MINERAL RESOURCE POTENTIAL OF THE COYOTE SE AND TABLE MOUNTAIN ROADLESS AREAS, INYO COUNTY, CALIFORNIA

SUMMARY REPORT

By

Geoffrey S. Elliott and Maurice A. Chaffee
U.S. Geological Survey

and

Donald O. Capstick
U.S. Bureau of Mines

STUDIES RELATED TO WILDERNESS

Under the provisions of the Wilderness Act (Public Law 88-577, September 3, 1964) and related acts, the U.S. Geological Survey and the U.S. Bureau of Mines have been conducting mineral surveys of wilderness and primitive areas. Areas officially designated as "wilderness," "wild," or "canoe" when the act was passed were incorporated into the National Wilderness Preservation System, and some of them are presently being studied. The act provided that areas under consideration for wilderness designation should be studied for suitability for incorporation into the Wilderness System. The mineral surveys constitute one aspect of the suitability studies. The act directs that the results of such surveys are to be made available to the public and be submitted to the President and the Congress. This report discusses the results of a mineral survey of the Coyote SE (5033) and Table Mountain (5035) Roadless Areas in Inyo National Forest, Inyo County, California. The areas were classified as further planning areas during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

SUMMARY

A combined geologic and geochemical investigation and a survey of mines, prospects, and altered areas indicate that the Coyote SE and Table Mountain Roadless Areas contain some areas that have a low resource potential for tungsten and marble. Metallic mineral occurrences in these roadless areas are in metasomatic replacement-type tactite deposits. Tungsten, in the mineral scheelite, is the most important metal found in this region; other metals including molybdenum, copper, gold, and silver occur in small amounts in the tactite. A low resource potential for uranium exists in a small area of the southwestern part of the Coyote SE Roadless Area. Scheelite-bearing tactite with a low resource potential is identified at the Middle Fork Shannon prospects in the Coyote SE area and at the Chipmunk (Pickup) and Marble Tungsten mines adjacent to or along the area boundary; the Marble Tungsten mine also has a low resource potential for marble. A low resource potential for marble was also identified at quarries in the southeast corner of the Coyote SE Roadless Area. The Waterfall prospect on the boundary of the Table Mountain Roadless Area has a low resource potential for tungsten.

INTRODUCTION

The Coyote SE and Table Mountain Roadless Areas lie along the eastern front of the Sierra Nevada between Bishop and Big Pine, Inyo County, Calif. (fig. 1). They include approximately 58,300 acres in Inyo National Forest.

The two areas are east of the main crest of the Sierra Nevada, and range from about 12,000 ft above sea level near the center of the Coyote SE Roadless Area to about 4,000 ft in the Owens Valley near Bishop. The climate is semiarid and the vegetation sparse because the area is in the rainshadow of the Sierra Nevada crest. Primary access to the Coyote SE area from the north is by a steep four-wheel-drive dirt road. Several other dirt roads reach the roadless-area boundaries, including the Shannon Road in Shannon Canyon. Access from the south is along Big Pine Creek on Big Pine Creek Road. California Highway 168 to Lake Sabrina and South Lake provides access to the lower elevations of the Table Mountain Roadless Area; the South Lake road also provides access to the lower elevations of the Coyote SE area.

Previous and present studies

The region, including the two roadless areas, was mapped in detail by Bateman (1965). The U.S. Geological Survey (Elliott and McKee, 1982) compiled a new geologic map using the mapping by Bateman and information in Moore and Foster (1980) and Stern and others (1981). A simplified version of this map is used in the accompanying map sheet. A tabulation of chemical analyses made as part of a geochemical study was published by Elliott and others (1982). The U.S. Bureau of Mines searched literature and county mining records for information on mines, prospects, and mineralized areas prior to conducting field investigations. Three hundred and twenty-two samples were collected from mines, prospects, and mineralized areas for analysis. Prominent mines and prospects in and near the roadless areas are described in table 1 and some are shown in figure 2.

GEOLOGY AND GEOCHEMISTRY PERTAINING TO MINERAL RESOURCE ASSESSMENT

GEOLOGIC SETTING

The area covered by this report records a complex geologic history involving Paleozoic miogeosynclinal sedimentation, late Paleozoic and Mesozoic deformation, Mesozoic plutonism, and Cenozoic igneous activity and basin-and-range faulting. The rocks can be divided into the following four major groups: (1) lower Paleozoic through middle Paleozoic metasedimentary rocks consisting of marble, pelitic hornfels, micaceous quartzite, schist, and metachert; (2) upper Paleozoic metavolcanic rocks, mostly meta-andesite with some felsic types; (3) granitic rocks, mostly granodiorite, that were intruded in Late Triassic to

Late Cretaceous time; (4) basaltic and andesitic intrusive and extrusive rocks of Miocene age. The Miocene volcanic rocks were erupted onto ancestral basin-and-range topography along faults that later controlled the structural development of Owens Valley and the eastern Sierra front.

Paleozoic rocks

Paleozoic rocks of the Coyote SE and Table Mountain Roadless Areas are metamorphosed strata of shallow-marine shelf facies that were deposited during late Precambrian to Devonian time as part of a clastic wedge at the west edge of the North American craton. Late Paleozoic compressional deformation resulted in tight folding and faulting with north to northwest trends. Intrusion of the Sierra Nevada batholith in Mesozoic time metamorphosed shale and siltstone to pelitic hornfels; marl and siliceous dolomite to calc-hornfels; limestone to marble and locally to tactite; sandstone to quartzite; and chert to metachert.

The largest cluster of metasedimentary rocks in the study area is called the Bishop Creek pendant (see accompaning map) which covers approximately 20 mi^2 and includes some 6,500 ft of strata. These rocks range in age from Early Ordovician to Devonian (Moore and Foster, 1980). A much smaller cluster to the south is called the Big Pine Creek pendant (Moore and Foster, 1980). Other uncorrelated metamorphic septa are scattered throughout the study area. Upper Paleozoic volcanic rocks, mostly meta-andesite and some silicic rock types, crop out in the study area.

Mesozoic rocks

Triassic to Late Cretaceous granitic rocks of the Sierra Nevada batholith underlie most of the Coyote SE and Table Mountain Roadless Areas. The granitic rocks include hornblende gabbro, quartz diorite, granodiorite, quartz monzonite, granite, and alaskite (Bateman, 1965; Elliott and McKee, 1982).

The oldest intrusive bodies are mafic, consisting of hornblende gabbro and quartz diorite. These small bodies occur as inclusions, pendants, and septa between the silicic granitic plutons throughout the area. Intruding these mafic rocks is the Tungsten Hills Quartz Monzonite, dated by U-Pb at about 200 m.y. (Stern and others, 1981). Underlying most of the southeastern part of the study area are Jurassic granitic rocks which are light-gray medium-grained biotite-hornblende quartz monzonite dated at 167 m.y. by the U-Pb method (Stern and others, 1981). About three-fourths of the eastern Sierra Nevada range front between Bishop and Big Pine is underlain by the leucogranite of Rawson Creek. The leucogranite of Rawson Creek has been dated at 95 m.y. by Stern and others (1981). The granodiorite of Coyote Flat underlies much of the central part of the Coyote SE Roadless Area. Kistler and others (1965) obtained a K-Ar age on a biotite of 90 m.y. from this unit. Dikes of aplite and pegmatite are also present. These dikes are similar in composition and probably related to the leucogranite of Rawson Creek.

Cenozoic rocks and surficial deposits

Basaltic dikes and dissected lava flows of late Cenozoic age crop out over a small part of the northeast end of the Coyote SE Roadless Area. The dissected flows are remnants of a once more extensive basaltic cap and the north-trending dikes in the central part of this roadless area are the remains of feeders. The volcanic rocks were erupted onto ancestral basin-and-range topography along faults that later controlled the structural development of Owens Valley and the eastern Sierra front. One flow in the northern part of the Coyote SE Roadless Area was dated at 9.6 m.y. by the K-Ar method (Dalrymple, 1963).

Several types of Quaternary surficial deposits are present in the roadless areas including glacial till of several ages and modern stream and alluvial fan deposits. These surficial deposits record a history of climatic variation as well as considerable vertical offset along basin-and-range faults during the past few million years.

GEOCHEMICAL STUDIES AND ROCK ANALYSES

The U.S. Geological Survey collected 64 rock, 90 stream-sediment, and 90 nonmagnetic heavy-mineral-concentrate samples from drainage basins in the Coyote SE and Table Mountain Roadless Areas. They were processed for geochemical analysis for use in this report. Analyses of the rock samples from unaltered outcrops indicate the chemical abundances in typical rock material; analyses of the stream-sediment and nonmagnetic heavy-mineral-concentrate samples indicate the overall chemistry of the minerals present in eroded rock material from the entire drainage basin upstream from each sample site. The higher concentrations of selected minerals in the nonmagnetic heavy-mineral samples, relative to their concentration in stream-sediment samples, permits determination of some elements that are not commonly detected in stream-sediment samples.

All samples were analyzed for 31 elements by six-step semiquantitative emission spectroscopy. The rock and stream-sediment samples were also analyzed for zinc by atomic-absorption spectrometry, for gold by flameless atomic-absorption spectrometry, and for uranium by fluorometry. A tabulation of these analyses is given in Elliott and others (1982).

The drainage basins from which the eroded material containing anomalous values originated were evaluated by assigning a numerical score dictated by the number of anomalous metals and their actual concentrations in stream-sediment and panned-concentrate samples. A map was produced (Donahoe and Chaffee, 1983) showing drainage basins with high scores and an explanation of the results.

All of the drainage basins with high scores contain outcrops of the metamorphosed sedimentary rocks that have been intruded and altered by granitic plutons of the Sierra Nevada batholith. This suggests that contact-metasomatic mineral deposits are the source of the metals detected. The geochemical anomalies in these drainage basins are characterized in general by anomalies of one or more of the elements Ag, As, Au, B, Be, Bi, Cd, Co, Cu, Fe, Mn, Mo, Pb, Sn, W, and Zn. This suite of elements, taken in conjunction with the geologic environment in these areas, suggests that precious-metal-rich contact-metasomatic tungsten deposits of the tactite type may be present in any or all of these anomalous drainage basins.

U.S. Bureau of Mines rock samples were fire assayed for gold and silver, analyzed for tungsten by induction-coupled argon-plasma spectrography, and analyzed for base metals by atomic-absorption methods. The results were used to identify metallic mineral occurrences and to aid in resource evaluation.

MINING DISTRICTS AND MINERALIZED AREAS

The Coyote SE and Table Mountain Roadless Areas are within the Bishop Creek mining district, a subdivision of the Bishop mining district which is noted for its tungsten production. The first prospecting, particularly for gold, was carried out by the earliest settlers to this region in the late 1800's. The only significant producer of gold within the Bishop district was the Cardinal mine, west of Table Mountain Roadless Area (fig. 2). It was operated from 1911 to 1922 and from 1934 to 1940, and produced $1.6 million in gold (Tucker and Sampson, 1938). This mine, as well as several small gold properties worked during the depression years of the 1930's, was closed at the beginning of World War II and has never reopened.

Tungsten prospecting began in the Bishop district in 1913 when scheelite was found in Deep Canyon in the Tungsten Hills 4 mi north-northeast of the Coyote SE Roadless Area (fig. 2). Since then, tungsten mining has continued only sporadically due to tremendous fluctuations in the price of tungsten. One thousand tons of tungsten trioxide (WO_3) had been produced from the area prior to World War II; present production for the Tungsten Hills is small.

Thirty-two mining properties were assessed within and along the boundaries of the roadless areas, the prominent properties being included in figure 2. All but one were

tungsten prospects. Two, the Marble Tungsten and the Schober and associated properties, produced 8,000 stu (a short ton unit (stu) contains 20 lb of WO_3) and 10,000 tons of approximately 0.5 percent WO_3, respectively. Several other properties that lie outside but close to the roadless areas were tungsten producers, including the Bakock, Chipmunk, Linder, Marble Tungsten, and the Rossi mine which produced over 10,000 stu WO_3. For a more complete listing, see table 1. No active mines are present in the Coyote SE or Table Mountain Roadless Areas today.

Non-metallic minerals have been mined near the roadless areas. Small amounts of antimony ore were shipped from the Bishop Antimony mine (fig. 2) in the early part of World War II. Kaolinite from the Nebecita Feldspar-Kaolin and the Sierra White Feldspar deposits (fig. 2) has been mined on a limited basis. The Blue Star mines (fig. 2) produced talc as recently as 1945 and marble used for roofing material was quarried from this mine, the Marble Tungsten mine, and from unnamed quarries next to the southeast boundary of the Coyote SE area. Though close to the Coyote SE Roadless Area, these deposits do not extend into the roadless area.

Coyote SE Roadless Area

A search of Inyo County records revealed a total of 236 lode and 10 placer claims in or near the Coyote SE Roadless Area. The earliest claims in the area were located in 1879. There are 15 inactive tungsten mines and prospects in the Coyote SE Roadless Area, and eight adjacent to or on the boundary (table 1). The Middle Fork Shannon prospect has 2,900 tons of low-grade tungsten resources averaging 0.24 percent tungsten trioxide (WO_3). The Chipmunk II (Brown) and two other prospects have a low resource potential for tungsten and (or) silver. Adjacent to the study area, the Chipmunk (Pickup) and Marble Tungsten mines have 18,000 and 4,000 tons of low-grade tungsten-bearing reserves averaging 0.50 and 0.54 percent WO_3, respectively. In addition to tungsten, the Marble Tungsten mine has 800,000 tons of low-quality marble resources. The Bakock mine has a low resource potential for tungsten and marble resources, while two quarries on a nearby unnamed property have a low potential for marble; both properties are near the study-area boundary. Two additional prospects on the roadless-area boundary, the Slim Chance and an unnamed property, have a low resource potential for tungsten.

Table Mountain Roadless Area

A search of Inyo County records revealed a total of 34 lode claims and one placer claim in or near the Table Mountain Roadless Area. No patented claims exist within the roadless area; the earliest claims were located in 1902. The Waterfall prospect and the Stevens prospect (fig. 2) located outside the roadless area, contain scheelite-bearing tactite in small marble pods. These deposits are small, discontinuous, and of low grade (table 1). The Waterfall prospect has a low resource potential for tungsten.

ASSESSMENT OF MINERAL RESOURCE POTENTIAL

Tactite containing tungsten resources is identified in and near the Coyote SE and Table Mountain Roadless Areas. In addition to tungsten, which is the most important metal in this rock type, gold, silver, copper, and molybdenum are present as secondary elements. Because the tactite bodies are small and low grade, the resource potential for tungsten and others metals within the Coyote SE and Table Mountain Roadless Areas is low.

Coyote SE Roadless Area

Metamorphic rocks, including some tactite, occur in the Coyote SE Roadless Area. Significant concentrations of metallic minerals in these tactites are rare, however, and most of the surface deposits have probably been found. Stream-sediment and panned-concentrate samples from drainages that cut the Bishop Creek roof pendant and also metamorphic rocks at the north end of the study area and in Shannon Canyon contain slightly anomalous concentrations of Ag, Au, B, Bi, Co, Cu, Fe, Mo, Pb, Sn, W, and Zn. The overall low concentration of these elements in these samples suggests that the possibility of metal-rich deposits is small. Weakly to moderately anomalous levels of uranium were found in stream-sediment samples in the southwesternmost part of the Coyote SE Roadless Area. Neither the source area nor the uranium-bearing mineral is known for this element. Based on the concentrations of uranium, the resource potential for uranium is low.

Known and potential mineral resources are within or near the northern, southeastern, and western parts of the Coyote SE Roadless Area and in Shannon Canyon on the east side. Tungsten-bearing tactite occurs in the inactive Chipmunk and Marble Tungsten mines outside the roadless area (fig. 2). The resource potential in these mines is considered low because of low to moderate grade and small tonnage of identified deposits.

Table Mountain Roadless Area

Analysis of samples of tactite from the Waterfall prospect, near the Table Mountain Roadless Area, suggests a low resource potential for tungsten. This potential is substantiated by anomalous amounts of Ag, Au, B, Bi, Cu, W, and Zn in stream-sediment and panned-concentrate samples in areas including and adjacent to the Waterfall prospect in the Bishop Creek roof pendant. This suite is associated with tactite mineralization (Rose and others, 1979).

REFERENCES

Bateman, P. C., 1965, Geology and tungsten mineralization of the Bishop district, California: U.S. Geological Survey Professional Paper 470, 208 p.

___1956, Economic geology of the Bishop tungsten district, California: California Division of Mines Special Report 417, 87 p.

Capstick, D. O., and Stump, A. L., 1983, Mineral investigation of the Coyote SE RARE II Area (No. 5033), Inyo County, California: U.S. Bureau of Mines Mineral Land Assessment MLA 84-83.

Dalrymple, G. B., 1963, Potassium-argon dates of some Cenozoic volcanic rocks of the Sierra Nevada, California: Geological Society of America Bulletin, v. 74, no. 4, p. 379-390.

Donahoe, J. L., and Chaffee, M. A., 1983, Geochemical anomaly map of the Coyote SE and Table Mountain Roadless Areas, Inyo County, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1426-C, scale 1:62,500.

Elliott, G. S., and McKee, E. H., 1982, Geologic map of the Coyote SE and Table Mountain Roadless Areas, Inyo County, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1426-A, scale 1:62,500.

Elliott, G. S., Diggles, M. F., Chaffee, M. A., Fey, D. L., Sutley, S. J., Hill, R. H., and Van Gaalen, Glen, 1982, Chemical analyses of samples of rock and stream sediment, and nonmagnetic heavy-mineral concentrate, Coyote SE and Table Mountain Roadless Areas, Inyo County, California: U.S. Geological Survey Open-File Report 82-996, 116 p., 1 plate.

Kistler, R. W., Bateman, P. C., and Brannock, W. W., 1965, Isotopic ages of minerals from granitic rocks of the central Sierra Nevada and Inyo Mountains: Geological Society of America Bulletin, v. 76, no. 2, p. 155-164.

Lemmon, D. M., 1941, Tungsten deposits in the Sierra Nevada rear Bishop, California: U.S. Geological Survey Bulletin 931-E, p. 79-104.

Moore, J. N., and Foster, C. T., Jr., 1980, Lower Paleozoic metasedimentary rocks in the east-central Sierra Nevada, California: Correlation with Great Basin formations: Geological Society of America Bulletin, v. 91, p. 37-43.

Rose, A. W., Hawkes, H. E., and Web, J. S., 1979, Geochemistry in Mineral exploration: London, Academic Press, 657 p.

Stern, T. W., Bateman, P. C., Morgan, B. A., Newell, M. F., and Peck, D. L., 1981, Isotopic U-Pb ages of zircon from the granitoids of the central Sierra Nevada, California: U.S. Geological Survey Professional Paper 1185, 17 p.

Tucker, W. B., and Sampson, R. J., 1938, Mineral resources of Inyo County: California Journal of Mines and Geology, v. 34, p. 368-500.

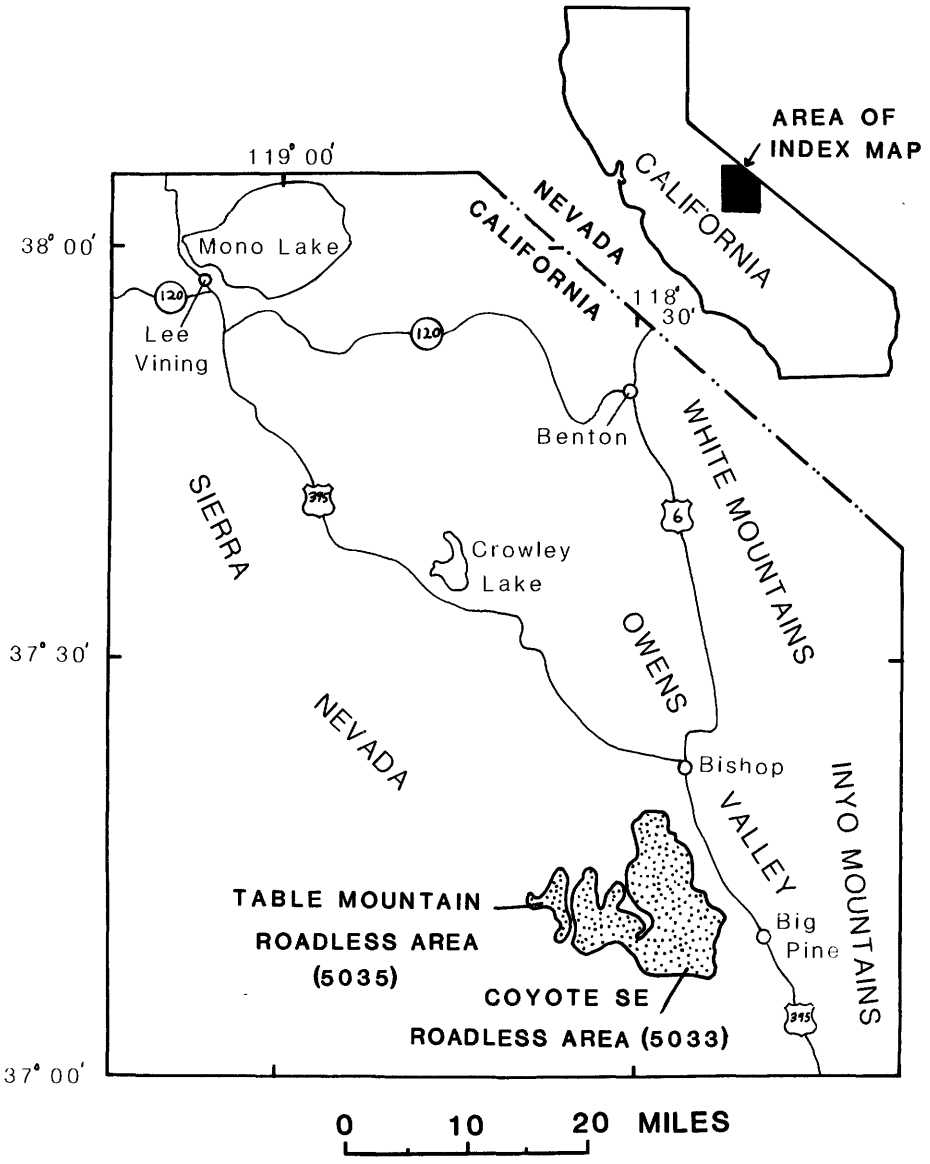
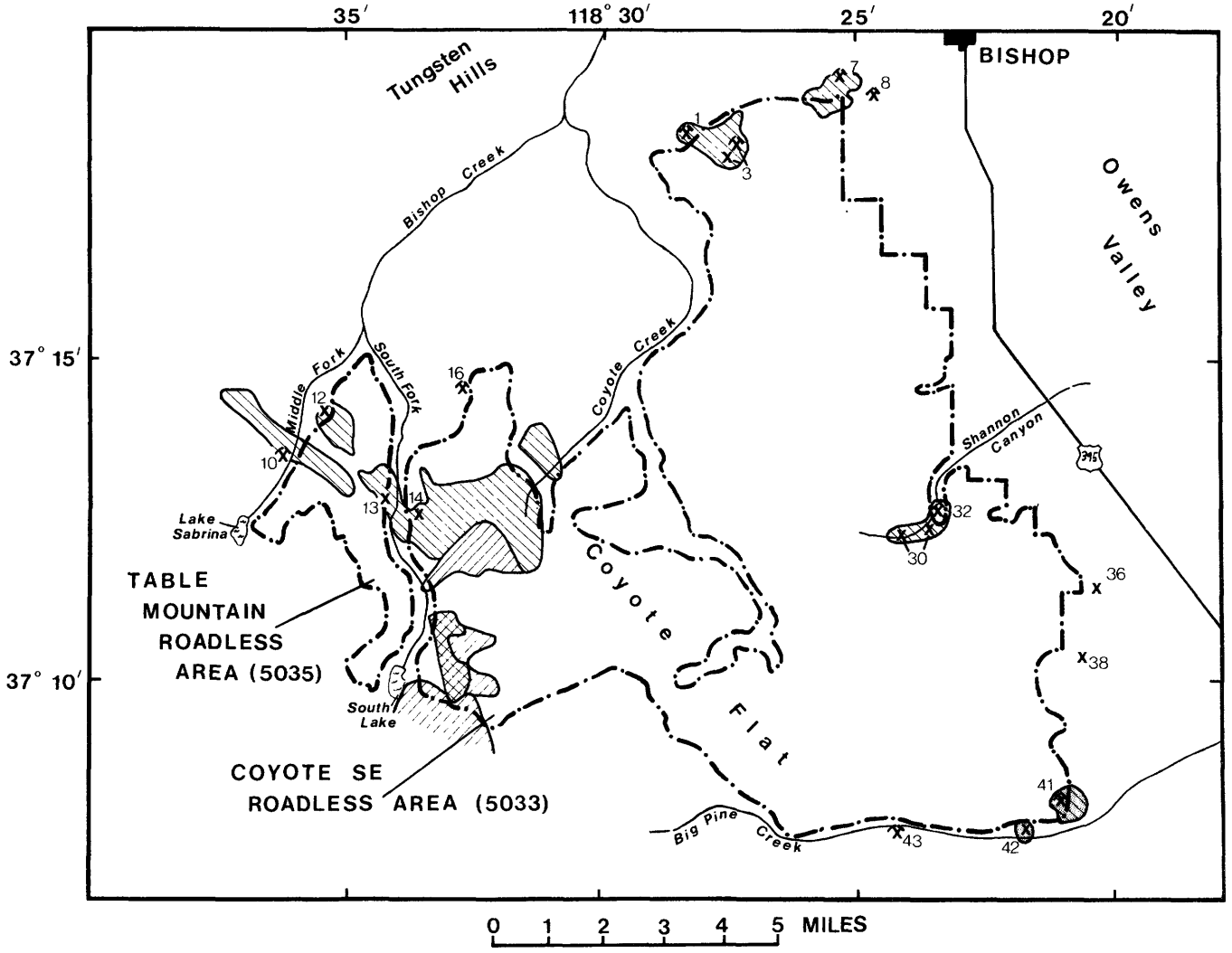


Figure 1--Index map showing location of roadless areas.



EXPLANATION

AREA OF LOW RESOURCE POTENTIAL FOR TUNGSTEN

AREA OF LOW RESOURCE POTENTIAL FOR URANIUM

AREA OF LOW RESOURCE POTENTIAL FOR MARBLE

MINE--Number refers to list of mines and prospects

PROSPECT--Number refers to list of mines and prospects

APPROXIMATE BOUNDARY OF ROADLESS AREAS

LIST OF MINES AND PROSPECTS
(in alphabetical order)

41	Bakock mine	32	Marble Tungsten mine	16	Schober mine
7	Bishop Antimony mine	30	Middle Fork Shannon prospects	38	Sierra White Feldspar deposit
43	Blue Star mines	36	Nebecita Feldspar-Kaolin deposit	14	Slim Chance prospect
10	Cardinal mine	42	Marble quarries	12	Stevens prospect
1	Chipmunk (Pickup) mine	8	Rossi Tungsten mine	13	Waterfall prospect
3	Chipmunk II (Brown) mine and prospect				

Figure 2.--Mineral resource potential of the Coyote SE and Table Mountain Roadless Areas, Inyo County, Calif.

Table 1.--Mines and prospects assessed within and near the Coyote-SE and Table Mountain Roadless Areas

Coyote SE

Map no.	Name	Summary	Workings and production	Sample and resource data
1	Chipmunk (Pickup) mine (tungsten)	The deposit is a xenolith of marble and hornfels having a maximum length of 500 ft and width of 300 ft. The predominant country rock is quartz monzonite, with lenses of diorite and hornblende gabbro. The southern portion of the inclusion is where most of the tactite is found. It is rich in garnet and epidote; some stringers were scheelite bearing.	Workings consist of a 370-ft main adit with a blocked raise, a south adit with 130 ft of workings, one 10-ft and one 15-ft adit, a 20-ft shaft with a stoped area, and a 30-ft by 40-ft open cut. Bateman (1956) estimates that 600 tons of ore were mined, probably including 218 tons of 0.5 percent WO_3 ore mined in 1955; recovery was about 60 percent.	Fourteen samples: eleven ranged from 0.01 to 1.46 percent WO_3. The deposits contained an estimated 19,000 tons of 0.5 percent WO_3 resources, as estimated by Lemmon (1941), before mining occurred. Thus, about 18,000 tons is estimated to remain, based on the reported figures and mapping and sampling during the present investigation.
2	Unknown (tungsten)	A 20-ft by 50-ft marble xenolith in granitic country rock, has a 10-ft-thick zone of interfingered stringers of tactite at its east margin. The tactite stringers are predominantly quartz-epidote-garnet.	One 80-ft bulldozer cut.	One chip sample in the tactite yielded 0.10 percent WO_3. There is low potential for tungsten resources.
3	Chipmunk II (Brown) mine (lower or north workings) (tungsten)	A 3-ft zone of tactite has formed at the contact of a 300-ft-long marble xenolith in quartz monzonite. Hornfels is also in the vicinity and is highly sheared.	One 120-ft adit with an 80-ft raise to the surface, one 25-ft and one 30-ft adit, an 80-ft adit with stoped sublevel. Production has been 21 stu (1 short ton unit (stu) contains 20 lb WO_3) of WO_3 from 46 tons of ore.	Twenty-three chip samples: 17 yielded from 0.01 to 0.79 percent WO_3. An occurrence of about 850 tons of tactite containing 0.33 percent WO_3 is present. There is low potential for tungsten resources.
3	Chipmunk II (Brown) prospect (upper or south workings) (silver)	A larger mass of marble and hornfels than observed at the lower Chipmunk II workings, also in quartz monzonite country rock. The hornfels is highly sheared. It is uncertain whether this portion of the old Brown prospect is included in the newer Chipmunk II claim.	Workings include a 130-ft adit, a 15-ft adit, two caved adits, and a shaft which was caved at 15 ft.	Thirteen chip samples: two yielded 0.7 and 0.9 oz silver per ton. There is low potential for silver resources.
4	Unknown	Quartz vein 2 to 4 in. thick in quartz monzonite country rock trends N. 78° E.; dip is unknown. Pyrite, chalcopyrite, sphalerite, and galena are in scattered small blebs. Vein can be traced for over 300 ft along strike, though poorly exposed.	Three prospect pits.	Five samples showed no significant metal values.
5	Early-Morhardt prospect (tungsten)	Tactite float was found along the base of the slope, and one small pod of marble with some tactite was found in place. Exposures are poor in the area because of extensive colluvial deposits. Country rock consists of schist, hornfels, and some quartzite.	One 20-ft adit, one 15-ft adit, several prospect pits, and over 1,000 ft of bulldozer trenches.	Six samples: two assayed 0.26 and 0.07 percent WO_3. The mineralized rock is not well enough exposed to enable a mineral resource assessment.

14	Slim Chance prospect (tungsten)	Small tactite pods are in hornfels and chert.	One open cut.	Two chip samples yielded values of 0.04 percent and 0.09 percent WO_3. There is low potential for tungsten resources.
15	Lookout prospect	Small pod of tactite, approximately 20 ft long by 6 ft wide by 3 ft deep. Country rock is hornblende gabbro.	One 50-ft-long bulldozer trench.	One chip sample showed no significant metal values.
16	Schober mine (tungsten)	The mine is in an "inclusion" (xenolith?) composed of tactite and hornfels on the margin of a mass of hornblende gabbro (Bateman, 1965, p. 40). The tactite contains calcite, garnet, and epidote, with considerable pyrrhotite. The latter oxidized to limonite, creating a thick gossan zone in many areas of the workings.	A 100-ft by 85-ft glory hole with a 115-ft adit in the east side, an inaccessible 140-ft inclined shaft with over 200-ft of workings reported at lower levels, and several hundred feet of bulldozer cuts. Recorded production is 10,000 stu of WO_3.	Five samples of tactite left at the glory hole assayed from 0.03 to 0.31 percent WO_3. The property is reported to be mined out.
17	Black Bump prospect	Two small bodies of tactite, the largest with approximate surface dimensions of 100 ft by 25 ft, are in hornblende gabbro country rock. The tactite consists of garnet and epidote, with lesser amounts of quartz and calcite.	Three bulldozer cuts: two 100 ft long and one 200 ft long.	Two chip samples of tactite pods showed no significant metal values.
18	Schober No. 2 claim	Small pod of epidote-garnet tactite a few feet across in outcrop adjacent to diorite.	One shallow bulldozer cut.	One chip sample had no significant metal values.
19	Merrill prospect (tungsten)	A pod of garnet-epidote tactite, approximately 40 ft long by 15 ft wide by 15 ft deep is enclosed in hornblende gabbro country rock.	A caved adit, probably 100 ft long, a 35-ft shaft (possibly a raise to surface from the adit), and 300 ft of bulldozer trench.	One sample assayed 0.10 percent WO_3, and two samples yielded 0.01 percent. The occurrence is too small to constitute a resource.
21	Brackett mine and prospect (tungsten)	Tactite masses, some at least 20 ft thick, formed along a north-trending contact of marble and hornfels with quartz monzonite country rock. Exposures are scarce; glacial till covers most of the area.	One 12-ft and one 15-ft shaft, 70 ft of open cut, four prospects pits, and two bulldozer trenches. Production has been at least 35 stu of WO_3 from 200 tons of ore.	One chip sample showed 0.24 percent WO_3. An unpublished U.S. Bureau of Mines report suggests 100 tons of tungsten-bearing tactite is present. The tungsten occurrences are too sporadic and small to be resources.
22	Unknown	Tactite float in alluvium and till.	One prospect pit.	One select sample of tactite float yielded no significant metal values.

Table 1.--Mines and prospects assessed in and near the Coyote-SE and Table Mountain Roadless Areas--Continued

Map no.	Name	Summary	Workings and production	Sample and resource data
		Coyote SE		
23	Linder mine (tungsten, copper)	Pods of quartz-garnet-epidote tactite occur discontinuously along the east-trending, steeply dipping contact of calc-hornfels with granodiorite. Aplitic sills and dikes penetrate the calc-hornfels. Extensive limonite, particularly in an altered zone at least 400 ft long and about 15 ft wide at the copper-bearing upper workings, suggests the presence of sulfide minerals.	One 90-ft adit, a 6-ft adit, four open cuts, at least 16 prospect pits and trenches, and ruins of a mill. Thirty tons of tungsten ore had been shipped by 1954 (Bateman, 1956).	Of 22 samples taken, 19 were chip and three were select samples. WO_3 values ranging from 0.01 to 1.35 percent were detected in 15 of these, mainly from the lower workings. Copper values ranging from 0.06 to 0.49 percent were detected in five samples, all at the upper workings. The tungsten and copper occurrences are too small and the values too sporadic to be considered resources.
24	Green Lake prospect	Small masses of tactite are found in marble or calc-hornfels country rock (strike N. 40° W., dip 70° SW.) north of Green Lake. The tactite pods are generally a few feet in longest dimension.	Bateman (1956) reported small prospect pits in the area, though none were found during this study.	Two samples of the tactite: no significant metal values.
25	Unknown	Small pod of garnet-epidote tactite with scattered sulfide minerals in granitic country rock.	One prospect pit.	Two samples showed no significant metal values.
26	McVan prospect	Small bodies of diorite with inclusions of marble or calc-hornfels (strike N. 40° W., dip 70° SW.) are found in granitic country rock; the pods are generally a few feet in longest dimension.	One open cut and one 25-ft adit.	Two chip samples of tactite yielded no significant values of tungsten or other metals.
27	Unknown	Small bodies of garnet-epidote tactite, only a few feet across in outcrop, are enclosed in hornblende diorite. Scattered malachite and limonite stain accompany local shearing.	Five prospect trenches.	Five samples showed no significant metal values.
29	Unknown	Small quartz veins cropping out over a large area in gabbro and granitic country rock. Largest vein at adit averages 3 ft thick, strikes N. 45° W., and dips 24° NE.	One 40-ft adit, seven small trenches.	Three chip samples and two grab samples yielded no significant metal values.
30	Middle Fork Shannon prospect (lower) (tungsten)	The prospect is in tactite that comprises the west end of a lens-like inclusion, measuring 80 by 30 ft, in granite. Most of the inclusion is composed of siliceous epidote, calcite, and quartz, with minor amounts of chlorite, pyrite, magnetite, and scheelite.	A 260-ft adit with a raise to a 60-ft-long second level. From the second level, another raise extends 75 ft to the surface.	Twelve samples: three contained from 0.05 to 0.27 percent WO_3. There is low potential for tungsten resources.

30	Middle Fork Shannon prospect (upper) (tungsten)	At least three zones of garnet-epidote tactite pods and lenses (with minor amounts of pyrite, chalcopyrite, malachite, and azurite) and altered marble are found along the margins of an irregularly shaped mass of diorite in quartz monzonite. The two largest tactite masses in the central zone were at least 15 ft thick and measured 30 ft by 30 ft and 50 ft by 20 ft.	One 30-ft adit, a 30-ft by 15-ft open cut, and a 75-ft bulldozer cut.	Fourteen samples: twelve ranged from 0.01 to 0.66 percent WO_3. Copper assayed as much as 0.22 percent. The central tactite body contains an estimated 2,900 tons of subeconomic resources averaging 0.24 percent WO_3.
31	Unknown (tungsten)	Garnet-epidote tactite is developed locally at the contact of marble and quartz monzonite. The tactite pod is approximately 100 ft by 20 ft, but highly irregular. Disseminated, fine-grained scheelite was observed under ultraviolet light.	One 15-ft adit.	Four chip samples, three of which averaged 0.07 percent WO_3; one taken in a high-grade tactite stringer showed 0.82 percent WO_3. Approximately 25-50 tons of a tungsten-bearing tactite exists at the property.
32	Marble Tungsten mine (tungsten, marble)	Scheelite-bearing tactite has been formed locally at the steeply dipping eastern contact of quartz monzonite with a mass of coarsely crystalline marble, whose outcrop measures 500 ft by 300 ft. Two smaller masses of tactite crop out along the west contact of the marble. The tactite is chiefly garnet-epidote with some quartz and calcite.	The eastern tactite mass has been extensively mined. Workings consist of a 250-ft adit, an 80-ft caved shaft sunk near the adit portal, a reported 300-ft drift at the bottom of the shaft, extensive stoping between levels and to the surface, and 30- and 70-ft adits at higher levels. The western tactite bodies have been explored by 90-ft and 20-ft adits, and 60 ft of open cut. The eastern tactite mass has been extensively mined. There are also mill ruins at the property. Bateman (1956) reports 7,910 stu of WO_3 was produced by 1954. An unknown amount of marble was produced for roofing granules and "allied uses".	Twenty-three samples were taken: 13 from remnants of the mostly mined out east tactite body, ten from the west tactite bodies. All but one sample assayed above detection limits (0.01 percent WO_3) and ranged from 0.01 to 1.11 percent WO_3, averaging 0.43 percent for samples taken across the tactite. The western tactite bodies contain about 4,000 tons of low-grade resources averaging 0.54 percent WO_3. A minimum of 800,000 tons of low-grade marble resources remain, based on Bateman's mapping (1956, pl. 14) and assuming an average thickness of 100 ft.
33	Unknown	Diorite dikes in quartz monzonite are heavily limonite stained and locally sheared.	Fourteen trenches within a 500-ft radius.	Ten grab samples and two chip samples yielded no significant metal values.
34	Unknown (silver)	Quartz veins in granodiorite country rock are heavily limonite-stained and locally sheared.	At least fifteen prospect pits and one short adit (caved).	Ten grab samples and one chip sample: one sample showed 1 oz silver per ton.

Table 1.--Mines and prospects assessed in and near the Coyote-SE and Table Mountain Roadless Areas--Continued

Coyote SE				
Map no.	Name	Summary	Workings and production	Sample and resource data
35	Unknown	Quartz vein approximately 1 ft thick strikes N. 45° E., dips vertically in quartz monzonite country rock, and has heavy limonite stain, scattered galena, and possibly other sulfide minerals.	Two 15-ft trenches.	Three chip samples yielded no significant metal values.
37	Unknown	A 1- to 2-ft thick shear zone strikes N. 80° W. and dips 87° NE. in quartz monzonite country rock.	Two caved adits, probably 15 ft each.	Two chip samples across shear zones yielded no significant metal values.
39	Unknown	Poorly exposed quartz veins are in quartz monzonite country rock.	Several prospect pits within 300-ft radius.	Two samples showed no significant metal values.
41	Bakock mine	Marble and quartz monzonite protrudes through morainal debris. Sparse, very fine scheelite is sporadically distributed in a tactite formed at the metasedimentary-intrusive rock contact. The N. 70° W.-trending and steeply northeast-dipping tactite is 10 to 40 ft thick; it crops out intermittently over a distance of 500 ft, subparallel to marble beds. Five claims were located in 1940 or 1941. Idle from 1944 to 1953, and probably to present.	At least six open cuts and pits up to 30 ft long and one 120-ft adit with a 95-ft raise to the surface. Bateman (1956, p. 70) reports "In 1944, a few hundred tons of ore were mined and treated in a mill that was constructed in Big Pine, but the operation proved unprofitable."	Not examined during this investigation, Bateman (1956, p. 79) reported zones containing 0.5 to 2.0 percent WO_3, but very limited in extent. There is low potential for tungsten and marble resources.
42	Unknown (marble)	Coarsely crystalline marble, striking N. 45° E. and dipping vertically, crops out in glacial till. The approximate surface dimensions are 1,000 ft by 500 ft.	Marble was mined at two small quarries, the larger working being about 80 ft by 120 ft and averaging 20 ft deep. A 30-ft adit with a 50-ft raise to surface was driven at the southern quarry, which is about 60 ft in diameter and averages 35 ft deep. From the size of the workings, production would have been about 24,000 tons, reportedly (Bateman, 1956, p. 86) used for roofing granules and "allied uses".	The marble is suitable for uses other than building stone. The property has a low potential for marble resources.

		Table Mountain		
11	West Side prospect	North-trending shear zone with quartz pods and stringers in gray micaceous hornfels; pods are as much as 2 ft thick. Localized shearing and heavy limonite stain. Hornfels country rock strikes N. 80° W. and dips 42° SW.	One 60-ft adit, one 10-ft adit, and small open cut.	Eight samples taken of vein quartz and shear zone; no significant metal values.
12	Stevens prospect	High-grade scheelite-bearing tactite float in talus and small lenses of scheelite-bearing tactite at contact of small marble pods with hornfels. Attitude of country rock strikes N. 33° W., dips 22° SW.	Two 15-ft adits and two small open cuts.	Deposit is too sporadic and small to be a resource.
13	Waterfall prospect	Thin discontinuous zone of scheelite-bearing garnet-epidote tactite bodies along nearly 300 ft of contact between marble and metachert. Contact strikes north-northwest and dips 15° NW. to 70° NE.	Four adits, the longest is 30 ft long, one open cut, and three prospect pits. Small undetermined amount of ore reported to have been milled (Bateman, 1956).	About 480 tons ore, average content of indicated resources is 0.08 percent WO_3.