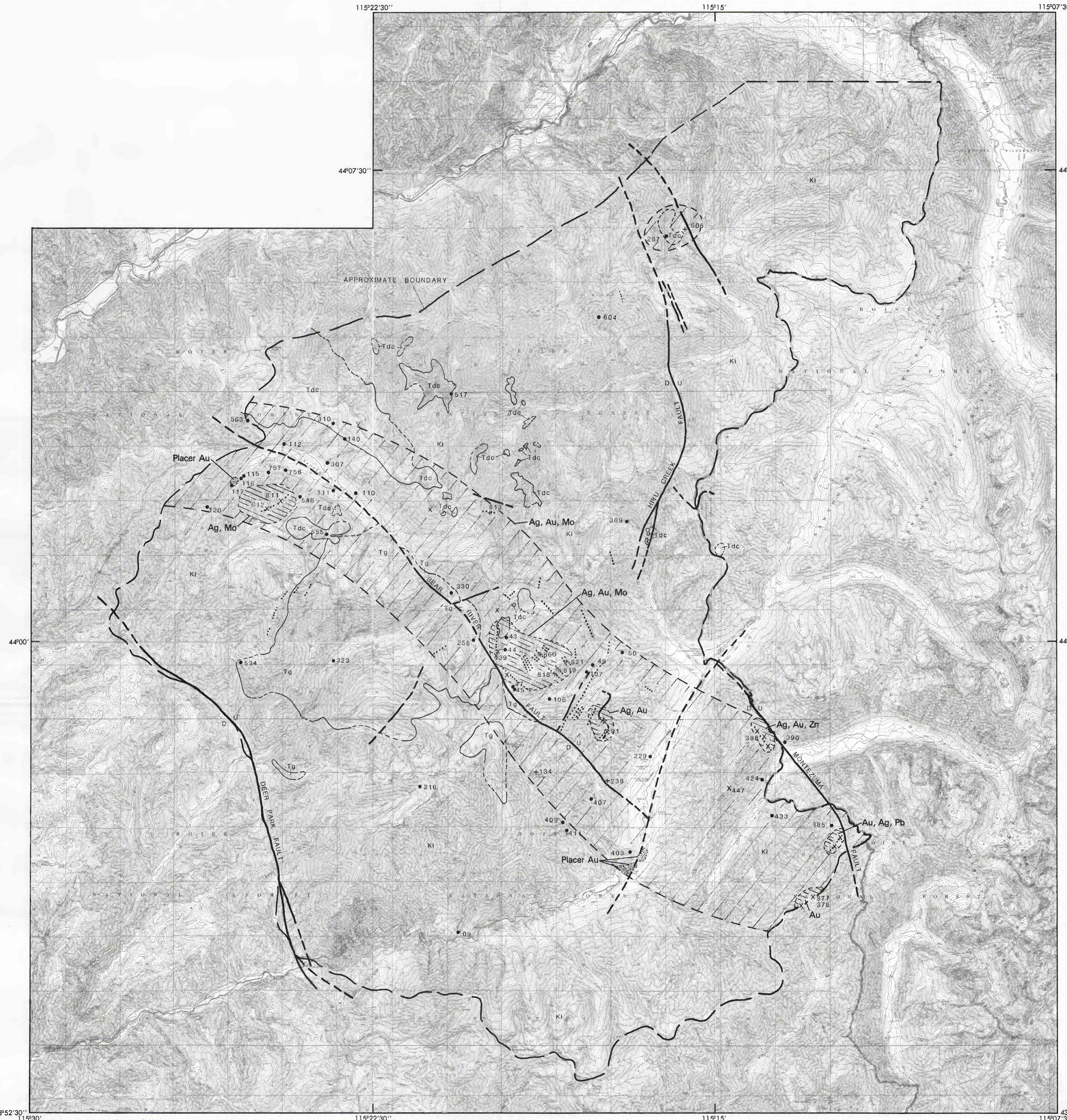

Geology simplified from Kiilsgaard (1983a)

MINERAL RESOURCE POTENTIAL MAP OF THE TEN MILE WEST ROADLESS AREA, BOISE AND ELMORE COUNTIES, IDAHO

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1983

EXPLANATION OF RESOURCE POTENTIAL

LOCALITIES HAVING MODERATE RESOURCE POTENTIAL FOR PLACER GOLD

LOCALITIES HAVING MODERATE MINERAL RESOURCE POTENTIAL

GEOLOGIC TERRANE HAVING LOW MINERAL RESOURCE POTENTIAL

QUARTZ VEIN

+39 ROCK SAMPLE LOCALITY--Containing 30 ppm or more silver and (or) 5 ppm or more gold. Sample number shown

•555 STREAM-SEDIMENT SAMPLE LOCALITY--Containing anomalous quantities of one or more of the metals silver, molybdenum, copper, and lead. Anomalous thresholds are: 3 ppm silver, 10 ppm molybdenum, 70 ppm copper, and 150 ppm lead. Sample number shown

x377 MINE, PROSPECT--Showing sample number

CORRELATION OF MAP UNITS

Tg, Tdc	TERTIARY
Ki	CRETACEOUS

LIST OF MAP UNITS

INTRUSIVE ROCKS

Tg GRANITE

Tdc DIORITIC ROCKS

Ki BIOTITE GRANODIORITE AND LEUCOCRATIC MONZOGRANITE, UNDIVIDED

CONTACT--Dashed where approximately located

FAULT--Dashed where inferred. U, upthrown side; D, downthrown side

STUDIES RELATED TO WILDERNESS

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to determine their mineral resource potential. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a mineral survey of the Ten Mile West Roadless Area , Boise National Forest, Boise and Elmore Counties, Idaho. The Ten Mile West Roadless Area (W4061) was classified as a further planning area during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

MINERAL RESOURCE POTENTIAL SUMMARY STATEMENT

The Ten Mile West Roadless Area contains identified placer-gold deposits. It also contains lode deposits known to contain silver, gold, lead, and zinc. The location of lode deposits with respect to faults and hydrothermally altered rocks, the scatter of stream-sediment samples with anomalously high metal contents, some of which indicate undiscovered mineral deposits, and the identified placer-gold deposits define a northwest-trending belt of geologic terrane that has low resource potential for silver, gold, and molybdenum. Within the belt are localities that have moderate resource potential for one or more of the metals gold, silver, lead, molybdenum, and zinc. Four localities within the belt have moderate resource potential for placer gold. There is a small area having low resource potential for silver, gold, and copper in the headwaters vicinity of Chapman Creek. Geothermal lease applications extend into the northern end of the study area. Anomalous quantities of fluorine and uranium were found in some stream-sediment samples, but there is no evidence of areas having resource potential for these elements. Coal, oil, and gas do not exist in the area.

INTRODUCTION

The Ten Mile West Roadless Area comprises 134 mi^2 in the Boise National Forest, Boise and Elmore Counties, Idaho (fig. 1). The area adjoins the western side of the Sawtooth Wilderness, which is part of the Sawtooth National Recreation Area. The U.S. Geological Survey studied the area during the summer of 1979 and part of the summer of 1980. The work included geological mapping, geophysical studies, and the collection and analysis of 584 samples of rocks and stream sediments. The U.S. Bureau of Mines searched literature and county mining claim records and performed field examinations in the roadless area in 1981 and 1982. Six localities of mineral interest were being held by claimants in 1982. Three of these are lode claims at old prospects, and the other three are placer claim groups located in the Crooked River and North Fork Boise River valleys. A total of 1,427 claims have been located in the roadless area. Of these, 1,123 lode claims and 12 placer claims, each of 160 acres, were being held in 1982. There are no producing mines, patented claims, oil and gas leases, or mineral leases in the roadless area.

GEOLOGY

The Ten Mile West Roadless Area is underlain chiefly by biotite granodiorite of the Idaho batholith and younger leucocratic monzogranite, both rock types of Cretaceous age. At Jackson Peak and to the southeast, these rocks are intruded by dioritic rocks and in the vicinity of Wolf Mountain and to the southeast by pink monzogranite, both rock types of Tertiary age. All of the intrusive rocks are cut by numerous dikes that range in composition from diabase to rhyolite and are related to the Tertiary intrusive rocks. Steep faults are the principal geologic structures of the area and two of them, the Deer Park and the Montezuma, are of regional extent. Altered rocks and quartz veins, some of which contain silver, gold, lead, zinc, and copper minerals, are concentrated along the western or downthrown side of the Montezuma fault and along both sides of the Bear River fault, which may be a faulted offset extension of the Montezuma fault (Kiilsgaard, 1983a). A belt of altered and mineralized rock along the Montezuma and Bear River faults defines a geologic environment that is favorable for mineral resources.

The Cretaceous biotite granodiorite is porphyritic, medium to coarse grained, and gray to light gray. The rock is intensely altered locally, forming conspicuous zones of light-gray to almost white rock along faults. Large exposures of bleached and altered rock occur at the heads of Big and Little Silver Creeks, in the vicinity of Graham Peak, and on Goat Mountain (Kiilsgaard, 1983a).

The Cretaceous leucocratic monzogranite forms dikes and stock-like masses of light-gray, fine- to medium-grained rock that intrude the biotite granodiorite. The leucocratic monzogranite is resistant to erosion, forms high points on ridges, and weathers to extensive rubbly scree.

The dioritic rocks of Tertiary age range from diorite to monzogranite in composition, and are characterized by abundant hornblende, euhedral biotite, and magnetite, which together make up as much as 35 percent of the rock. The outcrop pattern of the dioritic rocks near Jackson Peak and to the southeast is coincident with an aeromagnetic high (Mabey, in press) that suggests a large body of the rocks at shallow depth.

The pink monzogranite crops out on both sides of Bear River and at the heads of Taylor and Big Silver Creeks. The rock is identical to that of the Sawtooth batholith of Tertiary age, which is exposed extensively in the Sawtooth Wilderness east of the roadless area.

The numerous younger Tertiary dikes range from diabase to rhyolite in composition, with rhyolite and quartz-latite dikes being the most common.

Quaternary deposits include recent alluvium along streams, terrace-forming older alluvium, and unconsolidated glacial deposits.

Of the two principal steep faults of the area, the Deer Park fault is at least 30 mi long and has a scarp that forms the steep mountain front northwest of the North Fork Boise River. The southwest boundary of the roadless area follows the base of this scarp. The height of the scarp suggests a fault displacement of at least 2,600 ft, with the downdropped block on the southwest side.

A segment of the other principal fault, the Montezuma fault, marks a part of the eastern boundary of the roadless area. Rocks west of this fault are downthrown with respect to those on the east. The Montezuma fault may be offset by a fault inferred to extend northeast along the North Boise River, in which case it may continue to the northwest through the middle of the roadless area as the Bear River fault.

The Montezuma fault and the Bear River fault, which may or may not be a faulted extension of the Montezuma fault, apparently controlled the location of hydrothermally altered rocks, quartz veins, and mineralized deposits. The two faults and associated mineral deposits therefore define a northwest-trending belt that extends across the roadless area.

GEOCHEMISTRY

A total of 584 rock and stream-sediment samples was collected in the roadless area concurrent with geologic mapping. Chemical analyses of the samples and related locality and geologic descriptions have been reported by Kiilsgaard (1982, 1983b).

A high proportion of the stream-sediment samples contained abnormally large concentrations of silver and molybdenum, and detectable quantities of gold were determined in placer gravel at 27 sites in the valleys of Crooked River and of North Fork Boise River and its tributary, Johnson Creek. The localities of stream-sediment samples having anomalous concentrations of one or more of the metals silver, gold, molybdenum, copper, and lead are shown on the map, as are the localities of altered or mineralized rock where collected samples contained 30 ppm or more silver and (or) 5 ppm or more gold (1 troy oz of gold or silver per short ton is equivalent to 34,286 ppm).

Some of the stream-sediment sample localities which yielded anomalously high metal values are downstream from known mineral deposits; however, other sediment samples with high values are from streams where no mineralized rocks are known upstream, and therefore indicate an undiscovered mineral occurrence. Most of these localities where samples had anomalously high values are from stream drainages in the belt of faulted and altered rocks that trend northwest across the area.

ASSESSMENT OF MINERAL RESOURCE POTENTIAL

The Ten Mile West Roadless Area contains lode deposits that have moderate resource potential for silver, gold, lead, and zinc. The area also contains localities having moderate resource potential for placer gold. Some stream-sediment samples that had anomalously high contents of one or more of the metals silver, molybdenum, lead, and copper were collected downstream from known mineral deposits, but some were collected along streams draining areas where no mineralized occurrences are known and which indicate undiscovered mineral deposits.

Lode deposits in the mineralized belt that crosses the roadless area include the Lone Cabin claim group (no. 9, fig. 2) in the area of upper Grouse Creek, where selected sample 732 from a dump contained about 3.5 oz gold per ton, about 4.4 oz silver per ton, and more than 2 percent lead (Kiilsgaard and others, 1970). Of 18 samples taken at the Gold Bug claim (no. 10, fig. 2), 5 contained notable quantities of gold, of which 1 from the dump of a prospect pit contained 2.59 oz silver per ton and 3.20 oz gold per ton. Samples from the Valley Chief claim group (no. 8, fig. 2) contained as much as 14.6 oz silver per ton, 1.0 percent zinc, and minor amounts of copper and bismuth. Samples from workings in the Graham claim group (nos. 4-7, fig. 2) contained as much as 5.0 oz silver per ton, and 1 sample (no. 819, map) from an outcrop of a quartz vein contained 1.25 oz gold per ton.

Gravel was sampled for placer gold at 57 localities along Crooked River, the North Fork Boise River, and Johnson Creek (fig. 3); gold was found at 27 of these localities. Four of the localities have small volumes of placer gravel, ranging from 3,400 to 434,000 yd^3 and from $0.32 to $1.22 gold/$yd^3$ (at a gold price of $400/oz) (Benham and Avery, 1983). The volume of gravel at none of the sites is large enough or rich enough to classify the localities other than having moderate resource potential; however, thickness of the gravel prevented testing near bedrock to determine whether higher gold values occur there. Bright color and shape of the gold flakes indicate the gold was probably derived by erosion of veins in nearby North Fork Boise River and Crooked River drainages.

Many stream-sediment samples contained anomalously large amounts of one or more of the metals silver, molybdenum, lead, and copper, and some of these samples were from streams where no mineralized deposits were seen upstream from the sample site (Kiilsgaard, 1983b). Such samples include sample 385, which contained 500 ppm lead; sample 424, which contained 5 ppm silver, 10 ppm molybdenum, and 150 ppm lead; and sample 555, which contained 10 ppm silver, 150 ppm lead, and 200 ppm copper (see map). Stream-sediment samples 757 and 758 contained 50 and 20 ppm molybdenum, respectively, and were taken downstream from prospects, from which dump samples 811 and 812 contained values in silver but minor quantities of molybdenum (Kiilsgaard, 1982). The molybdenum contents of samples 757 and 758, plus that of nearby anomalous stream-sediment samples 115, 116, 117, and 120, indicate widespread molybdenum mineralization in the headwaters areas of the streams from which the samples were taken (see map). Stream-sediment samples 43, 44, 45, 47, 49, 50, 106, and 107, from Big and Little Silver Creeks, also had anomalously high silver or molybdenum contents (see map). The silver probably was derived from known upstream mineral deposits, but rock samples from those deposits were low in molybdenum content; thus, the molybdenum in the sediments may have come from other sources.

Deposits that are known to contain silver, gold, lead, and zinc occur in the mineralized belt, adjacent to the Montezuma and Bear River faults, that extends across the entire roadless area. The known deposits, the possible undiscovered deposits indicated by anomalously large amounts of metal in some stream-sediment samples, and the favorable geologic environment along the fault zones mark the entire terrane of the belt as having a low resource potential for silver, gold, and molybdenum. Several smaller areas around and near some of the known lode deposits in the belt have moderate resource potential for one or more of the metals silver, gold, lead, molybdenum, and zinc. Four localities within the belt have moderate resource potential for placer gold. A small area in the headwaters vicinity of Chapman Creek in the northern part of the roadless area has a low resource potential for gold, silver, and copper near a small dioritic intrusion. Two geothermal lease applications, nos. I-15985 and I-15986, overlap the northern boundary of the roadless area (fig. 2), but the applications are centered around the Bonneville Hot Springs, which are outside the roadless area. Anomalous quantities of fluorine and uranium were found in some stream-sediment samples, but there is no evidence of areas having resource potential for these elements. Coal, oil, and gas do not exist in the area.

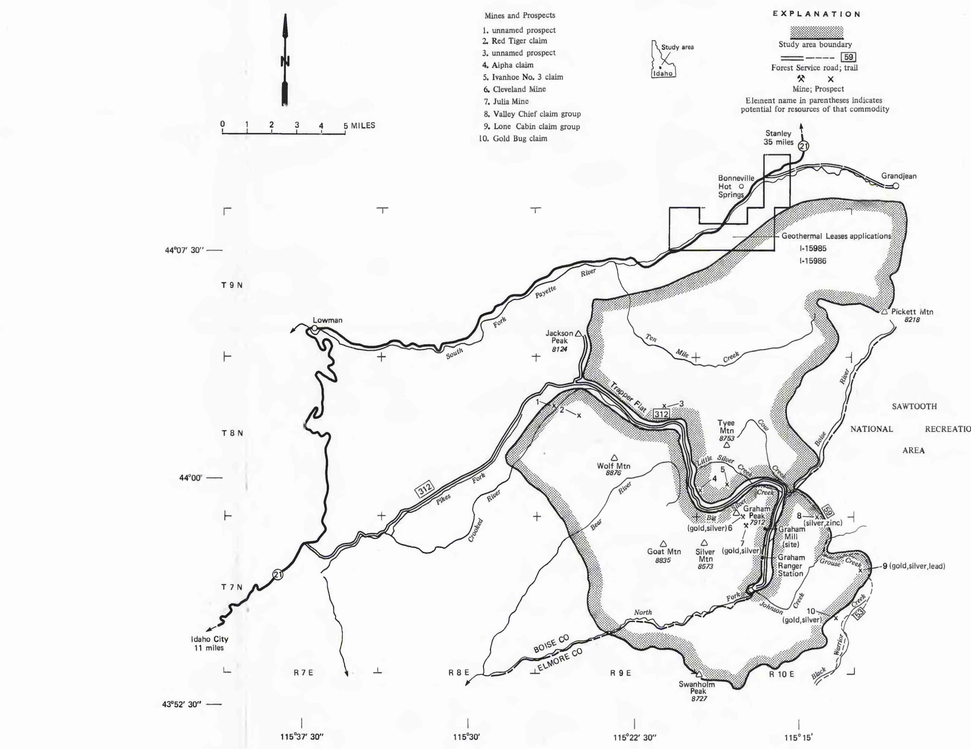

Figure 2.--Map showing lode sample localities in the Ten Mile West Roadless Area.

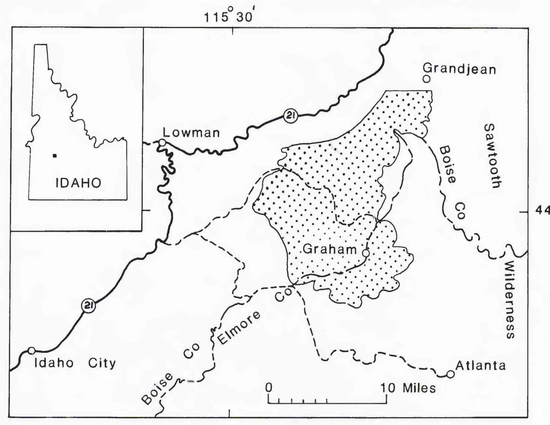

Figure 1.--Index map showing location of Ten Mile West Roadless Area, stippled (W4061), Idaho.

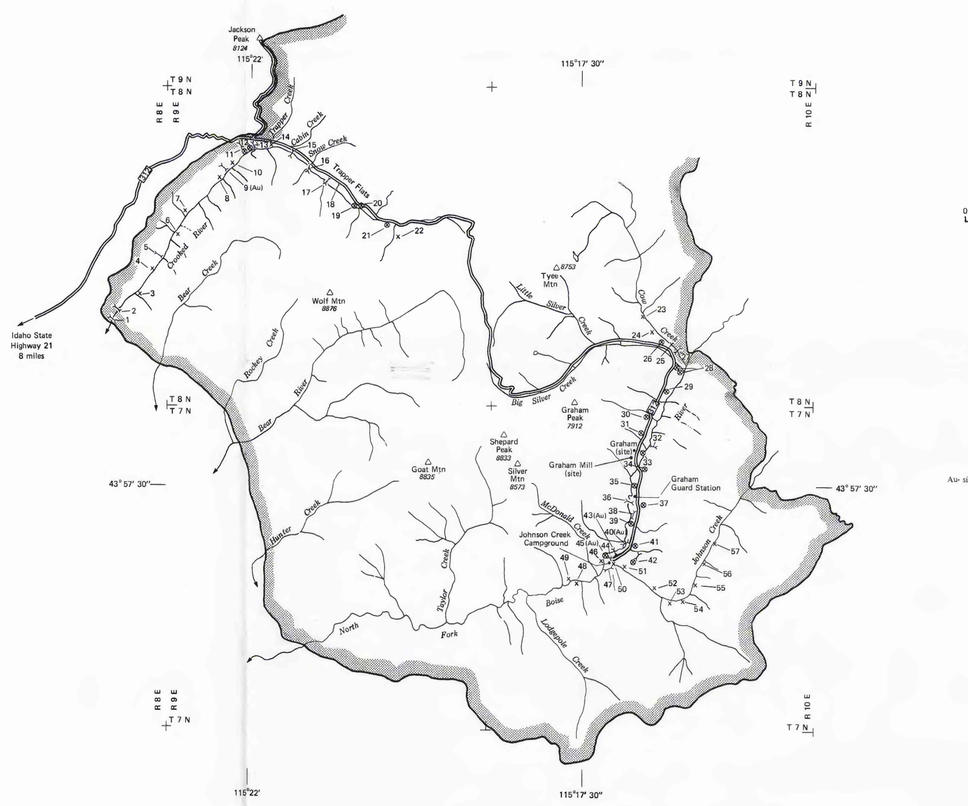

Figure 3.--Map showing placer sample localities, south-central part of the Ten Mile West Roadless Area.

REFERENCES

Benham, J. R., and Avery, D. W., 1983, Mineral Investigation of the Ten Mile West RARE II AREA (No. W4-061), Boise and Elmore Counties, Idaho: U.S. Bureau of Mines MLA Open-File Report.

Kiilsgaard, T. H., 1982, Analytical determinations from samples taken in the Ten Mile West Roadless Area, Boise and Elmore Counties, Idaho: U.S. Geological Survey Open-File Report 82-1099, 34 p.

_____1983a, Geologic map of the Ten Mile West Roadless Area, Boise and Elmore Counties, Idaho: U.S. Geological Survey Miscellaneous Field Studies Map MF-1500-A, scale 1:62,500.

_____1983b, Geochemical map of the Ten Mile West Roadless Area, Boise and Elmore Counties, Idaho: U.S. Geological Survey Miscellaneous Field Studies Map MF-1500-B, scale 1:62,500.

Kiilsgaard, T. H., Freeman, V. L., and Coffman, J. S., 1970, Mineral resources of the Sawtooth Primitive Area: U.S. Geological Survey Bulletin 1319-D, 174 p.

Mabey, D. R., in press, Geophysical maps of the Ten Mile West Roadless Area, Boise and Elmore Counties, Idaho: U.S. Geological Survey Miscellaneous Field Studies Map MF-1500-D.

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