12	do----	do----------	N	1.313
13	do----	do----------	.051	13.02
14	do----	do----------	N	1.367
15	do----	do----------	.127	13.54
16	Grab--	Bleached lithic tuff----------	.018	N
17	Chip--	Shear zone in welded tuff N. 50° E., 90°---	.156	14.3
18	Grab--	Milky quartz and silicified vein material from dump----------	.113	.37

Table 2.--Sample results from the Starr Canyon area--Continued

Sample			Analyses	
No. (fig. 5)	Type	Description	Gold (ppm)	Silver (ppm)
19	Chip--	Silicified shear zone in welded tuff N. 60° E., 90°----------	0.195	116.0
20	do----	do----------	.019	4.93
21	Grab--	Bleached, moderately argillized tuff with minor iron oxides----------	.026	3.763
22	do----	do----------	.020	1.63
23	Chip--	Breccia zone in volcanic rock, partly silicified; trends N. 40° W.----------	.038	6.74
24	do----	do----------	N	1.035
25	Grab--	Iron oxide stained lapilli tuff----------	.077	1.537
26	Chip--	Green-gray, argillized tuff(?) with pervasive iron oxide on fractures---------	.062	1.658
27	do----	do----------	.040	.82
28	do----	do----------	.050	2.189
29	do----	do----------	.032	3.448
30	do----	Quartz-rich fault gouge, 1.5 ft wide, N. 30° E., 90°----------	.095	13.92
31	do----	White argillized tuff with disseminated and fracture filled iron oxide----------	N	.49
32	Grab--	Bleached, moderately argillized tuff with minor iron-oxides----------	.021	2.071
33	Chip--	Iron oxide filled veins and veinlets trending N. 30° E.----------	.029	2.331
34	do----	Argillized, bleached, iron oxide stained volcanic rock----------	.054	N
35	do----	Silicified, argillized, brecciated volcanic rock; zone strikes N. 65° E.----------	N	.66
36	do----	do----------	N	1.135

Table 2.--Sample results from the Starr Canyon area--Continued

Sample			Analyses	
No. (fig. 5)	Type	Description	Gold (ppm)	Silver (ppm)
37	Chip--	Argillized, bleached lithic tuff----------	N	0.58
38	do----	Moderately argillized and silicified lithic tuff----------	N	.67
39	do----	Argillized, bleached, iron oxide stained volcanic rock----------	0.114	.37
40	do----	White-gray, bleached volcanic rock with iron oxide filled veinlets----------	N	.51
41	do----	Strongly bleached and argillized volcanic rock----------	.111	.36
42	do----	White-gray, bleached volcanic rock with iron oxide filled veinlets----------	N	1.097
43	do----	Fractured fault zone with pervasive iron oxide staining----------	.020	.36
44	do----	Quartz-filled fault zone, 5-10 ft wide, N. 70° E., 50° NW.----------	N	5.902
45	Grab--	Bleached, moderately argillized tuff with minor iron oxides----------	.023	1.991
46	do----	do----------	.024	.74
47	Chip--	Blue-gray, altered volcanic rock----------	N	.53
48	do----	Milky, iron oxide stained crystalline quartz vein N. 70° E., 75° NW.----------	.017	.75
49	do----	Across adit portal through iron oxide stained intrusive rock----------	N	.84
50	do----	Milky quartz, brown fault gouge and unaltered country rock----------	.029	2.16
51	do----	Gray, altered tuff with pervasive iron oxide filled veinlets N. 80° E., 50° SE---------	.020	.59
52	do----	White-gray, bleached volcanic rock with iron oxide filled veinlets----------	N	.68

Table 2.--Sample results from the Starr Canyon area--Continued

Sample			Analyses	
No. (fig. 5)	Type	Description	Gold (ppm)	Silver (ppm)
53	Chip--	Quartz veins and veinlets up to 1.2 ft wide, N. 50° E., 65° NW.----------	0.043	1.144
54	do----	Blue-gray altered volcanic rock----------	N	.73
55	Grab--	Milky, crystalline quartz with iron oxide stain----------	.084	7.482
56	Chip--	Quartz and silicified country rock in fault N. 70° E., 90°----------	.060	3.474
57	do----	Quartz-rich fault zone, 8-10 ft wide, N. 90° E., 80° S.----------	1.792	123.0
58	Grab--	Bleached, moderately argillized tuff with minor iron oxides----------	.023	.82
59	Chip--	Quartz and iron oxide filled fault zone up to 1.0 ft wide, N. 70° E., 82° NW.--------	.036	1.485

Of 59 samples taken from the zone, 39 contained detectable gold ranging from 0.017 to 1.79 ppm, and 57 contained detectable silver ranging from 0.36 to 123 ppm. Excluding statistical outliers, analyses for gold and silver averaged 0.035 and 2.79 ppm, respectively 2/. A complete summary of sample analyses from the Starr Canyon group are listed in table 2.

Because of limited data and inaccessibility of the underground workings, resources for the area were not calculated. However, sample data indicate that small amounts of both gold and silver occur throughout the altered zone, with higher values occurring predominantly in faults or quartz veins.

Cow Group

Seventy-nine claims were located by Houston International (Tenneco) along a section of Cow Canyon in 1980 (fig. 2, B). Originally located to explore the uranium potential, the claims were dropped in 1982. Rocks within the area include Tertiary foliated and basal composite rhyolites. The upper end of Deep Canyon is separated from Cow Canyon by a north-trending fault (figs. 2 and 4). Of eight stream sediment samples taken during the GEM study within and downstream from the claim block, one was weakly anomalous for copper ". . . with two samples anomalous in antimony or zinc . . . " (Great Basin GEM Joint Venture, 1983a, p. 15). Two other stream sediment samples taken from the Deep Creek basin, adjacent to Cow Canyon, contained anomalous amounts of copper.

In an effort to investigate the possibility of resources, 27 rock chip samples were taken within the Cow claim block and adjacent areas. Of these, all were analyzed for gold and silver, 21 for uranium within Cow Canyon, and most subjected to semiquantitative spectrographic analysis. Gold and silver analytical results from the Cow Canyon drainage were either below or very near detection limits, and uranium ranged from 3.3 to 24 ppm, averaging 8.6 ppm. Gamma ray scintillometer readings at 22 sites were generally correlative with the uranium analyses, averaging 90 counts per second. Of six samples from the Deep Creek area, none contained detectable gold or silver. No other elements in unusual concentrations were found in either area.

Others

Of the six remaining claims or claim groups, one is outside the boundary (fig. 2, E), and mineralized zones on these claims do not extend into the study area. Two active (1983) claim groups within or adjacent to the study area (fig. 2, C, H), contained no workings or evident

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2/ Statistical outliers were 1.79 ppm for gold and 123 and 116 ppm for silver. A value of 0.0035 ppm for gold and 0.15 ppm for silver was used for analytical results below the detection limit.

mineralized character. One other historical claim (fig. 2, A) also contained no workings or apparent mineralization, but one sample from silicified rhyolite within the claim block (fig. 2, no. 1) contained 0.102 ppm gold and 1.822 ppm silver. Two other samples within the same area, however, provided no additional indication of resources. Deposits in the Florence Canyon area (fig. 2, I) do not appear to extend into the study area.

Ground reconnaissance and limited aerial observations identified no additional workings or claims; however, two areas with apparent mineralized character were defined. An area in the northeast corner of the study area (fig. 2, D) and another along a small section of Cherry Creek (fig. 2, F) contain weakly anomalous amounts of gold and silver (table 1). The zone along Cherry Creek may be linked to mineralization in Starr Canyon. No resources are apparent, but sample results and alteration patterns indicate further studies may be warranted.

A chip sample was taken from each of the five sites along the eastern side of the study area (fig. 2, nos. 4, 7-10) suspected to contain zeolite minerals. The major constituent in all five samples was quartz, with trace to minor amounts of mica and montmorillonite. Although analcime is not commonly a major constituent in zeolite-bearing rocks of Nevada (Papke, 1972, p. 1), one sample (fig. 2, no. 8) contained 52 percent analcime and another (fig. 2, no. 9) had 8 percent analcime and 6 percent clinoptilolite. Sample analyses from the other sites are considered insignificant.

All prospects, claims, and mineralized sites examined during this study are summarized on table 1.

APPRAISAL OF MINERAL RESOURCES

No resources were identified within or adjacent to the study area; however, one or more mineralized sites in the study area may be of interest. Gold and silver occur both in veins and in low-grade disseminated deposits at the Starr Canyon group, between the head of Starr Canyon and the upper end of Cherry Creek. Two areas (fig. 2, nos. 3-6 and nos. 11-18), in the northeast corner of the study area and along Cherry Creek, are weakly anomalous for gold and silver. Sample analyses and field examination of other claims or claim blocks within or adjacent to the area studied provided no evidence for mineral resources. Zeolite-bearing rocks on the eastern side of the study area may be of interest for their analcime content.

RECOMMENDATIONS FOR FURTHER STUDY

Additional studies for disseminated gold-silver resources are recommended for the Starr Canyon group. These could include a re-opening of the caved adit and detailed mapping and sampling of underground workings and close-spaced rock chip or soil sampling on the surface. A drilling program would be needed to delineate the grade and extent of mineralization. Additional close-spaced sampling and geologic mapping may also be warranted along Cherry Creek and in the northeast corner of the study area to further understand the nature and extent of the indicated anomalies.

TABLE 3.--Prospects, claims, and mineralized sites in the Clan Alpine Mountains study area

[*, outside study area]

Map letter	Name	Summary	Workings and production	Sample data
A	DV claims	Silicified rhyolite	None.	Of three chip samples, one contained 0.102 ppm gold and 1.822 ppm silver.
B	Cow claims (uranium)	Seventy-nine claims located on foliated and basal composite rhyolites.	None.	Of 27 chip samples, none contained detectable gold or silver. Uranium, in 21 samples, averaged 8.6 ppm.
C	Great Western	Bleached lithic tuff.	None.	Two chip samples contained no detectable gold or silver.
D	Mineralized outcrop (gold)	Rhyolite and rhyolite breccia.	One 2-ft adit.	Eight chip samples contained gold ranging from 0.032 to 0.211 ppm and silver ranging from 0.859 to 6.153 ppm.
* E	Artel	Not visited during this study.		
F	Mineralized outcrop (gold)	Silicified rhyolite and fault breccia.	None.	Five samples contained gold ranging from 0.021 to 0.120 ppm and silver ranging from 0.64 to 2.104 ppm.
G	Starr Canyon group	Two-mile-long by 0.5-mile-wide zone of altered volcanic and minor intrusive rocks containing disseminated and quartz vein gold and silver.	Three adits, one shaft, five pits, two trenches, and one dozer cut. Six tons of gold and silver ore produced in 1879 (Schrader, 1947, p. 328).	Of 59 grab and chip samples, 39 contained gold ranging from 0.017 to 1.79 ppm, and 59 contained silver ranging from 0.36 to 123 ppm. No resources were identified, but area has highly anomalous amounts of gold and silver.
H	MM group	Gray crystal tuff.	None.	Two chip samples contained no detectable gold or silver.
I	Joe group	Unaltered rhyodacite.	None.	Four chip samples contained no detectable gold or silver.

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