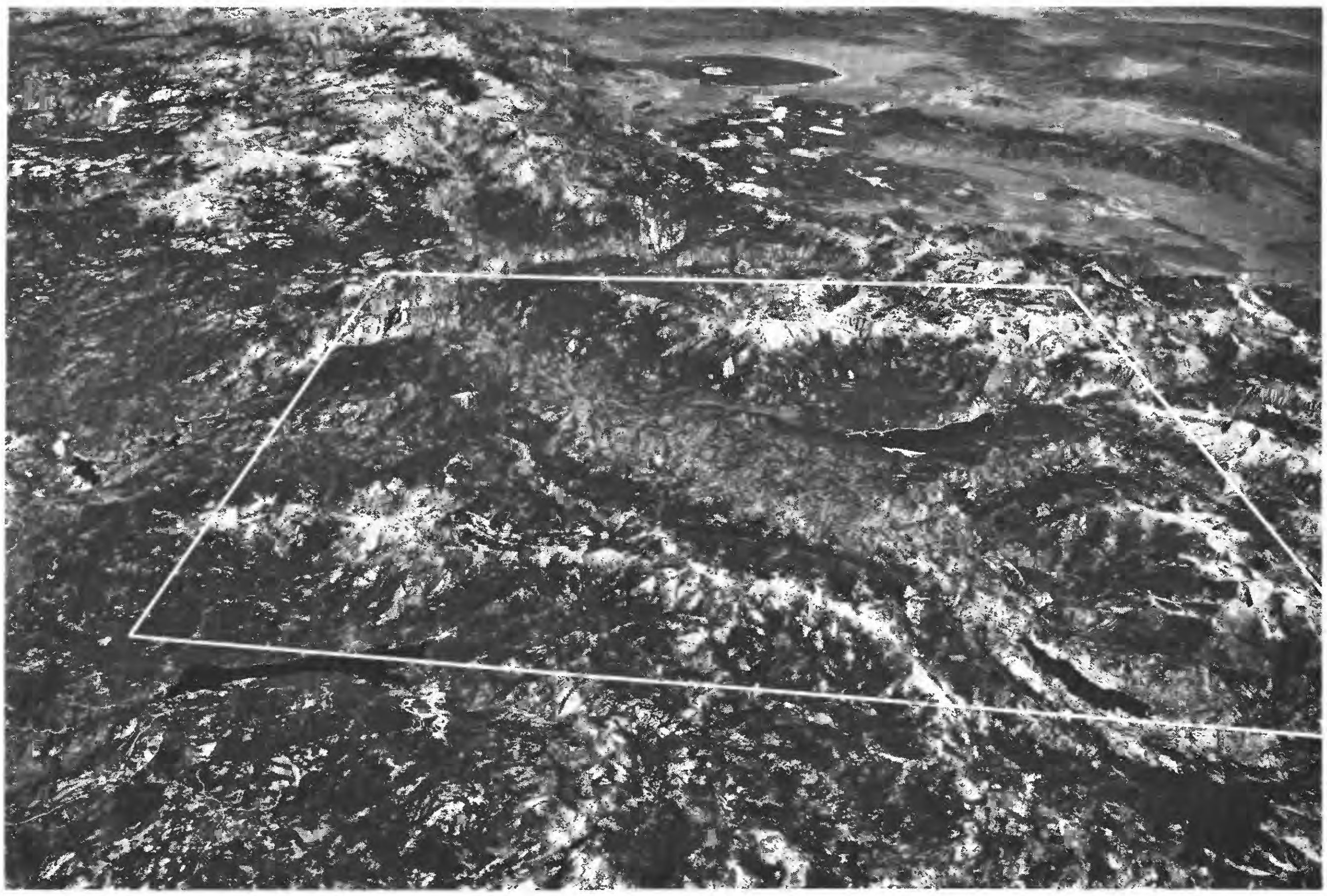
Mineral Resource Evaluation of the U.S. Forest Service Sierra Demonstration Project Area, Sierra National Forest, California

GEOLOGICAL SURVEY PROFESSIONAL PAPER 714

MINERAL RESOURCE EVALUATION,
U.S. FOREST SERVICE SIERRA
DEMONSTRATION PROJECT AREA



High-altitude view of the Sierra Demonstration Project area from the south. The four prominent lakes in the middleground are manmade hydroelectric reservoirs (from left to right: Mammoth Pool, Huntington Lake, Lake Thomas A. Edison, Florence Lake). Mono Lake in background.

Mineral Resource Evaluation of the U.S. Forest Service Sierra Demonstration Project Area, Sierra National Forest, California

By J. P. LOCKWOOD, P. C. BATEMAN, *and* J. S. SULLIVAN

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A geological appraisal of the mining and recreational potential of public lands in part of the San Joaquin River basin, Sierra Nevada

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GLOSSARY

Alkali feldspar. Potassium- or sodium-rich feldspars (microcline, orthoclase, albite, anorthoclase, and so forth).

Alluvium. Unconsolidated sediment deposited by rivers and streams.

Batholith. A very large mass of granitic rocks. Most batholiths are composed of numerous plutons.

Colluvium. Slope wash, talus, and other unconsolidated debris that covers bedrock exposures.

Detrital. Describes rocks or mineral grains formed by the disintegration and erosion of older, preexisting rocks.

Diorite. A granitic rock composed of sodic plagioclase and biotite, hornblende or pyroxene, and lacking appreciable potassium feldspar.

Foliation. Planar structure in any rock.

Granitic. Describes medium- to coarse-grained quartz-bearing igneous rocks which have cooled slowly at depth.

Granodiorite. A granitic rock composed of quartz, sodic plagioclase, biotite, hornblende, and a little potassium feldspar.

Hornfels. A very fine grained flinty metamorphic rock formed from shale or marl.

Igneous. Applied to crystalline or glassy rocks which have formed by cooling of once-molten rock.

Joint. A straight or slightly curved fracture or crack in solid bedrock. Usually found as parallel or subparallel sets.

Lode deposit. A mineral deposit found within solid bedrock.

Magma. Molten rock that generally contains suspended crystals.

Marble. A dense crystalline rock formed by the metamorphism of limestone or dolomite.

Mesozoic. An era of geologic time extending from about 65 to 235 million years ago.

Metamorphic. Pertains to rocks that have been recrystallized as a result of heat and pressure.

Metamorphism. The process of rock alteration by heat and pressure.

Moraine. Bouldery sediment transported and deposited by glaciers. Lateral moraines are ridges of bouldery material deposited along the sides of glaciers.

Paleozoic. An early era of geologic time extending from about 235 to 570 million years ago.

Pegmatite. Very coarse grained dike rocks consisting principally of quartz and feldspar.

Pelitic hornfels. Dense fine-grained rock formed by the thermal metamorphism of shale.

Phenocryst. A crystal in an igneous rock, which is much larger than surrounding crystals. Phenocrysts in granitic rocks are generally potassium feldspar.

Placer deposit. A deposit of heavy minerals concentrated in unconsolidated sediments by water or wind.

Pleistocene. An epoch of geologic time extending from about 10,000 to 2–3 million years ago and characterized by widespread and repeated episodes of glaciation.

Pluton. An individual body of intrusive igneous rock with its own individual characteristics and history of emplacement.

Pumice. A highly vesicular form of volcanic glass, so light that it will generally float on water.

Quartz monzonite. A light-colored granitic rock composed of biotite, quartz, and nearly equal amounts of sodic plagioclase and potassium feldspar.

Quartzite. A dense rock composed of quartz grains cemented by quartz.

Schist. A medium- to coarse-grained metamorphic rock in which numerous parallel flakes of mica or other platy minerals cause the rock to split into slabs and plates.

Tactite. A dark rock formed from limestone or other carbonate rock by reaction with fluids from an intruding igneous magma.

Trachybasalt. A dark volcanic rock that contains potassium feldspar.

MINERAL RESOURCE EVALUATION OF THE U.S. FOREST SERVICE SIERRA DEMONSTRATION PROJECT AREA, SIERRA NATIONAL FOREST, CALIFORNIA

By J. P. Lockwood, P. C. Bateman, and J. S. Sullivan

ABSTRACT

The known geologic history of the 240,000-acre Sierra Demonstration Project area covers about half a billion years and records a complex sequence of sedimentary deposition, volcanism, metamorphism, granitic intrusion, erosion, and glaciation. Metal deposits of the project area are of three kinds: contact metasomatic deposits formed within the bodies of metamorphic rock by reaction with fluids associated with invading magmas, vein deposits formed along regionally widespread joints that cut the metamorphic and granitic bedrocks, and placer deposits found along streams or the courses of former streams. To evaluate the mineral potential of each of these types of deposits, we visited and sampled all known mines and prospects and conducted a detailed geochemical sampling program over the entire area to determine the distribution of metals and to locate any anomalous metal concentrations. Samples of 599 stream sediments and of 159 bedrock and miscellaneous materials were collected and analyzed for 30 metallic elements.

No large mineral deposits suitable for major commercial exploitation are now known or are likely to be found in the foreseeable future in the Sierra Demonstration Project area. Small tungsten deposits on Kaiser Ridge have been mined and are being further explored. Small low-grade deposits of placer gold along Kaiser Creek are being worked sporadically. Very small deposits containing high concentrations of copper, lead, molybdenum, silver, and zinc occur along a mineralized joint system in the northeast corner of the Sierra Demonstration Project area, but their restricted extent and difficult access make exploitation economically unattractive at the present time. Nonmetallic mineral resources of the project area include quartz, ornamental stone, and sand and gravel. Because similar products are available much closer to market areas, these resources are not likely to be exploited.

Several geologic features are of recreational and educational value and can be considered resources for people today and for future generations. These include volcanic flows and ash falls, hot-spring deposits, glacial moraines, and other features.

INTRODUCTION

PURPOSE OF THE INVESTIGATION

The public lands of the United States contain the nation's principal recreational and wildlife areas and important reserves of timber, water, forage, minerals, and other natural resources. Public need for all these resources places different and frequently conflicting demands upon the public lands.

The U.S. Forest Service is deeply concerned that the National Forests be utilized to their fullest extent under the multiple-use concept. Accordingly, it established the Sierra Demonstration Project to develop rapid and accurate means for obtaining the basic resource information required for intelligent management decisions. This project is designed to explore the feasibility of obtaining all required resource information concurrently, using up-to-date technological methods from several engineering and scientific disciplines (Swinnerton, 1969).

To evaluate the mineral potential of the Sierra Demonstration Project area, the U.S. Forest Service asked the U.S. Geological Survey early in 1969 to conduct a mineral survey of the area. A cooperative program between the two agencies was initiated, and a field survey was undertaken during the summer of 1969. In addition to the Sierra Demonstration Project area proper, the survey covered a wedge of land to the west between the project area and the San Joaquin River. Henceforth, this expanded area will be referred to as the project area. The results of our survey of that area are contained herein.

LOCATION AND GENERAL FEATURES

The Sierra Demonstration Project area is 60 miles northeast of Fresno, Calif., about midway between Yosemite and Kings Canyon National Parks on the gentle west slope of the central Sierra Nevada (fig. 1). It includes the Kaiser Peak 15-minute quadrangle and the west half of the Mount Abbot 15-minute quadrangle (figs. 1, 2). Most of the project area is in Fresno County, but the northwest corner extends into Madera County. The area is in the north half of the Sierra National Forest, and the east one-third lies within the John Muir Wilderness. The total area, which includes the area between the west side of the project area proper and the

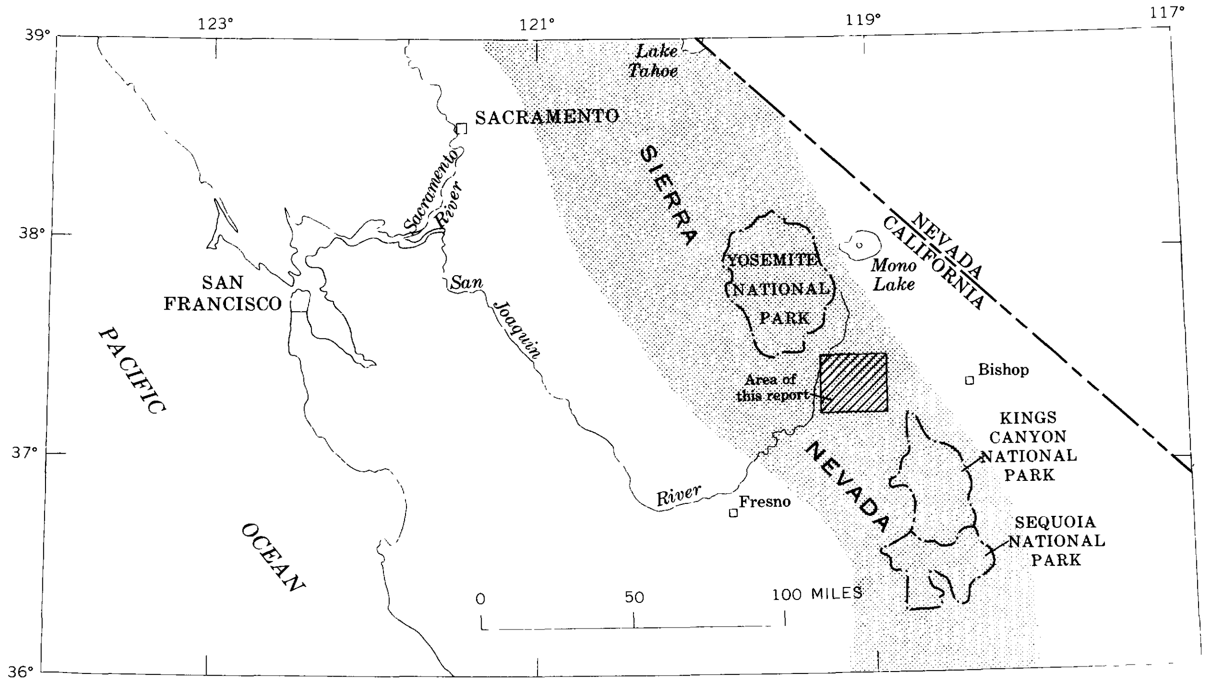

FIGURE 1.—Location of the Sierra Demonstration Project area.

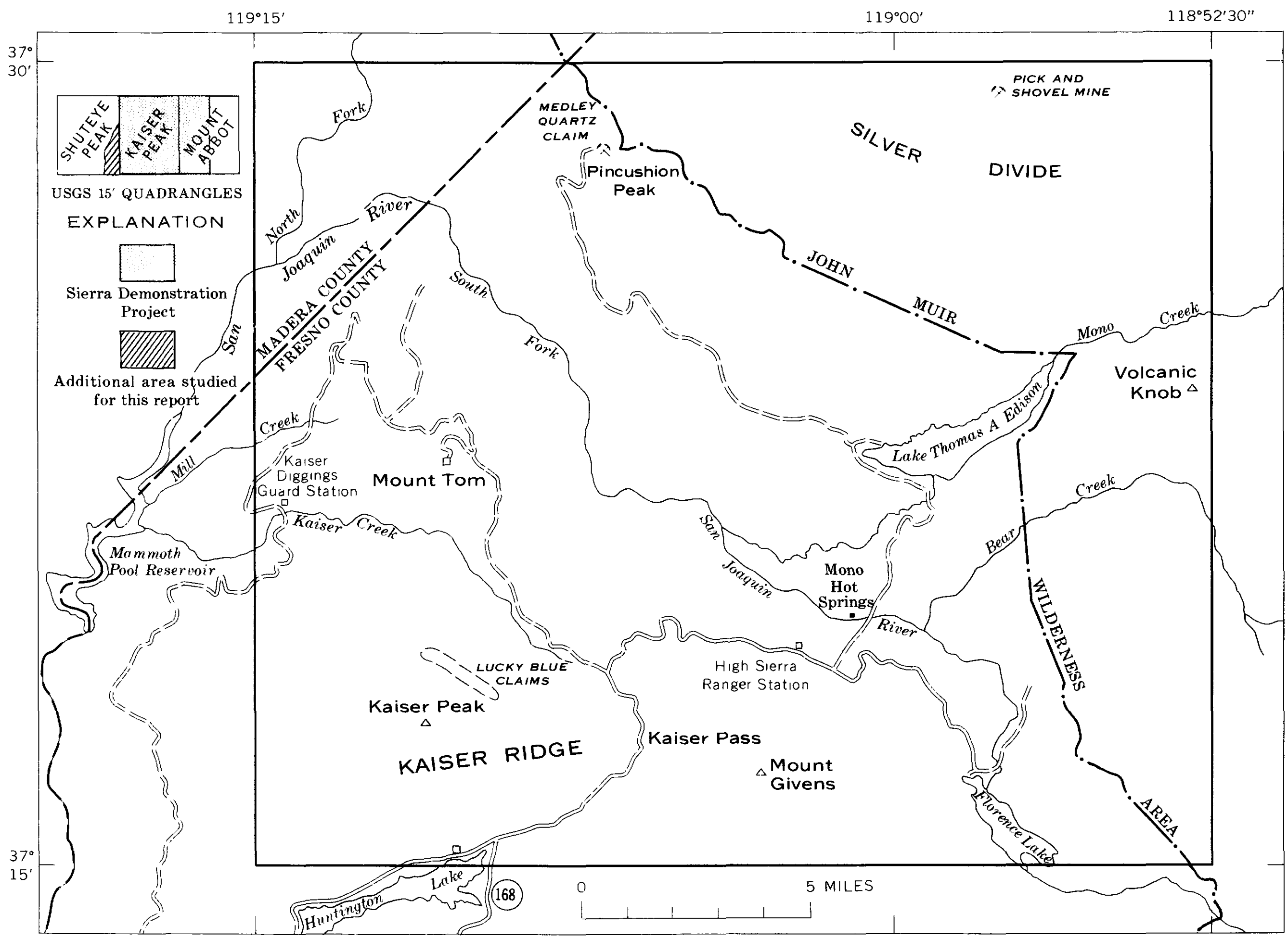

FIGURE 2.—General physiographic and cultural features of the Sierra Demonstration Project area.

San Joaquin River, encompasses approximately 405 square miles (1,025 km^2).

All the project area lies within the drainage basin of the San Joaquin River, the South Fork of which flows northwestward through the central part of the area. Mono Creek and Bear Creek are principal tributaries to the South Fork within the project area. Along the north edge of the area, north-flowing Silver and Fish Creeks drain basins on either side of Silver Divide. In the southwestern part of the area, Kaiser Creek drains the north flank of Kaiser Ridge, and Big Creek drains the south flank.

At higher elevations many small natural lakes fill depressions created by glacial erosion during Pleistocene alpine glaciation, but the four largest lakes in the area (frontispiece) are manmade reservoirs for hydroelectric power projects. Most elevations within the project area are 6,500 to 9,500 feet above mean sea level, although elevations rise to 12,349 feet at Mount Hooper, 4 miles northeast of Florence Lake, and drop to 2,450 feet where the San Joaquin River flows out of the area at the southwest corner. The upper part of the South Fork of the San Joaquin River flows in a broad glacially modified valley, but downstream the river is entrenched in a narrow canyon 1,600 feet deep.

Precipitation ranging from 24 to 32 inches per year is primarily snow at higher elevations and rain at lower elevations (U.S. Weather Bureau, 1959). Forests of ponderosa, jeffrey, and lodgepole pine along with red and white fir cover most of the area. Logging is currently being carried on in the Kaiser Creek basin. At lower elevations shrubs such as manzanita, Sierra chinquapin, and mountain white-thorn are common. Willows, quaking aspen, and alder line many streams. At highest elevations glacial erosion has exposed large areas of bedrock, and the sparse soil-covered areas support only alpine vegetation.

State Highway 168 from Fresno ends at Huntington Lake, near the south boundary of the project area (fig. 2). Continuing on from the northeast corner of Huntington Lake into the project area is a narrower one- to two-lane blacktop road which leads over Kaiser Ridge through 9,175-foot-high Kaiser Pass into the basin of the South Fork of the San Joaquin. One branch of this road ends at Lake Edison and the other at Florence Lake. By late 1971, this road had been widened and improved nearly to Kaiser Pass. Beyond Kaiser Pass the road is narrow and steep, which tends to limit the number of people entering the area. On the other hand, it is adequate for passenger car traffic and offers a highly scenic drive into this undeveloped country in the heart of the Sierra Nevada.

The other route into the area is an unpaved, graded road that begins near the town of Big Creek southwest of Huntington Lake and extends northward along the east valley wall of the San Joaquin River into the Kaiser Creek basin. This road provides access to recreational areas along the San Joaquin River and Kaiser Creek and is also used by logging trucks. Branching from these two roads are a few unimproved roads suitable mainly for 4-wheel-drive vehicles. All roads into the area are closed by snow during the winter months.

A network of trails for hikers and horseback riders crosses the area. The John Muir Trail crosses the east edge of the area close to the crest of the Sierra Nevada.

GEOCHEMICAL INVESTIGATION

A program of geochemical sampling was carried out to gain information that might bear on the origin of the known mineral deposits and to evaluate the potential of the project area for undiscovered mineral resources. This program involved extensive collection of both bedrock and stream-sediment samples and laboratory analysis to determine metal content.

SAMPLING PROGRAM

Before any samples were collected, a sampling pattern was laid out for both stream sediments and bedrock. Initially, we planned to collect about one stream-sediment sample per square mile, and about one bedrock sample per 8-square-mile area, but early analytic results indicated the need for more samples of both kinds. We collected 599 stream-sediment samples and 108 samples of typical bedrocks, the latter including 84 granitic rocks, 14 metamorphic rocks, and 10 volcanic flows. In addition, we collected 50 other samples, including nine from lode deposits that have been worked, 23 from unexplored quartz veins, six of altered bedrock, six of mineral-spring precipitates, and six of miscellaneous materials.

The samples of typical bedrock were taken primarily to establish regional patterns of metal content that might affect the compositions of the stream sediments. Stream-sediment samples reflect the metal content of watershed areas rather than local rock units; so many samples were collected just above stream junctions in order to evaluate the metal content of individual drainage basins.

Early analyses indicated that stream sediment is not chemically homogeneous at any one place. Metals such as gold, tungsten, iron, chrome, and vanadium are preferentially concentrated in the coarse gravel and boulder-rich parts of the streambed, whereas copper and molybdenum are most highly concentrated in fine sand and mud. To obtain comparable samples at each locality,

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approximately one-half the required amount of sieved sand ordinarily was taken from gravel near the bottoms of streams, and one-half was taken from sandbars or mud along stream margins. For large streams, however, it was not always possible to sample bottom gravels owing to high water. This was especially difficult early in the summer, when melt runoff from a record snowpack (U.S. Weather Bureau, 1969, p. 78, 116) caused very high water levels.

Most sand samples were wet sieved at the collecting site with a small set of aluminum sieves consisting of a 20-mesh sieve at the top, an 80-mesh sieve, and a collection cup at the bottom. Some samples were collected in bulk, dried, and sieved several days after being collected. Samples of 10 to 30 grams each were taken from each of the two size fractions and placed in cloth sample bags. Initial chemical analyses of both size fractions indicated that the −80 mesh fraction almost invariably contained higher metal concentrations than the −20, +80 fraction and was thus more sensitive as an indicator of metal anomalies. For this reason only the −80 fraction was ordinarily submitted for analysis. Some −20, +80 fractions were submitted as checks for analytical error. In table 3, the size fraction analyzed is indicated by a numerical suffix. Thus, sample 005–20 is the −20, +80 fraction, and 005–80 is the −80 fraction.

ANALYTICAL METHODS AND PROCEDURES

Most of the samples were analyzed chemically and spectrographically for a total of 30 different metallic elements (table 1–3), although 52 of the bedrock samples were only analyzed spectrographically. The chemical analyses, more sensitive and precise than spectrographic analyses, were made for gold, copper, tungsten, and arsenic. The first three elements were considered important potential resources in the project area, and arsenic was considered important as a possible indicator of mineralization in general. Semiquantitative spectrographic analyses were made for 30 elements: silver, arsenic, gold, boron, barium, beryllium, bismuth, calcium, cadmium, cobalt, chromium, copper, iron, lanthanum, magnesium, manganese, molybdenum, niobium, nickel, lead, antimony, scandium, tin, strontium, titanium, vanadium, tungsten, yttrium, zinc, and zirconium. Spectrographic analyses of arsenic, gold, copper, and tungsten are omitted from table 3 because these elements were also analyzed chemically, and calcium, magnesium, and titanium are omitted because they are not significant in this study. Cadmium and antimony are omitted from table 3 because they were not found in any sample.

Approximate mean metal contents were calculated for each group of principal sample types analyzed (table 3). Mean values in parentheses are considered unreliable, generally because measureable values are too few for calculation of a representative average.

All analyses were performed by Geological Survey personnel. Chemical analyses were made in Winnemucca, Nev., Denver, Colo., and in a mobile field laboratory based at the High Sierra Ranger Station. All spectrographic analyses were performed in Denver, except for sample 105F and 51 other bedrock samples (with numbers beginning with "A" or "KP"), which were analyzed in Menlo Park, Calif. Samples received by the analytical laboratories were ground if necessary (for example, rock samples) and sieved to −80 mesh size. The following quantities of sample were then removed for analysis:

Spectrographic analysis	10 mg
Chemical analysis:	
Gold	10 g
Copper	1 g
Tungsten	.2 g
Arsenic	.1 g

The aliquots for gold and copper were dissolved in acid and analyzed by standard atomic absorption techniques (Ward and others, 1969). Lower sensitivities of 0.02 and 10 ppm (parts per million), respectively, were obtained by this method. Tungsten and arsenic contents were determined by colorimetric analysis, as described by Ward, Lakin, Canney, and others (1963, p. 40–44 and 78–79). Minimum sensitivities of these methods are 20 and 10 ppm, respectively. The methods of spectrographic analysis are described by Ward, Lakin, Canney, and others (1963, p. 91–94).

PREVIOUS STUDIES

Geologic study of three quadrangles that cover the project area was nearly completed when this study was begun and provided a sound basis for evaluating the mineral potential of the area. Geologic maps of the Shuteye Peak quadrangle (Huber, 1968) and the Kaiser Peak quadrangle (Bateman and others, 1971) are already published, and a geologic map of the Mount Abbot quadrangle is in final stages of preparation.

The first geologic observations of the area were made by members of J. D. Whitney's geological survey party, who traversed the project area in 1864 (Whitney, 1865). A reconnaissance study of the geomorphology and glacial geology of the area was made by F. E. Matthes in the 1930's and published in 1960. A more detailed study of the glacial geology along Mono Creek and the South Fork of the San Joaquin River was made by Birman (1964) at the time of construction of Vermillion Dam (below Lake Thomas A. Edison). Chesterman (1942) described a small area of metamorphic rocks north of Kaiser Peak, and Hamilton (1956) studied the geology of a part of the Demonstration Project area immediately north of Huntington Lake. The geology of the north half of the Mount Abbot quandrangle, including the northeast corner of the Demonstration Project area, has been described by Sherlock and Hamilton (1958).

No comprehensive mineral resource surveys had been conducted in the area of the Sierra Demonstration Project prior to this study, although the area has been extensively prospected over the past century, mainly for gold and tungsten.

ACKNOWLEDGMENTS

The U.S. Forest Service provided excellent support during the field investigations. Leigh B. Lint of the Forest Service's Engineering Division was the principal liaison officer between the Geological Survey and the Forest Service and was responsible for coordinating helicopter support and providing aerial photographs. The Forest Service provided 48.1 hours of helicopter flight time in support of our study; the capable helicopter pilotage of Harold Dickey contributed to our success in covering a large area in a very short period. The many courtesies extended by Mr. Lint and by Arnold P. Snyder and Michael P. Goggin of the High Sierra Ranger Station are greatly appreciated. Color aerial photographs of the project area at scales of 1:48,000 and 1:24,000 taken during the summer of 1968 for the Forest Service, greatly facilitated our field investigations. They were invaluable in locating areas of mineralized or otherwise anomalous rock formations, enabled us to plan helicopter landing sites, and greatly facilitated cross-country foot traverses over difficult terrain.

Frank E. Barr assisted field operations for 1 month under the sponsorship of the National Science Foundation Research Observer Program for secondary school instructors. Ronald J. Fitzhugh assisted in the sampling program and is largely responsible for compilation of the extensive geochemical data. Messrs. Floyd T. Wilmoth and Lawrence C. Wehmeyer kindly showed us their mining claims and allowed us to sample their workings.

GEOLOGIC FEATURES

The Sierra Demonstration Project area is near the center of the Sierra Nevada batholith, a large composite body of granitic rock that makes up about 80 percent of the bedrock of the Sierra Nevada. Metamorphic rocks older than the batholith underlie the remainder of the Sierra Nevada. The geology of the Sierra Nevada and the Sierra Nevada batholith was described by Bateman and Wahrhaftig (1966) and by Bateman and Eaton (1967). Readers desiring more-detailed information will find numerous references to technical studies in these publications.

Rocks of the project area can be broadly divided into four principal groups: (1) old, pregranitic metamorphic rocks, (2) granitic rocks, (3) much younger volcanic formations, and (4) very young unconsolidated sedimentary deposits that overlie bedrock and include both stream and glacial deposits. The distribution of the major bedrock units is shown in figures 9–14.

METAMORPHIC ROCKS

The pregranitic rocks include all the sedimentary and volcanic rocks into which the granitic magmas were intruded. These rocks were metamorphosed by heat and pressure, which preceded and accompanied the emplacement of granitic magma. All these metasedimentary rocks and most of the metavolcanic rocks are conspicuously stratified, and although they were deposited originally in horizontal or gently dipping layers, they have been strongly folded and faulted and in most exposures dip steeply or are vertical. The metamorphic rocks must have been more widespread before the extensive erosion that followed emplacement of the granitic rocks. Although not very abundant in the project area, the metamorphic rocks are favorable hosts for metallic ore deposits and are of particular importance in this investigation.

The metamorphic rocks include an older group of metasedimentary rocks and a younger group of metavolcanic rocks. The metasedimentary rocks were derived by the erosion of an ancient landmass and were deposited in Paleozoic seas 575–235 m.y. (million years) ago, when shallow seas covered much of western North America. These strata were folded, faulted, and eroded before the overlying metavolcanic rocks were deposited. Remnants of metasedimentary rocks include numerous masses along Kaiser Ridge and the eastern part of the Mount Morrison roof pendant, which extends into the northeast corner of the project area. The principal rocks along Kaiser Ridge are quartzite, hornfels, and marble. The most common rock in the part of the Mount Morrison roof pendant within the project area is hornfels.

The metavolcanic rocks were deposited across the metasedimentary strata after these strata had been deformed and then truncated by erosion, during the early and middle Mesozoic, 235–135 m.y. ago. They include metamorphosed lava flows, pyroclastic deposits, associated dikes and sills, and sedimentary rocks that were derived from the volcanic rocks by rapid erosion shortly after deposition. Remnants of metavolcanic rocks occur north of Silver Divide, northeast of Lake Edison, northeast of Florence Lake, and in the western part of the Mount Morrison roof pendant. The most common metavolcanic rocks are light- to dark-gray mica schists, some of which stain orange on weathering. They were formed by the recrystalization of volcanic ash beds and associated lava flows. Typical metavolcanic rocks are exposed along the Bear Creek trail at and above Bear Diversion Dam. Dark metavolcanic schists that form the top of Red and White Mountain in the Mount Morrison roof pendant can be viewed from near the High Sierra Ranger Station.

GRANITIC ROCKS

The granitic rocks underlie about 95 percent of the project area. They intruded the older, folded and faulted sedimentary and volcanic rocks as molten or partly molten magma. The granitic rocks of the project area consist of at least 20 different plutons, most of which were intruded and solidified at different times. For this report, the plutons have been grouped into seven map units (figs. 9–14). These plutons are divisible into two principal age groups: a younger group that was emplaced 90–79 m.y. ago and an older group that was emplaced more than 100 m.y. ago (Evernden and Kistler, 1970).

The plutons of the older group includes three geographically separated units: (1) the granodiorite of Dinkey Creek in the southwestern part of the project area, (2) a pluton of quartz monzonite northeast of Florence Lake, and (3) the alaskite of Graveyard Peak north of Lake Edison. The relative ages of these plutons are not known, since the plutons are nowhere in contact with one another.

The largest of these older plutons is the granodiorite of Dinkey Creek. Rocks of this pluton are light to medium gray and nearly everywhere contain abundant dark inclusions of biotite and hornblende diorite. In most places the granodiorite of Dinkey Creek is separated from the Mount Given Granodiorite, which belongs to the younger group, by the metasedimentary rocks of Kaiser Ridge. Radiometric age dates from the granodiorite of Dinkey Creek range from 115 to 104 m.y. (Evernden and Kistler, 1970). A few older, small plutons of granodiorite and quartz monzonite along the west margin of the project area are included with the granodiorite of Dinkey Creek in figures 9–14.

The quartz monzonite of Bear Dome northeast of Florence Lake is generally fine grained and forms prominent topographic features such as Bear Dome, Jackass Dike, and The Tombstone. Much of this pluton is rimmed by the light-colored metavolcanic rocks of Bear Creek.

The alaskite of Graveyard Peak is a large mass of very light colored granite along the north margin of the project area. This rock, which commonly weathers to red orange, forms the Vermillion Cliffs northeast of Lake Edison. Also included as alaskite in figures 9–14 are numerous small bodies of other old rocks that range in composition from gabbro to granodiorite.

Age relations among the younger (90–79 m.y.) group are well known. The oldest pluton of this group is the Lamarck Granodiorite, a narrow body which crops out northeast of the Bear Creek metavolcanic rocks. This granodiorite, widespread south of the project area, is medium grained, contains abundant dark inclusions, and is typified by large well-formed crystals of black hornblende. In the southeast corner of figures 9–14, a body of porphyritic quartz monzonite similar to the quartz monzonite of Recess Peak has been included with the Lamarck Granodiorite.

Next oldest is the Mount Givens Granodiorite, which underlies the entire basin of the San Joaquin River between Kaiser Ridge and Lake Edison. The Mount Givens Granodiorite is one of the largest single plutons in the Sierra Nevada batholith and extends several miles to the north, south, and west of the project area. This granodiorite is exposed in nearly all the roadcuts from Kaiser Pass to Florence and Edison Lakes. Texturally the Mount Givens is a variable rock, although in most places it is light gray and medium grained equigranular and contains scattered dark discoidal inclusions. Along much of the west margin of the project area, ½–1-inch-size phenocrysts of potassium feldspar are abundant, and dark inclusions are absent.

Next oldest of the 90–79 m.y. group is the granodiorite of Lake Edison. This pluton trends northwest-southeast across the northeastern part of the project area and forms the east shores of Lake Edison. It is generally fine grained and is characterized by abundant small crystals of honey-colored sphene. Along its margins much of this pluton is light colored and has the composition of quartz monzonite.

The youngest pluton of this group is the quartz monzonite of Recess Peak, in the northeast corner of the project area. This unit is the coarsest grained of all granitic rocks in the project area and typically contains 5–20 percent of giant phenocrysts of potassium feldspar, which are as much as 4 inches long. Although all in situ exposures of this quartz monzonite are far from roads, large boulders of this rock are common in glacial moraines near Lake Edison.

VOLCANIC ROCKS

After the granitic rocks cooled and solidified, the Sierra Nevada was uplifted in various episodes, and several miles of overlying rock was removed by erosion, exposing the levels of granitic rocks we see today. About 10 m.y. ago, volcanic activity resumed in the Sierra

Nevada, and it has continued into historical times. In the project area, volcanoes along Silver Divide and upper Mono Creek erupted about 3½ m.y. ago (Dalrymple, 1963) and poured moderately large quantities of trachybasalt lava into low-lying areas. Feeder pipes for these volcanoes are present east of Pincushion Peak and on Volcanic Knob. Erosion has removed the superstructure of the volcanoes as well as most of the lava flows which must have once covered much of the San Joaquin River's South Fork valley. Remnants of the flows crop out along the South Fork valley, Silver Divide, and Mono Creek.

JOINTS

Conjugate joints are well developed in the bedrock of most parts of the project area and are among the most prominent structural features observable in aerial photographs of this region (frontispiece, especially near Florence Lake). The joints average about N. 40° E. and N. 20° W. in strike and dip steeply, but the range of attitudes is wide. They were formed several million years ago by regional stresses after consolidation of the granitic rocks; many are the loci of later small-scale strike-slip faults (fig. 3). Longer and more conspicuous joints contain crushed and altered rock that erodes to form low-lying linear trenches along which soil, brush, and timber are concentrated. Shorter and less conspicuous joints are well exposed in nontimbered areas, and many contain narrow veinlets of quartz, epidote, and chlorite (fig. 4). These veinlets are of potential economic importance, since they commonly contain minor amounts of ore minerals.

UNCONSOLIDATED DEPOSITS

GLACIAL DEPOSITS

During the Pleistocene, most of the project area was repeatedly covered by thick alpine glaciers. These ice masses transported enormous quantities of rock downhill and greatly modified the topography of the region. Deposits of glacially transported till, moraine, and outwash cover approximately 15 percent of the project area, but are not shown in figures 9–14. The engineering properties of these glacial deposits are important to construction activities, and persons interested in their distribution should refer to detailed geologic maps of this area (see section on "Previous Studies") and to the report of Birman (1964).

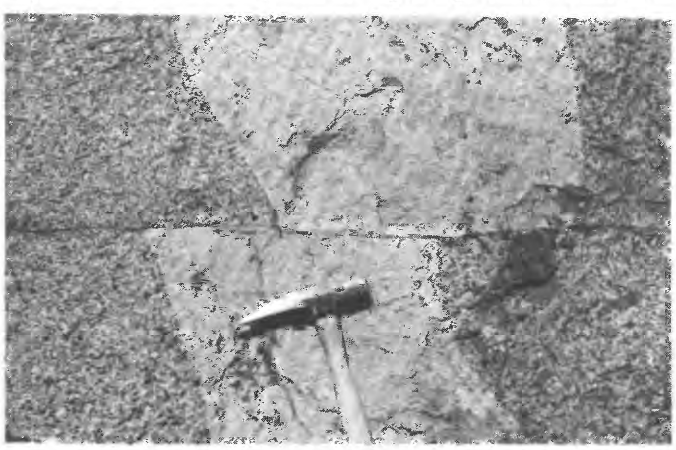

FIGURE 3.—Right-lateral offset of a fine-grained dike along a joint near Bear Diversion Dam. Note quartz vein along the joint.

LAKE AND STREAM DEPOSITS

Since the last glacial recession, lakes at higher elevations have accumulated only small amounts of silt and clay. A few lakes at lower elevations have, however, been completely filled with sediment and now are beautiful

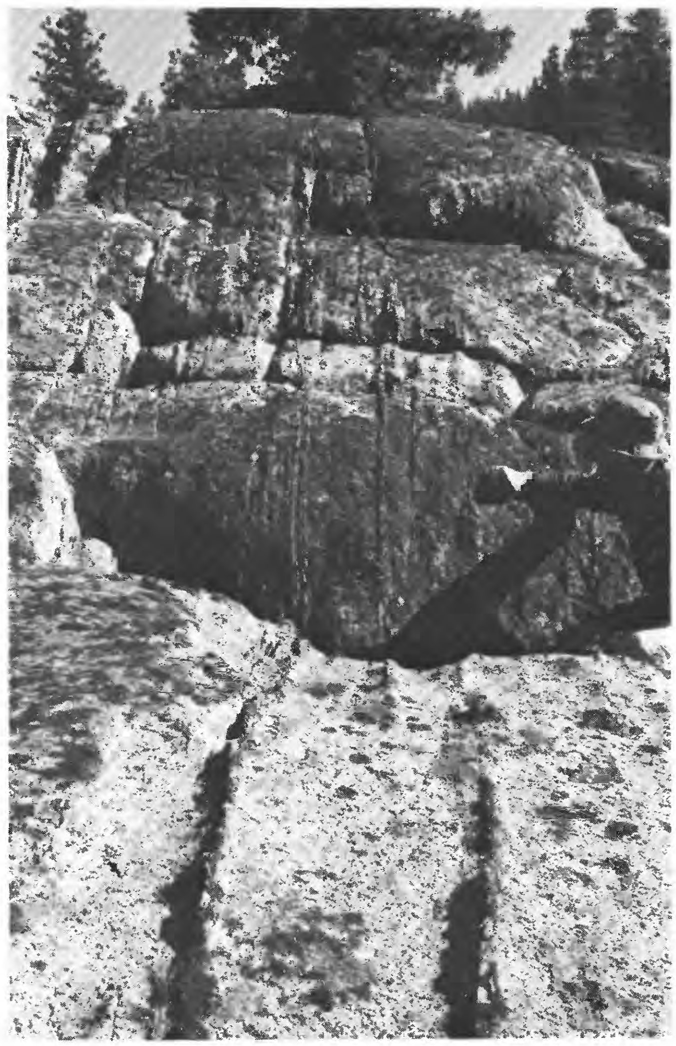

FIGURE 4.—Mineralized joints in Mount Givens Granodiorite 1 mile west of Mono Hot Springs. The joints are filled with narrow (1/32–¼ inch) quartz veins and are bordered by alteration zones ½–1½ inches wide, which are resistant to erosion and stand out in relief. Joints strike N. 20° E.

mountain meadows such as Graveyard Meadows north of Lake Edison. Most streams have only minor accumulations of gravel and sand, and large alluvial deposits have developed only along the San Joaquin River. Stream sediments are of economic interest since those in the western part of the project area contain placer gold.

PUMICE

Violent eruptions in the Mammoth Lakes region several hundred years ago ejected tremendous volumes of white rhyolite pumice, which was carried southward by winds into the east half of the project area. In the northeastern part of the area, waterlogged pumice makes up a large fraction of the stream sediments; however, the amount of pumice decreases southward, and at Kaiser Pass only scattered fragments are present in sheltered pockets in bedrock.

MINERAL RESOURCES

RELATION OF MINERAL DEPOSITS TO GEOLOGY

Metalliferous deposits of the Sierra Demonstration Project area fall into two groups—lodes (formed and found within the granitic and metamorphic bedrock of the area) and placers (heavy minerals transported and concentrated by streams).

The lode deposits are of two kinds: contact metasomatic deposits found only in metamorphic rocks and vein deposits that occur in both the metamorphic and granitic rocks. The contact metasomatic deposits were mainly formed by hot, metal-bearing fluids that emanated from cooling granitic magma and reacted with and partly replaced metamorphic rocks along or near granitic contacts. Such processes formed the tungsten deposits of Kaiser Ridge and also may account for anomalies of tungsten, copper, gold, tin, and zinc associated with other metamorphic rock masses (table 3). The concentration of some metals may also have been locally enhanced by hot, circulating fluids, which redistributed metals originally present in small amounts throughout the metamorphic rocks. Sulfide-bearing quartz veins that cut metavolcanic rocks along Bear Creek may have such an origin.

The vein deposits postdate the granitic rocks and were formed by metal-bearing solutions that migrated upward along a system of regional joints. Many of these joints are actually small faults and show small amounts of lateral offset (fig. 3). They cut metamorphic and granitic bedrock alike. The veins along these joints consist principally of quartz, epidote, and chlorite, and commonly contain small grains of pyrite, molybdenite, argentiferous galena, and other sulfide minerals. The veins range in width from less than one-sixteenth inch to about 6 feet; most are between one-fourth and 1 inch wide. They generally are bordered by alteration zones much wider than the veins themselves. These alteration zones, in which plagioclase is converted to epidote, albite, and sericite, and mafic minerals to chlorite, are more resistant to weathering than the surrounding unaltered granite and typically stand out in relief (fig. 4). These mineralized veins are most abundant in the northeast half of the project area.

The placer deposits are related to bedrock geology only indirectly—they formed downstream from a bedrock source. Local topography is more important than bedrock lithology in controlling the distribution of placer deposits. All placer deposits in the project area are along segments of stream courses or former stream courses where the gradient is low; placer concentrations are uncommon where the gradient is steep and streamflow rapid.

KNOWN MINERAL OCCURRENCES

TUNGSTEN MINES AND PROSPECTS ALONG KAISER RIDGE

Like most of the tungsten deposits in the Sierra Nevada, deposits in the project area are all of contact-metasomatic origin (Bateman, 1965, p. 123–150). Such deposits form when hot aqueous solutions given off by bodies of cooling and crystallizing granitic magma react with marble and other calcareous country rocks. Contact metasomatism of this kind produces a dark silicate rock, tactite (or skarn), composed chiefly of pyroxene of the diopside-hedenbergite series, garnet of the grossularite-andradite series, quartz, and epidote. Some tactite contains scheelite ($CaWO_4$), the only important tungsten-bearing mineral in contact-metasomatic deposits; tactite may also contain metallic sulfides and oxides of potential economic importance. Many tungsten ores contain less than 1 percent WO_3, so the small amount of scheelite required for commercial exploitation may be visible only under ultraviolet light.

Within the project area scheelite-bearing tactite occurs along Kaiser Ridge, where the tactite hosts are calcareous rocks in the metamorphic septum that separates the granodiorite of Dinkey Creek on the south and west from the Mount Givens Granodiorite on the north and east. Marble and calc-silicate-hornfels are common along a 5-mile span that extends from near the center of the NE¼ sec. 34, T. 7 S., R. 26 E. (about 1 mile north of the Forest Service campground of Badger Flat) northeast to near Pryor Lake (unnamed on the Kaiser Peak quadrangle topographic map) in the S½NE¼ sec. 13, T. 7 S., R. 26 E. Prospect pits are common throughout this span of the septum, especially near

Twin Lakes (Chesterman, 1942), but the only reported production has been from the unpatented Lucky Blue claims held by Mr. Floyd T. Wilmoth of Sunset-Whitney Ranch, Calif. A search of mining records at the Fresno County Recorder's Office in April, 1970, revealed no other tungsten claims for which current notices of annual assessment work have been filed.

The Lucky Blue claims cover the northwest third of the exposures of calcareous rocks (fig. 5). Claims 4 and 5 can be reached by a private road from the Forest Service campground at Sample Meadows, and the other claims are readily accessible from this road. Mr. Wilmoth estimates that tungsten ore valued at approximately $50,000 was produced from claims 4 and 5 during and following the Korean War (1951–56). Much of this production was from glacial erratics that were scattered along the ridge that extends north from the location cuts of the two claims. Most of the exposed scheelite-bearing boulders have been mined, and we saw only one, which appeared under ultraviolet light to contain several percent WO_3. Ore was also shipped from the location cuts on these two claims, according to Mr. Wilmoth.

The principal metamorphic rocks in the vicinity of these opencuts are conspicuously crossbedded white quartzite, pelitic hornfels, and calc-silicate hornfels. Tactite pods formed principally in limestone or calcareous interbeds within the quartzite. At each opencut the tactite is adjacent to dikes and irregular bodies of pegmatite, a relationship suggesting strongly that the tactite is genetically associated with the emplacement of the pegmatite magma, which probably was saturated with water.

Night inspection by ultraviolet light of claims 3, 4, and 5 (which contain the highest grade ore now exposed, according to Mr. Wilmoth) revealed that scheelite is limited to a few small areas several square feet in extent within and adjacent to the opencuts. Examination of the metamorphic rocks between the opencuts revealed only a few small areas of tactite that contains scheelite. Within the mineralized zones scheelite is irregularly distributed in grains that range from pinpoint size to half an inch in diameter. The coarsest scheelite is exposed on chain 3. Only pinpoint-size grains were found on claim 4, but pyrite, chalcopyrite, sphalerite, galena, and magnetite were also present there in irregular streaks and masses.

We obtained composite samples from each of the three opencuts by chipping across each face at different levels, being careful to obtain an even distribution of chips. We took two samples each from claims 4 and 5, and one from claim 3. One sample from claim 4 (2532A) consists mainly of sulfides, and the other (2532B) is chiefly tactite, although both sulfides and silicates are present in both samples. Our first sample from claim 5 (2533A) proved to be from barren rock when the opencut was examined under ultraviolet light, so we took a second sample (2533B) of the highest grade ore ex-

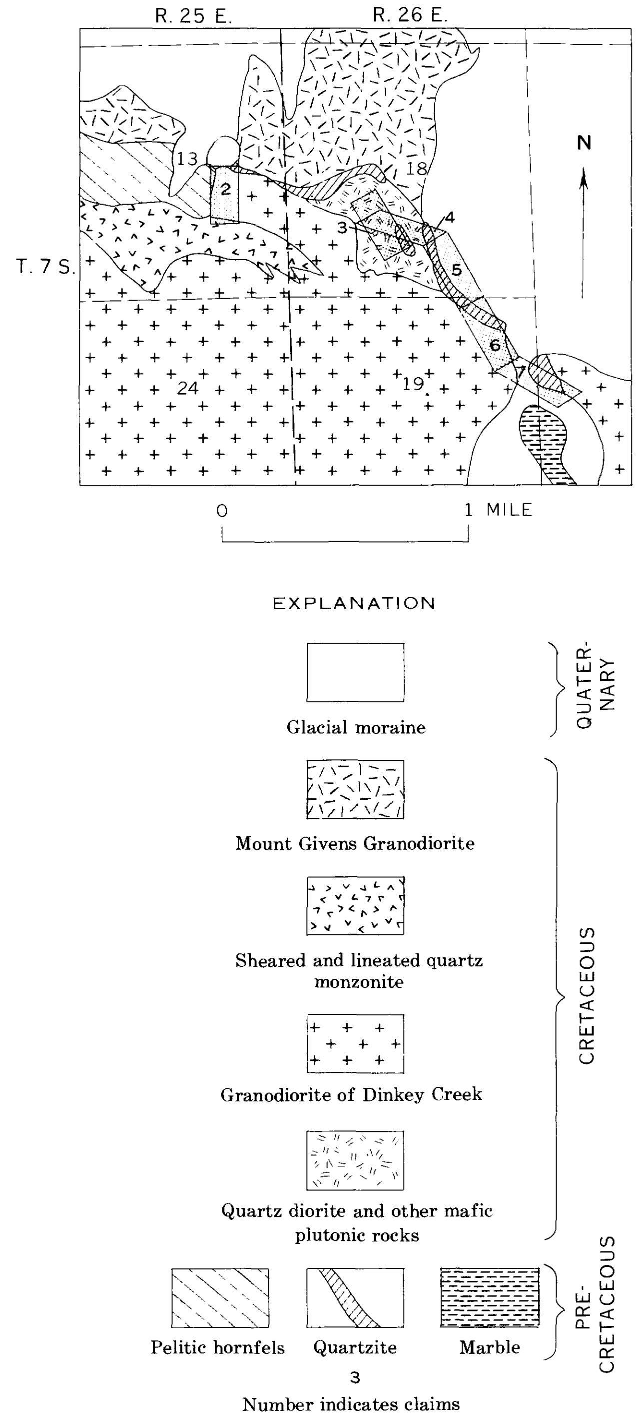

FIGURE 5.—Area surrounding the Lucky Blue lode claims. Locations of the claims are plotted from maps supplied by F. T. Wilmoth. Location cuts are near centers of claims. Area of this figure shown in figure 9.

posed. The samples were analyzed chemically for gold, copper, arsenic, and tungsten and spectrographically for a wide variety of elements (table 1).

The analyses show that only on claim 3 is tungsten ore of commercial grade present at the surface. Claim 4 contains only trace amounts of tungsten but significant amounts of copper, lead, and zinc. Nevertheless, the surface extent of the mineralized areas on all three claims is too small to permit accurate estimates of inferred ore reserves.

TABLE 1.—*Spectrographic and chemical analyses of composite samples from the Lucky Blue claims*

[Spectrographic analyses by G. W. Day; chemical analyses by R. E. Culbertson, J. G. Frisken, J. R. Hassemer, R. L. Miller, and M. S. Rickard. Values reported in parts per million; these values can be converted to weight percent by dividing by 10,000 (for example, 20 ppm=0.002 percent and 600 ppm=0.06 percent). Numbers in pareutheses after each element indicate usual lower determination limit. Explanation of symbols: N, not detected; L, present but below determination limit; G, greater than value shown]

Element	2532A: location cut, claim 4		2532B: location cut, claim 4		2533A: location cut, claim 5		2533B: location cut, claim 5		2534: location cut, claim 3	
	Spectrographic analyses	Chemical analyses	Spectrographic analyses	Chemical analyses	Spectrographic analyses	Chemical analyses	Spectrographic analyses	Chemical analyses	Spectrographic analyses	Chemical analyses
Ag (0.5)	100	--------	20	--------	N	--------	N	--------	N	--------
As (10)	N	10	N	10	N	L	N	L	N	10
Au (0.02)	N	.08	N	.02	N	0.02	N	0.02	N	.02
B (10)	100	--------	70	--------	L	--------	L	--------	10	--------
Ba (20)	100	--------	300	--------	1,500	--------	700	--------	N	--------
Be (1)	7	--------	5	--------	N	--------	N	--------	N	--------
Bi (10)	70	--------	N	--------	N	--------	N	--------	N	--------
Cd (50)	500	--------	150	--------	N	--------	N	--------	N	--------
Co (5)	500	--------	50	--------	5	--------	5	--------	10	--------
Cr (5)	5	--------	20	--------	100	--------	100	--------	30	--------
Cu (10)	2,000	1,700	1,000	1,000	7	L	7	L	50	64
Fe (500)	G200,000	--------	150,000	--------	50,000	--------	100,000	--------	100,000	--------
La (20)	L	--------	L	--------	50	--------	50	--------	L	--------
Mn (10)	G5,000	--------	G5,000	--------	5,000	--------	G5,000	--------	G5,000	--------
Mo (5)	10	--------	15	--------	L	--------	100	--------	200	--------
Nb (10)	10	--------	15	--------	15	--------	15	--------	20	--------
Ni (5)	30	--------	7	--------	N	--------	N	--------	N	--------
Pb (10)	3,000	--------	50	--------	30	--------	10	--------	100	--------
Sc (5)	10	--------	10	--------	10	--------	10	--------	7	--------
Sn (10)	70	--------	50	--------	100	--------	100	--------	70	--------
Sr (100)	L	--------	200	--------	200	--------	150	--------	200	--------
V (10)	150	--------	100	--------	70	--------	70	--------	100	--------
W (20)	N	L	N	L	N	20	700	600	10,000	2,000
Y (10)	30	--------	30	--------	30	--------	50	--------	50	--------
Zn (200)	G10,000	--------	10,000	--------	N	--------	N	--------	N	--------
Zr (10)	30	--------	200	--------	700	--------	500	--------	200	--------

PICK AND SHOVEL MINE

The Pick and Shovel mine is within the John Muir Wilderness in the northeastern part of the project area (fig. 2). The mine property consists of seven unpatented claims east of Minnow Creek in the northwest corner of the Mount Abbot quadrangle. The claims, held by G. T. Burns, B. Baldwin and L. C. Wehmeyer of Clovis and Coalinga, Calif., were filed in 1952 on the site of earlier prospect pits.

The principal workings are on a hillside near the center of the area covered by the claims (sample loc. 105 in fig. 9) and consist of a drift approximately 125 feet long, which intersects a vertical shaft approximately 80 feet deep. These workings follow a quartz vein system that strikes N. 50° E. and dips 80°–85° NW. Where the vein system is exposed in faces on the drift, it consists of several narrow ½–4-inch-wide red-stained quartz veins in highly altered granite. The width of this veined zone ranges from 3 to 4 feet in the part of the mine examined. Chemical analyses of three samples from the vein system are given in table 2. Sample 105A is composed of the typical red-stained quartz and shows low values of gold, silver, and lead. Sample 105C is composed of red-stained quartz containing fracture fillings of a yellow, powdery mineral tentatively identified by Mr. Wehmeyer as carnotite and shows relatively high values of lead, vanadium, and zinc. Sample 105F, altered quartz monzonite adjoining the quartz veins, shows almost no significant mineralization other than a small amount of lead.

Several tons of ore have been mined and stockpiled near the portal. This ore consists of mineralized quartz containing relatively abundant galena, pyrite, and malachite and lesser amounts of sphalerite, chalcocite, bornite, chalcopyrite, and azurite. Laumontite and stilbite are associated gangue minerals in some specimens. A grab sample composed of numerous small specimens of high-grade ore from the stockpile contains high values of copper, lead, and zinc (table 2, sample 105B). An analysis of one sample of high-grade copper ore containing visible chalcocite (105D) shows 3.6 percent copper, 0.02 percent silver, high content of lead and zinc, and minor amounts of cadmium and gold.

TABLE 2.—*Spectrographic and chemical analyses of samples from the Pick and Shovel mine*

[Spectrographic analyses by D. F. Siems and Chris Heropoulos; chemical analyses by J. G. Viets. Values reported in parts per million. Numbers in parentheses after each element indicate usual lower determination limit. Explanation of symbols: N, not detected; L, present but below determination limit; G, greater than value shown]

Element	105A, vein quartz		105B, grab sample of high-grade ore		105C, vein quartz		105D, high-grade copper ore		105F, altered quartz monzonite	
	Spectrographic analyses	Chemical analyses	Spectrographic analyses	Chemical analyses	Spectrographic analyses	Chemical analyses	Spectrographic analyses	Chemical analyses	Spectrographic analyses	Chemical analyses
Ag(0.5)	2	----------	20	----------	10	----------	200	----------	N	----------
As(10)	N	N	N	L	N	L	N	10	N	----------
Au(0.02)	N	.04	N	L	N	0.06	N	.06	N	----------
B(10)	10	----------	10	----------	10	----------	10	----------	N	----------
Ba(20)	30	----------	70	----------	200	----------	70	----------	1,500	----------
Be(1)	2	----------	2	----------	2	----------	2	----------	N	----------
Bi(10)	N	----------	20	----------	N	----------	10	----------	N	----------
Cd(50)	N	----------	500	----------	N	----------	G500	----------	N	----------
Co(5)	L	----------	10	----------	L	----------	5	----------	3	----------
Cr(5)	5	----------	5	----------	L	----------	L	----------	1.5	----------
Cu(10)	30	34	3,000	3,200	500	230	G20,000	36,000	3	----------
Fe(500)	50,000	----------	2,000	----------	3,000	----------	10,000	----------	20,000	----------
La(20)	N	----------	N	----------	N	----------	N	----------	50	----------
Mn(10)	50	----------	100	----------	700	----------	100	----------	1,000	----------
Mo(5)	N	----------	N	----------	N	----------	N	----------	N	----------
Nb(10)	10	----------	L	----------	L	----------	L	----------	7	----------
Ni(5)	15	----------	5	----------	5	----------	5	----------	N	----------
Pb(10)	500	----------	G20,000	----------	7,000	----------	10,000	----------	200	----------
Sc(5)	L	----------	L	----------	L	----------	L	----------	30	----------
Sn(10)	N	----------	N	----------	N	----------	N	----------	N	----------
Sr(100)	L	----------	N	----------	100	----------	N	----------	500	----------
V(10)	20	----------	10	----------	200	----------	20	----------	30	----------
W(20)	N	L	N	L	N	L	N	L	N	----------
Y(10)	N	----------	N	----------	N	----------	N	----------	10	----------
Zn(200)	N	----------	G10,000	----------	5,000	----------	G10,000	----------	N	----------
Zr(10)	100	----------	N	----------	20	----------	N	----------	150	----------

According to Mr. Wehmeyer, most of the high-grade ore on the stockpile was taken from an inaccessible incline below the present mine level. The ore body apparently was pod shaped. The present mining operation, carried on sporadically during the summer, is directed toward the discovery of either an extension of this body or new bodies.

The mineralizing solutions that formed the Pick and Shovel deposit and other veins nearby moved along a steeply dipping regional joint system that strikes N. 35°–55° E. in this area. In many places the quartz veins typically found along these joints widen abruptly to form small (2–4 in. maximum length) pockets of red-stained quartz in which sulfides, especially galena and pyrite, are visible. These pockets are irregularly distributed along individual joints and are nowhere very abundant. Some of these mineralized pockets appear to have formed by replacement of wallrock, but most have formed through fillings of voids left by differential lateral movement between the rock on either side of the joint (fig. 6). The main ore body at the Pick and Shovel mine probably formed by this process, although on a larger scale. Other ore pockets similar to the one mined probably exist along the Pick and Shovel joint system, but they are probably distributed erratically and will be expensive to find, develop, and mine.

PLACER GOLD DEPOSITS OF KAISER CREEK

Kaiser Creek, in the southwest quarter of the project area, has been the site of sporadic small-scale placer mining for about 100 years. Early records are sparse but indicate that gold was discovered along Kaiser Creek prior to 1880. The earliest published reference to these placers (Burchard, 1882, p. 33) stated,

> Rich gravel deposits are reported along the banks of Keyser Gulch. The bed of the creek was rich, and was mined out years ago, but the banks were never extensively prospected. The deposits now being opened are said to indicate an ancient river channel, which has not hitherto been discovered in the country.

U.S. Bureau of Land Management survey plats of 1882–85 show that "old miner's cabins" and "old mining ditches" existed at that time. Today, all that remains of these old workings are a few gravel piles overgrown with yellow pine along lower Kaiser Creek in the vicinity of Kaiser Diggings Guard Station.

Small placer operations were conducted along Kaiser Creek in the early part of this century (Bradley, 1915, p. 444–445), and during the Depression many people reportedly subsisted through placer mining from Sample Meadow to the San Joaquin River. Records at the Fresno County Recorder's Office indicate that the only presently active claim in the area (April, 1970) is the Rose-Kay claim on lower Kaiser Creek 1½ miles

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southwest of Kaiser Diggings Guard Station. John L. Dodge and Weldon Millis of Fresno hold this claim.

Chemical analyses of stream-sediment samples from Kaiser Creek show anomalous concentrations of gold along a span of about 6 miles—from near Sample Meadows to a point about 2 miles upstream from the junction with the San Joaquin River. Sieved stream sediments from this part of Kaiser Creek contain as much as 13 ppm gold, and panned concentrates show as much as 34 ppm. Free gold was observed in about half the panned samples but was extremely fine (most grains were less than 400 microns in diameter). Panning of modern stream sediments indicates little gold is presently being moved by Kaiser Creek; however, good colors can be panned from beneath large boulders or from bedrock crevices under roots. Good colors were also panned from colluvium several feet above the present stream level. One local resident, whom we observed operating a small sluice box on an unclaimed part of middle Kaiser Creek, reported recovering $3–$7 in gold per day from bedrock crevices high on the banks of the creek.

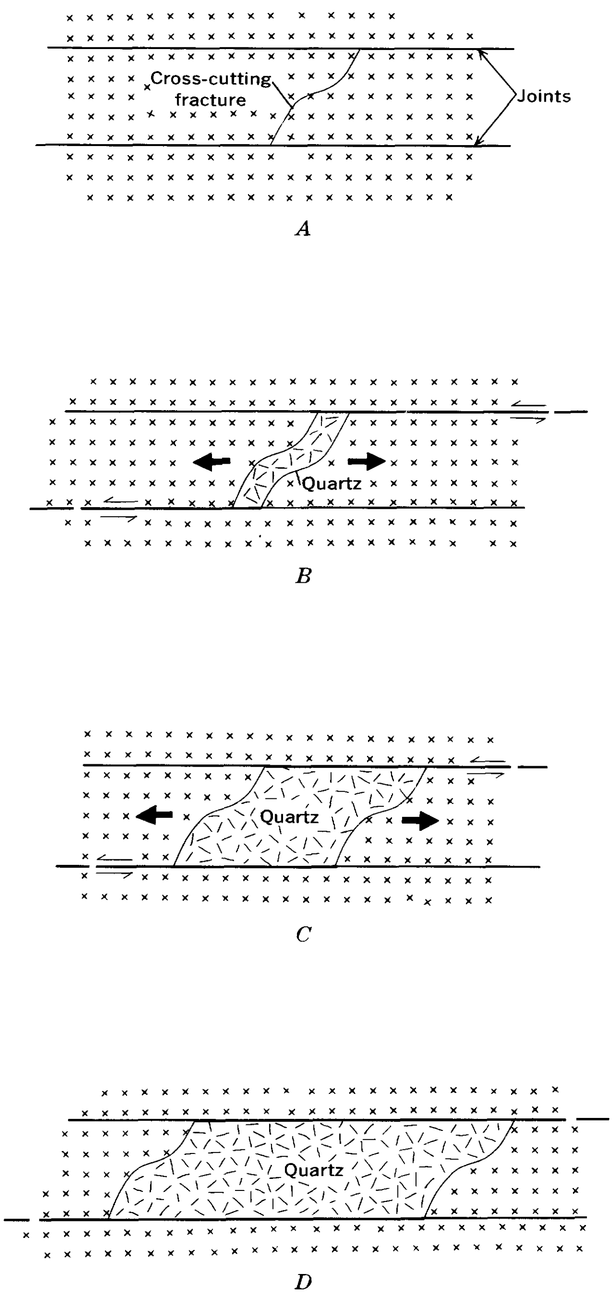


FIGURE 6.—Mechanism responsible for formation of quartz pods along joints in the vicinity of the Pick and Shovel mine. Direction of offset along joints is shown by small arrows, relative movement between blocks by large arrows. The length of these pods varies from less than 2 inches to more than 2 feet. Although the pod is shown as though it were continuously filled with quartz, voids were no doubt intermittently present as the fracture opened.

The sparseness of quartz veins near Kaiser Creek and the fact that the one local vein analyzed (table 3, sample 208) contains no gold suggest distant sources for this metal. At Kaiser Diggings the creek occupies a relatively flat catchment basin ideally situated to entrap gold carried in from any source. Any gold reaching the basin probably remained behind and became concentrated as less dense, more easily disintegrated detritus was washed away. The gold appears to have been transported into this basin by a combination of glacial and stream transport processes. An observed association of gold and tungsten in the stream sediments along Kaiser Creek suggests that Kaiser Ridge was once source (figs. 10, 12), for the tungsten was almost certainly derived from there. Floyd T. Wilmoth states that a single narrow quartz vein on his Lucky Blue tungsten claims north of Kaiser Ridge had a high gold content. Low concentrations of gold (0.02–0.04 ppm) in stream sediments near Kaiser Ridge indicate a weak anomaly along most of the ridge but do not suggest that any major deposit is currently being eroded. If commercial lode deposits were ever present, they have been eroded away, and if the placer gold at Kaiser Diggings came from Kaiser Ridge, it was probably concentrated from small discontinuous lode deposits of no commercial importance, such as may still be present.

Kaiser Ridge was not the only source of placer gold, however. Sediment samples collected well north of Kaiser Creek (figs. 9, 10, samples 213, 1082, 1083) contain as much as 0.63 ppm gold, and this gold could not have been transported by the streams that now drain the ridge. Some of this gold could have been carried from distant eastern sources by glaciers that once flowed down the South Fork of the San Joaquin River. Birman (1964) mapped older glacial deposits along the north side of Kaiser Creek; these deposits indicate that large amounts of potentially auriferous glacial material derived from the east once covered the Kaiser Creek drainage.

Most of the Kaiser Creek gold was apparently mined prior to 1880, when records of small producers were poorly kept, and almost no production records were found for these placers. The only production figures found, for 1940, were 7 ounces of gold and 3 ounces of silver (U.S. Bureau of Mines, 1933–68). A comparison of the Kaiser Creek area with similar placer districts of the southern Sierra Nevada indicates total gold production to date from Kaiser Creek of probably 500 ounces or less, but certainly less than 1,000 ounces (M. G. Johnson, oral commun., 1970).

All easily worked gold deposits of economic significance along Kaiser Creek appear to have already been evaluated and mined, and it is unlikely that any major deposits remain. Small amounts of gold are present, however, and small placer operations and recreational gold panning will probably be carried on for many years to come.

PLACER GOLD DEPOSITS OF MILL CREEK

Mill Creek, near the west margin of the project area northwest of Kaiser Creek, has also yielded small amounts of gold. Vestiges of a former placer operation indicate that mining was restricted to a half-mile segment of the creek just above Mammoth Pool Reservoir. It is not known exactly when the area was worked, but refuse around a large cabin still standing at the site indicates activity between 1920 and 1940, probably during the Depression.

The Mill Creek placer deposits are on a relatively flat bluff 500 feet above the San Joaquin River (fig. 7). The principal workings at the older placer operation are several trenches cut into thick soil cover on the ridge north of Mill Creek. These trenches (fig. 8), presently 3–8 feet deep and as much as 250 feet long, are mostly oriented in north to northwest directions, transverse to the ridge crest. Large quantities of soil were apparently moved to Mill Creek for sluicing. Gravel piles along the creek indicate that stream sediments were also placered. The only gold detected in our samples from the Mill Creek area, 1.4 ppm, was in a panned concentrate of soil (227–P) from near the trenched area north of lower Mill Creek. Ten stream-sediment samples (three of them panned) from Mill Creek and its tributaries contain less than 0.02 ppm gold. Analyses of a sample of granitic bedrock and of a quartz vein upstream from the Mill Creek placers likewise show no gold.

The absence of gold upstream from this deposit (fig. 10) indicates that gold in the soil cover was not derived from present-day Mill Creek headwaters. Nor is there any indication that the gold is derived from in situ weathering of a lode deposit in the granitic rocks of the ridge. Quartz veins are scarce on the ridge: an analysis of the bedrock (sample 225, table 3) shows no gold anomaly, and geologic mapping indicates no geologic features that would favor a lode deposit in this area (Huber, 1968). The Mill Creek deposit is probably an erosional remnant of a very old bench placer that was formed several million years ago along the ancestral San Joaquin River. Doubtless river gravels once

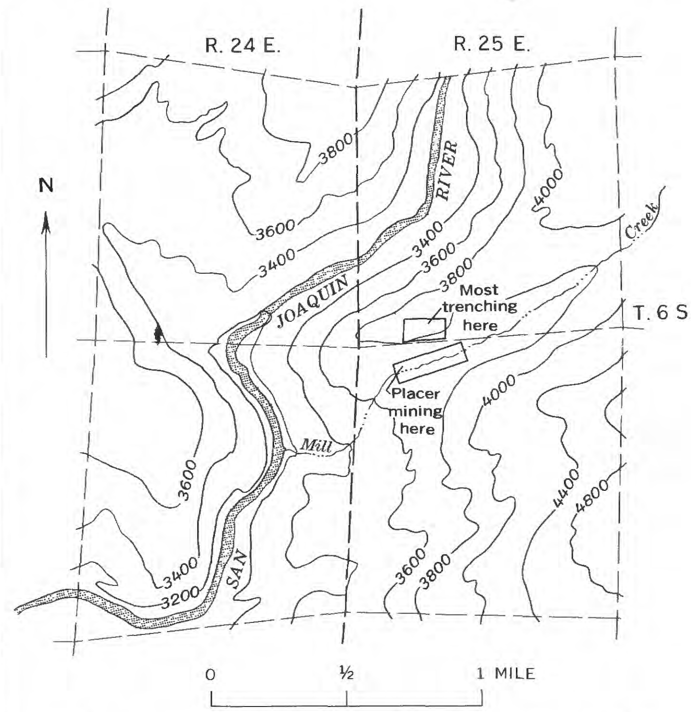


FIGURE 7.—Lower Mill Creek gold mining area. Contours from the U.S. Geological Survey topographic map of the Shuteye Peak quadrangle, 1953 edition (before filling of Mammoth Pool Reservoir). Area of this figure shown in fig. 9.

FIGURE 8.—Mining trenches north of Mill Creek. Yellow pine and brush in trenches indicate age of workings.

were present, but they have been removed by erosion, leaving behind the gold they contained. During a long period of weathering and erosion this gold apparently mixed with upper parts of a deep soil that formed from the underlying granitic bedrock. Some of this gold may have been secondarily concentrated downslope in the gravels of Mill Creek.

No production figures were found for the Mill Creek of the project area even though Minerals Yearbooks for the years 1932–35 and 1938 indicate a production from "Mill Creek" of 102.62 ounces of gold and 9 ounces of silver (U.S. Bureau of Mines, 1933–68). Microfilm copies of original Bureau of Mines records indicate, however, that this "Mill Creek" is a different stream, 40 miles to the south, north of Dunlap.

The gold remaining in the Mill Creek area is very sparse, and recovery of additional gold does not appear economically feasible. The Mill Creek deposit is, however, geologically important as an example of a type of gold placer that may exist elsewhere along the San Joaquin River. Any flat or dissected river-cut bench along the San Joaquin River could contain placer gold deposits of the Mill Creek type.

QUARTZ

Quartz deposits in the project area are of two types: (1) numerous small quartz veins that cut metamorphic and granitic bedrock and (2) older quartz-pegmatite segregations related to late stages in cooling and crystallization of the granitic rocks.

Only the quartz pegmatite masses are large enough and pure enough to be of potential economic value. The Medley quartz claims, near Pincushion Peak, have been explored by Mr. John Medley, who reported having sold several shipments of quartz of piezoelectric quality.

The unpatented Medley quartz claims are on the west slope of Pincushion Peak at about 8,600 feet elevation. A road has been opened to the mine area, considerable overburden has been removed, and a shallow shaft sunk. The quartz is highly fractured and is embedded in a matrix of white clay that has resulted from weathering of originally abundant alkali feldspar. The quartz consists of both clear rock crystal and smoky quartz. A few large thin blades of a resinous mineral tentatively identified as ilmenite occur in some quartz crystals. Although the bedrock is very highly weathered and a thick soil has developed, it is still apparent that this deposit is part of a quartz-core pegmatite dike that cuts the grandodiorite of Lake Edison. The dike ranges in thickness from 3 to 4 feet, strikes about N. 60° W., and dips 5°–25° N. Quartz appears to be concentrated near the footwall of the dike. The weathered dike is exposed over a length of about 80 feet, but its extent at depth is unknown. A comparison with other pegmatites of the project area suggests that this mass may have been lens shaped; if so its extent at depth probably does not exceed 80 feet. The site was inactive in 1969.

Other large masses of quartz are exposed 1 mile west of the Pick and Shovel mine (along the contact between the alaskite of Graveyard Peak and the quartz monzonite of Recess Peak) and on the east slope of the prominent ridge 1 mile east of Devil's Bathtub. These deposits consist predominantly of milky quartz of no economic value.

SAND AND GRAVEL

Small deposits of sand and gravel are found along stream bottoms and in areas of glacial outwash. Other local deposits include the tailings from construction of Ward Tunnel under Kaiser Ridge. No commercial use is made of these materials except by summer residents for concrete aggregate.

ORNAMENTAL STONE

The coarse- to medium-grained granitic rock found over much of the project area is a potential source of dimension and ornamental stone but is of no commercial value owing to the remoteness of the area and to the presence of similar rock at more accessible localities.

Small deposits of travertine are found locally around hot mineral springs. Most of this rock is soft and punky, but at some localities, particularly along the San Joaquin River north of Crater Lake (near sample 180, fig. 9), small amounts of dense beautifully banded yellow and orange onyx are present in the precipitates of inactive hot springs. The onyx deposits are too small and inaccessible for commercial exploitation, but could provide small amounts of ornamental stone for hobbyists.

DISTRIBUTION OF METALS IN THE SIERRA DEMONSTRATION PROJECT AREA

The chemical analyses of stream-sediment and bedrock samples provide a detailed picture of the distribution of metallic elements throughout the project area. In conjunction with geologic considerations, these analyses indicate that of the 30 metals for which analyses were made (see section "Analytical Methods and Procedures"), only gold, tungsten, copper, silver, tin, and molybdenum have possible economic importance in this area. The locations of samples and the abundance of these six elements are shown in figures 9–14. The data in figures 10–14 are taken from tables 1–3.

The distribution of arsenic was also plotted because initially we thought it might serve as a tracer, but we found no correlation between its abundance and the abundance of more valuable metals. In many places arsenic appears to reflect the presence of arsenic-rich mineral springs.

GOLD

Analyses of metamorphic bedrock show traces (up to 0.08 ppm) of gold. The highest bedrock gold content, 0.90 ppm, is from a single sample (169) of volcanic breccia on Volcanic Knob. This content is unexplainably high and may be the result of sample contamination. Analyses of quartz veins in the project area showed gold content to range from less than 0.02 ppm to only 0.08 ppm. The relative abundance of gold in the stream sediments does not appear to be closely dependent on bedrock lithologies but instead depends on physiography and the complex transport mechanisms of streams and glaciers. Chemical analyses of stream sediments show that small amounts of gold (0.02–0.20 ppm) are widespread throughout much of the area. Concentrations higher than these are rare; most are restricted to the Kaiser Creek basin, the bench placer north of Mill Creek, streams immediately north of Huntington Lake (samples 3022, 3023), and the San Joaquin River below Mono Hot Springs (sample 004). Areas in which most stream gravels contain low amounts of gold (0.02–0.20 ppm) are 1 mile northeast of Mount Givens, a large area northwest and west of Lake Edison, the area surrounding Hoffman Meadow north of Kaiser Creek, and the east end and south slope of Kaiser Ridge.

TUNGSTEN

Among the bedrock samples, tungsten in measurable amounts is found only in samples of metamorphic rocks on the Lucky Blue claims (see section "Tungsten Mines and Prospects Along Kaiser Ridge"), in two mineral-spring precipitates (003 and 1149), in one sample of Mount Givens Granodiorite (1033), and in two samples (068 and 165) of quartz veins, which contain 600 and 480 ppm, respectively. The tungsten-bearing mineral in these veins was not identified. Most quartz veins analyzed contain little or no tungsten.

The distribution of tungsten in stream sediments clearly is related to the presence of metamorphic rocks upstream. Thus, high tungsten concentrations occur downstream from all metamorphic rocks except the metavolcanic rocks at the northeastmost corner of the area. High tungsten concentrations are also found in sediments from the North Fork of the San Joaquin River and from Granite Creek (figs. 9, 12, samples 193, 195, 1150). These values probably reflect metamorphic rocks and tungsten deposits northwest of the project area. Low tungsten values at other scattered localities probably reflect detrital tungsten-bearing minerals that were carried from distant metamorphic rock sources by glaciers.

COPPER

Copper contents of granitic bedrock samples range from less than 10 ppm in many granodiorites to 190 ppm in a hornblende gabbro (sample 116); the granitic rocks average 12 ppm. Metamorphic rocks contain up to 186 ppm copper (sample 204) and average 27 ppm. Most quartz veins analyzed contain 10–50 ppm copper and one (sample 1111) contains 2,400 ppm.

Small amounts (10–20 ppm) of copper are widespread in stream sediments of the project area. These amounts are not anomalously high and generally can be explained by the presence of detrital concentrations of such minerals as hornblende and magnetite, which commonly contain copper in trace amounts, and by small amounts of copper adsorbed on clay minerals and organic matter (Hawkes and Webb, 1962, p. 122–125). Most stream-sediment samples from part of the area southeast of Pincushion Peak and northwest of Lake Edison, however, contain relatively high amounts of copper (to 88 ppm). Quartz veins are scarce in this area, and no sign of copper mineralization at the surface was noted. This area of high copper content is centered on a large mass of the granodiorite of Edison Lake and surrounds a central facies of coarse-grained rock known as the quartz monzonite of Rock Creek Lake (Bateman and others, 1971). The copper anomaly here is probably explained by a slightly higher than normal copper content in these underlying granitic rocks.

SILVER

With the exception of a metavolcanic schist (sample 204), an anomalous diorite dike rock (sample 231), and two mineralized rocks (samples 118, 127), the country rocks in the project area contain no detectable silver, and most quartz veins contain only minor amounts (to 100 ppm), probably in argentiferous galena. Silver also is very sparse in stream sediments of the project area. It was detected in only 13 sediment samples, in amounts ranging from 0.5 to 2 ppm. Stream-sediment samples with high silver contents are from the northeast and southwest corners of the area. The silver in the southwest is probably alloyed with placer gold, whereas silver in the northeast appears related to abundant small argentiferous veins developed along northeast-southwest trending joints (p. 7).

TIN

Tin is rare in bedrock of the area and has been identified only in tactite samples from the Lucky Blue tungsten claims (samples 2532–34), in one metavolcanic rock (sample 204), in one hot-spring tufa deposit (sample 003), in one sample of vein quartz (sample 1111),

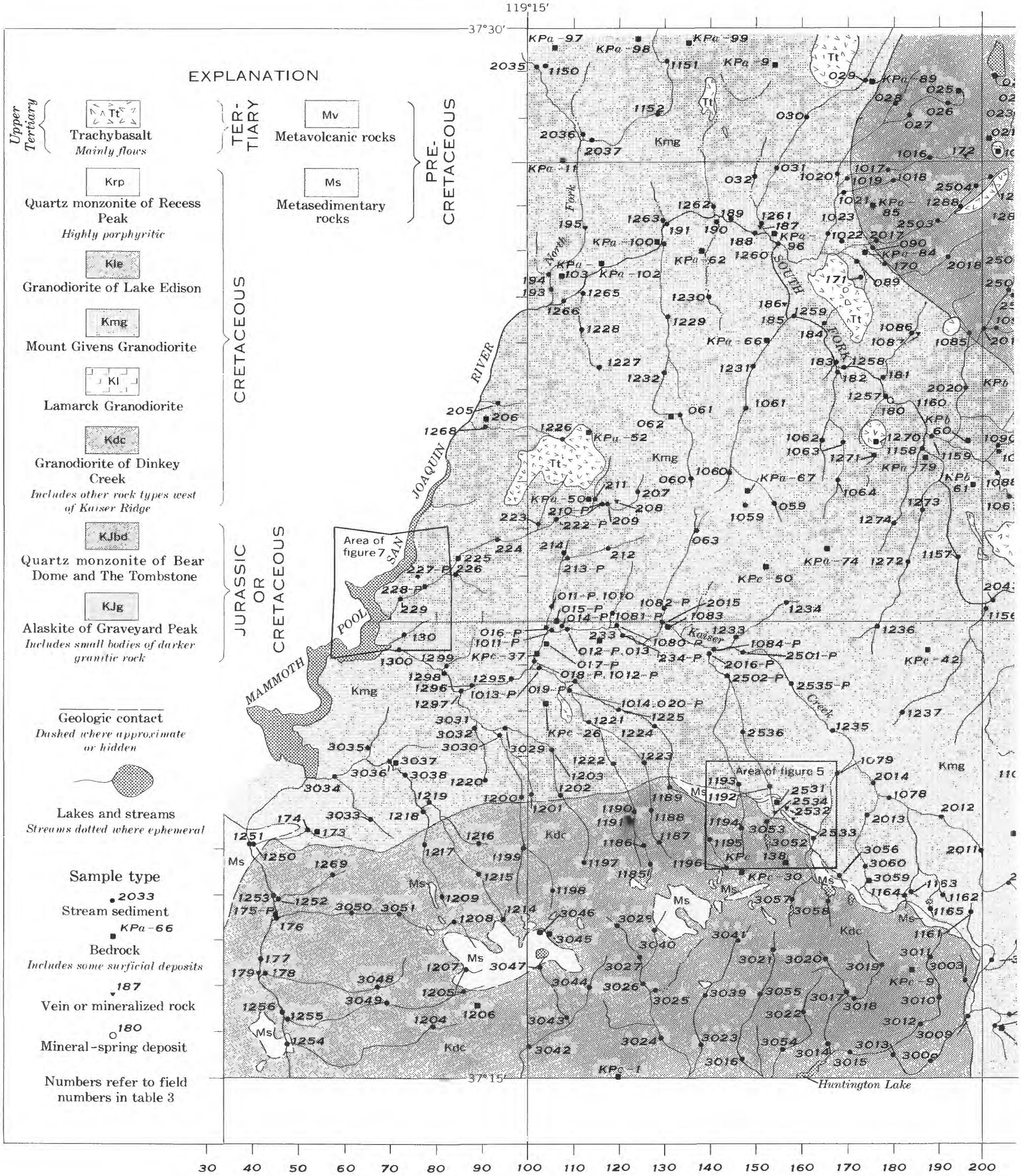
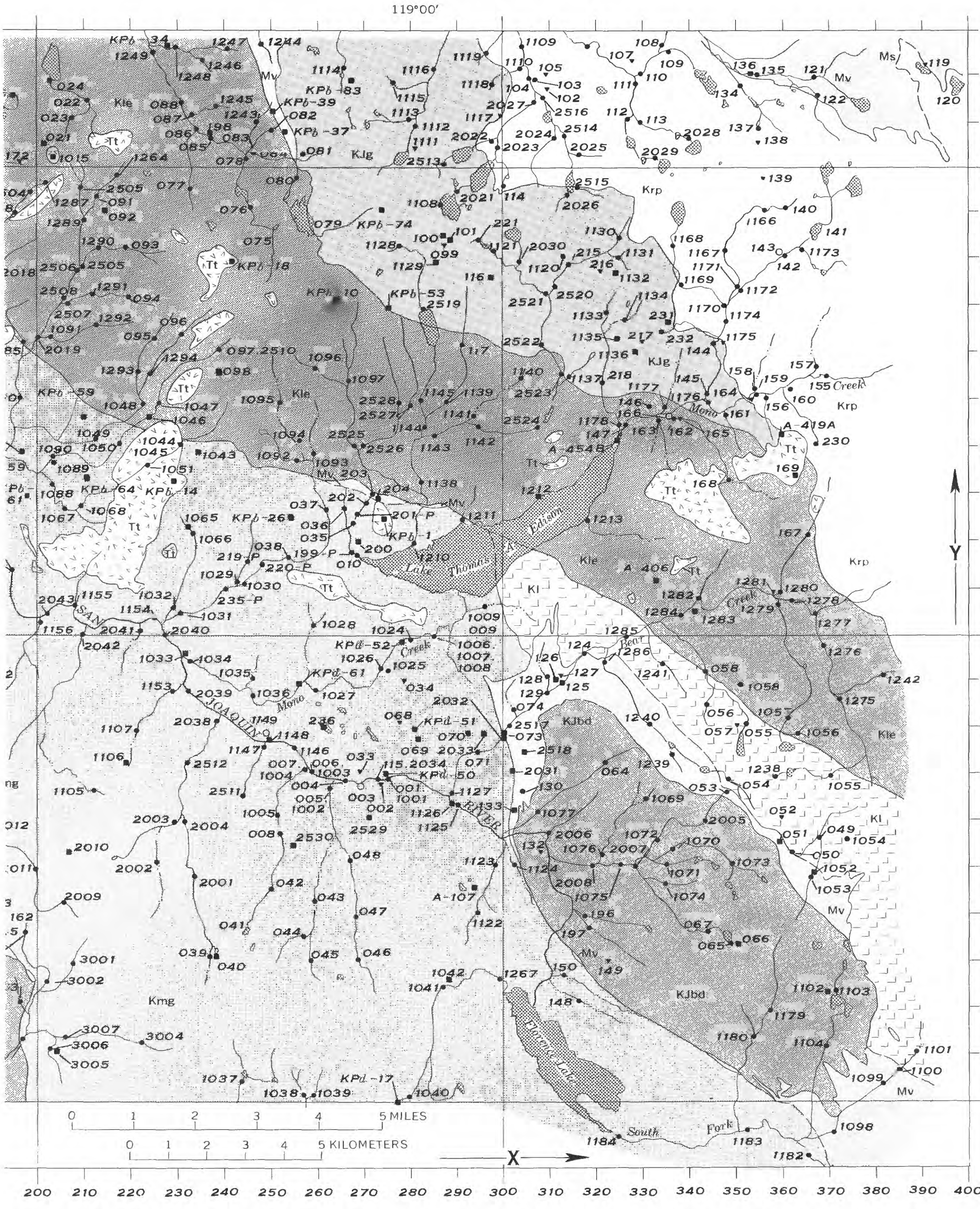


FIGURE 9.—Locations of chemically analyzed samples in the Sierra Demonstration Project area.



Reference grid numbers along figure margins included as aid to locate samples listed in table 3.

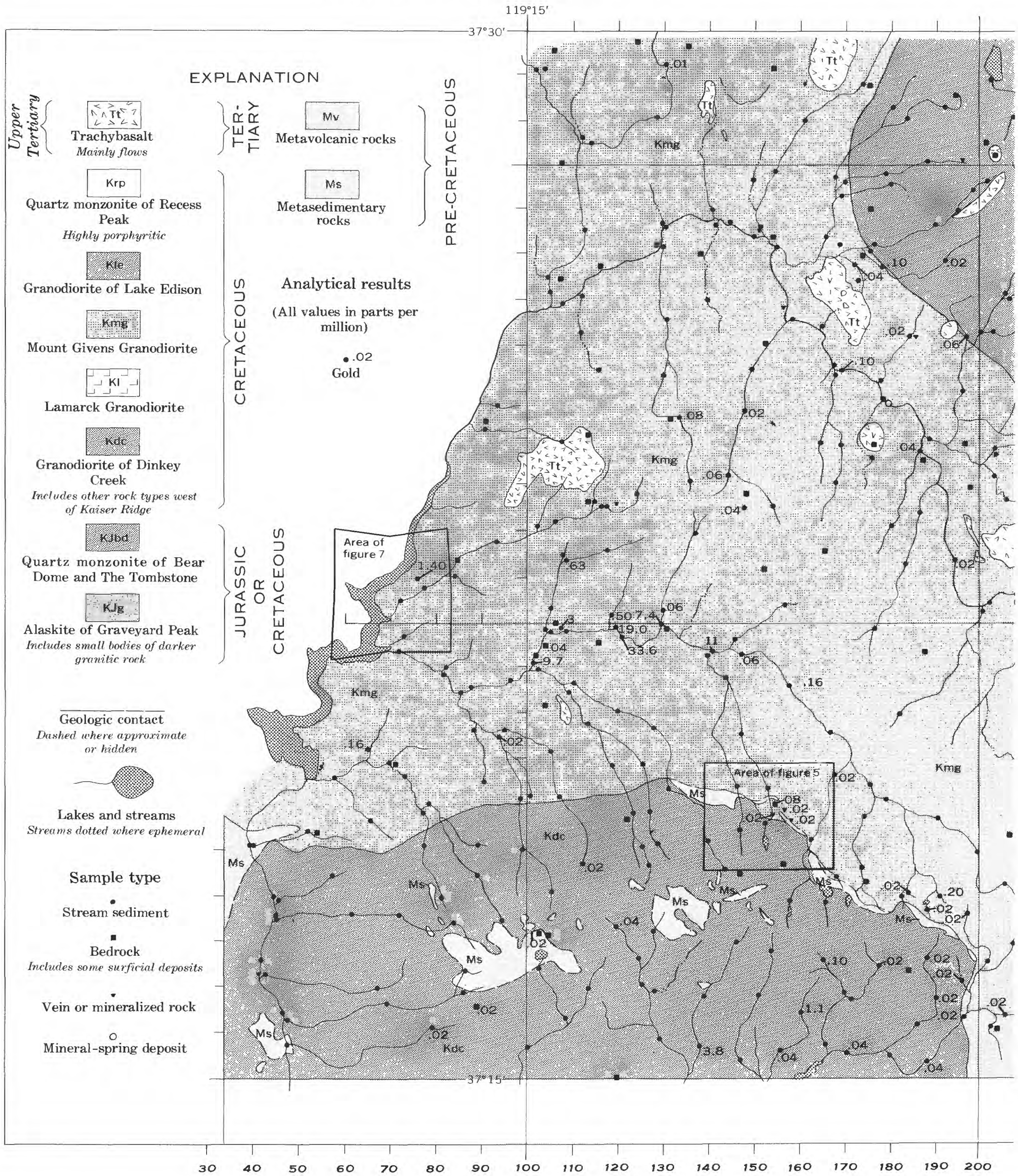
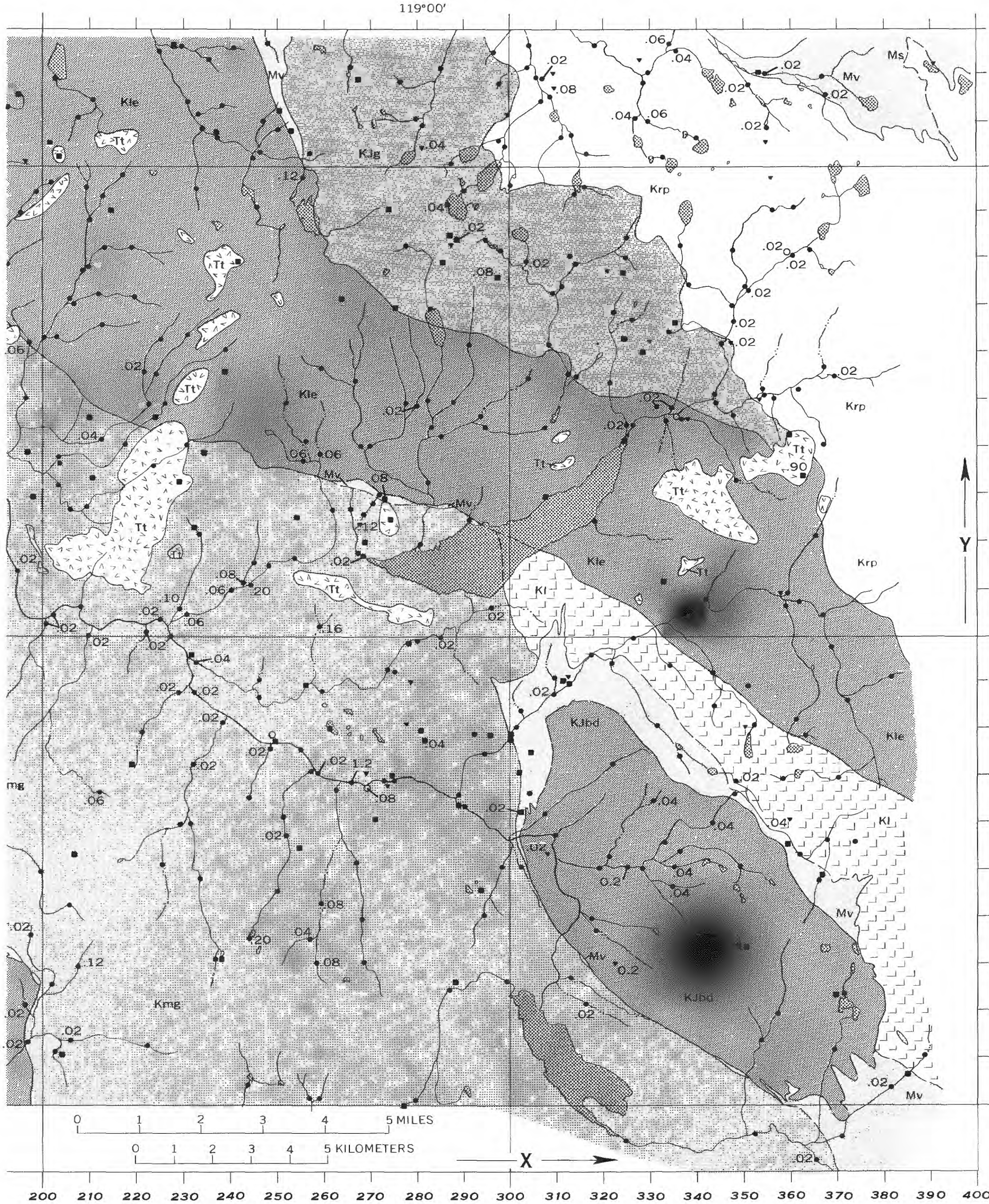


Figure 10.—Distribution of gold in the Sierra Demonstration Project area. Reference



grid numbers along figure margins included as aid to locate samples listed in table 3.

459-605 O - 72 -4

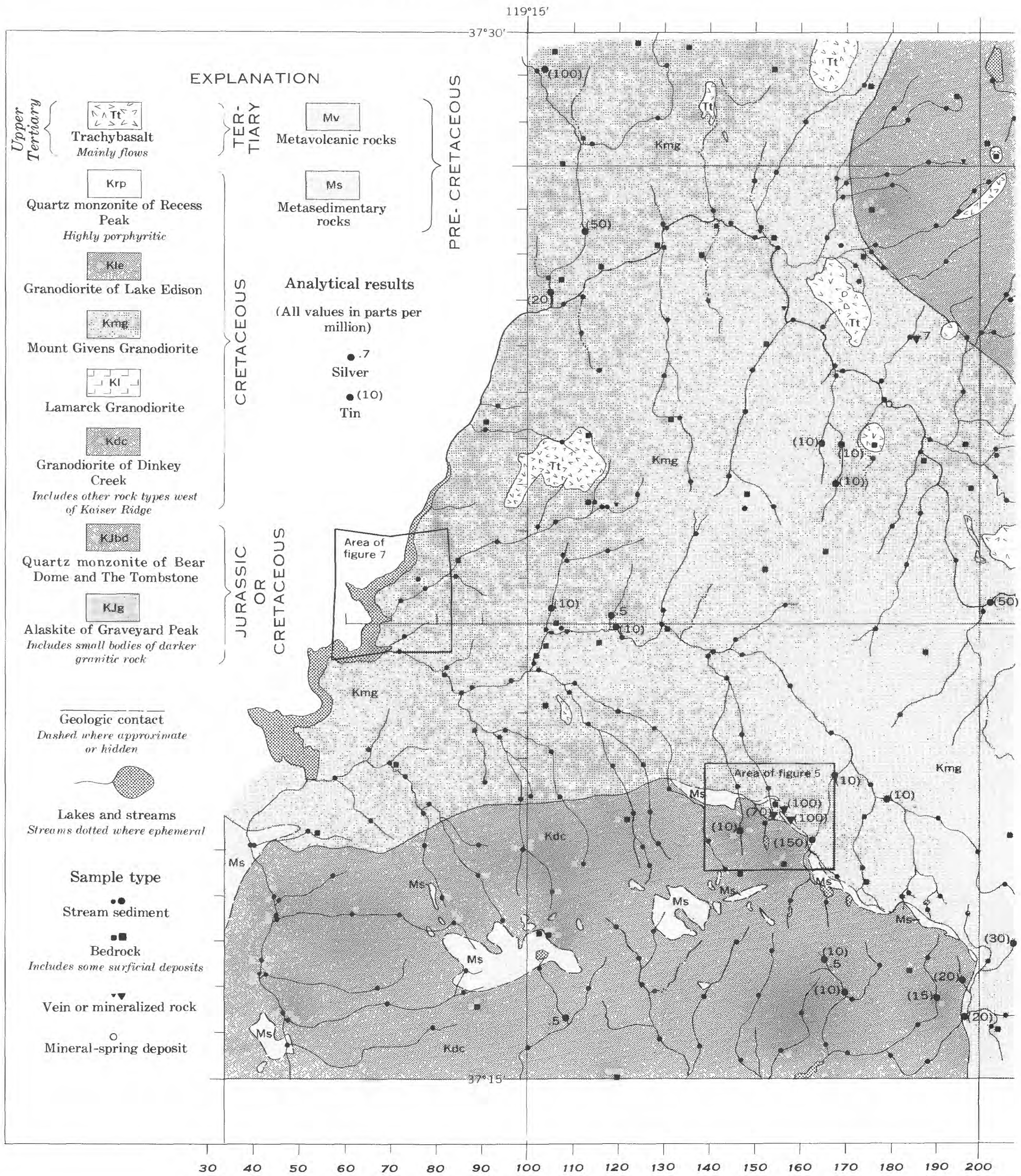
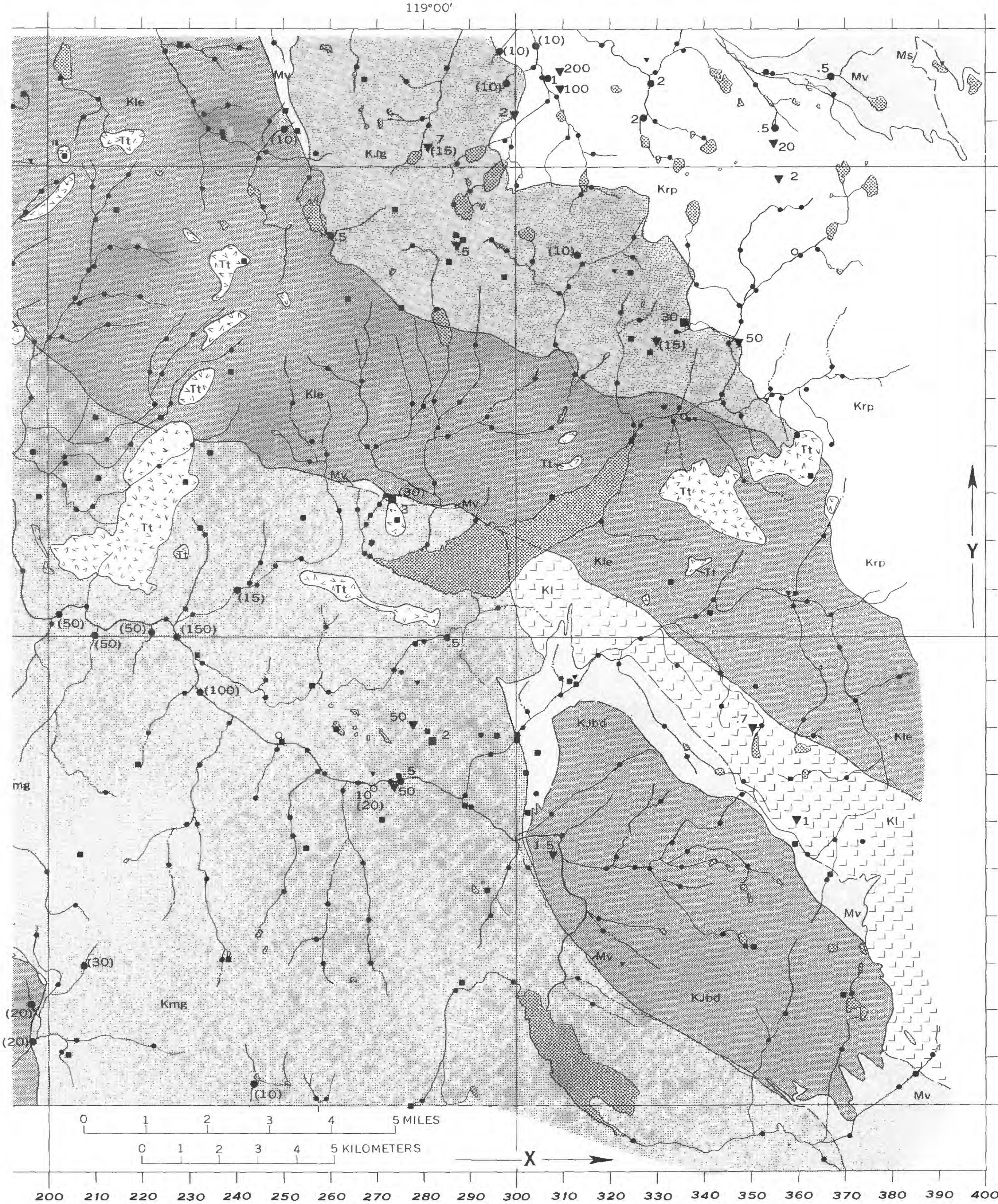


Figure 11.—Distribution of silver and tin in the Sierra Demonstration Project area. Reference



grid numbers along figure margins included as aid to locate samples listed in table 3.

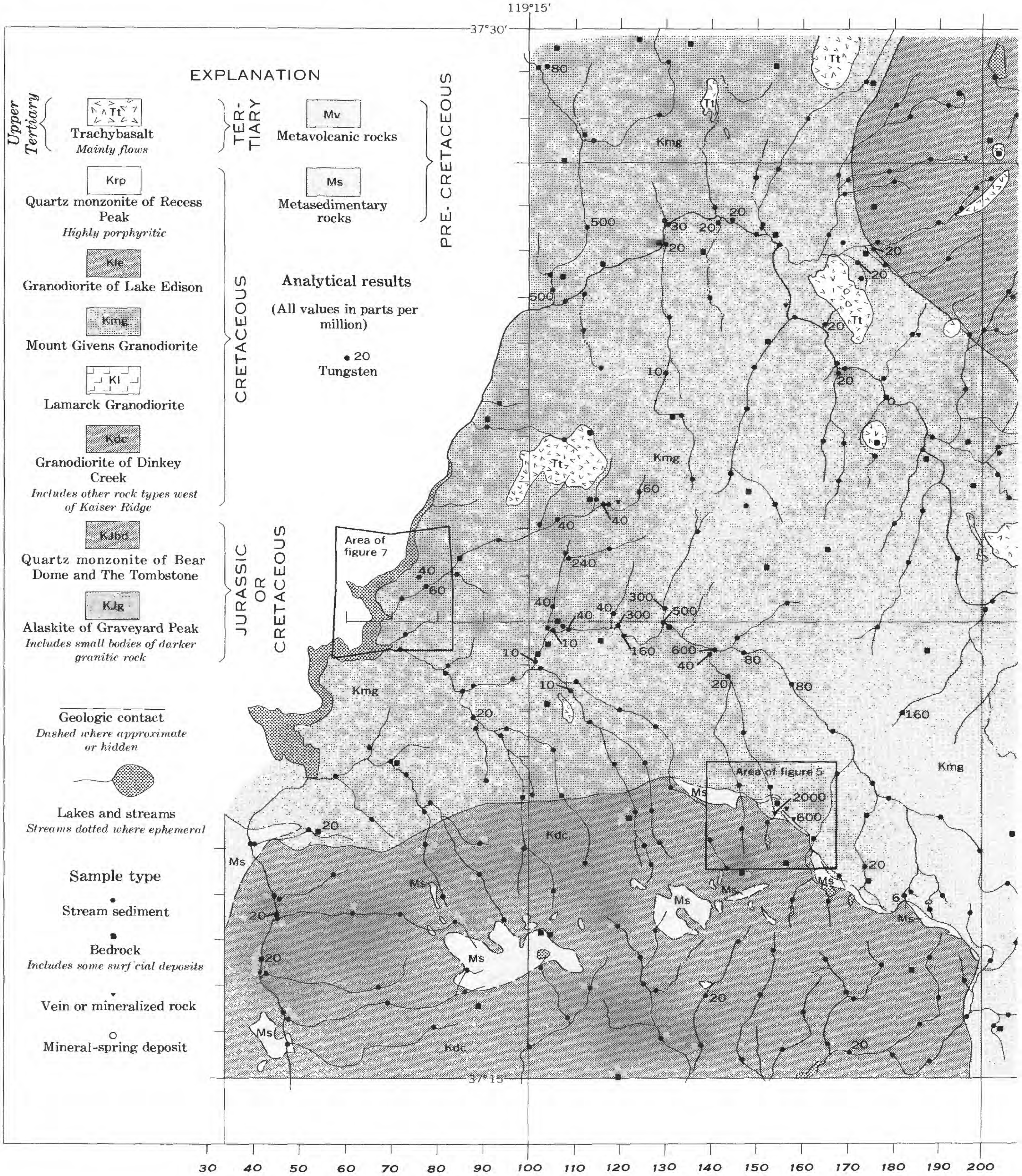
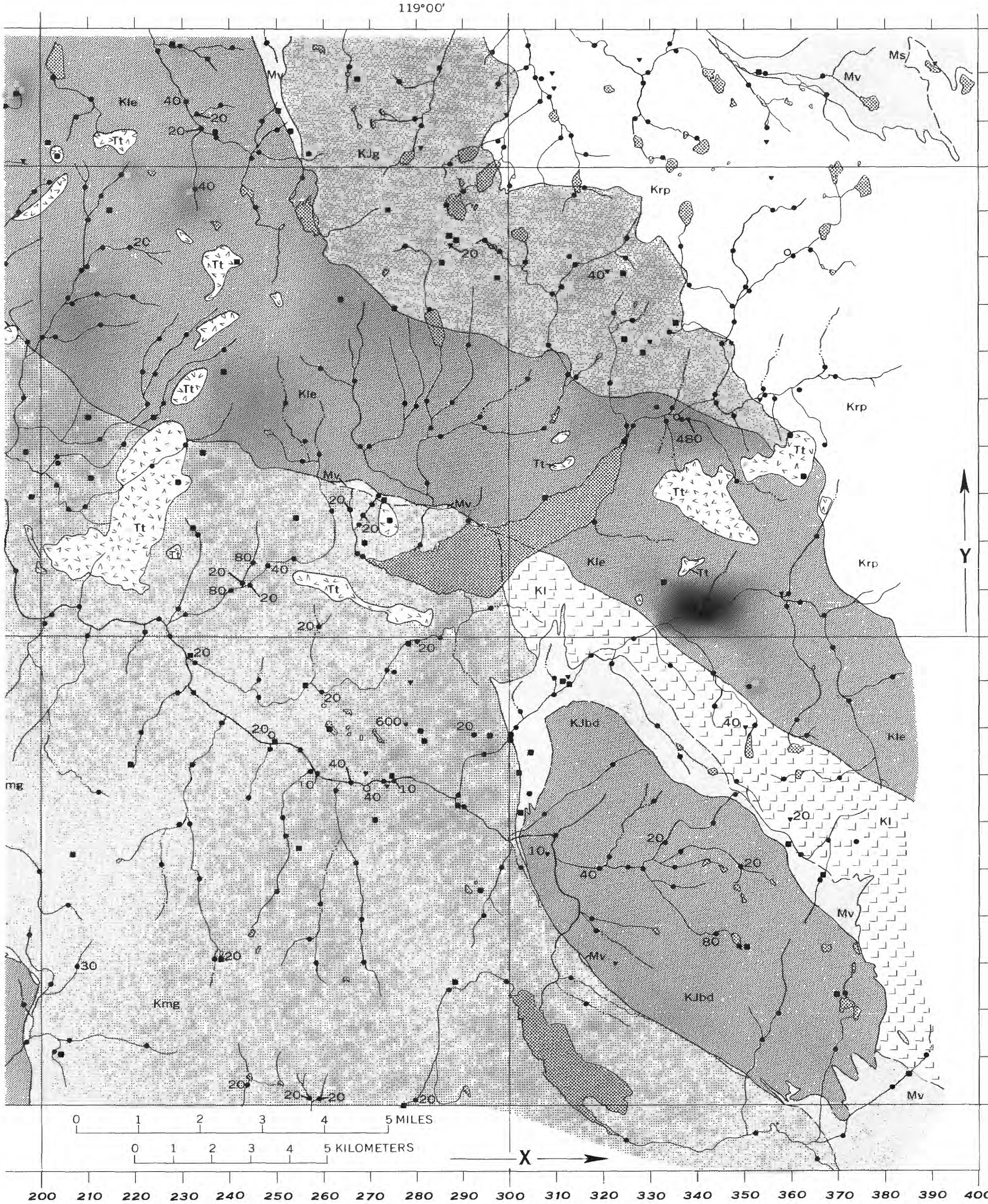


FIGURE 12.—Distribution of tungsten in the Sierra Demonstration Project area. Reference



grid numbers along figure margins included as aid to locate samples listed in table 3.

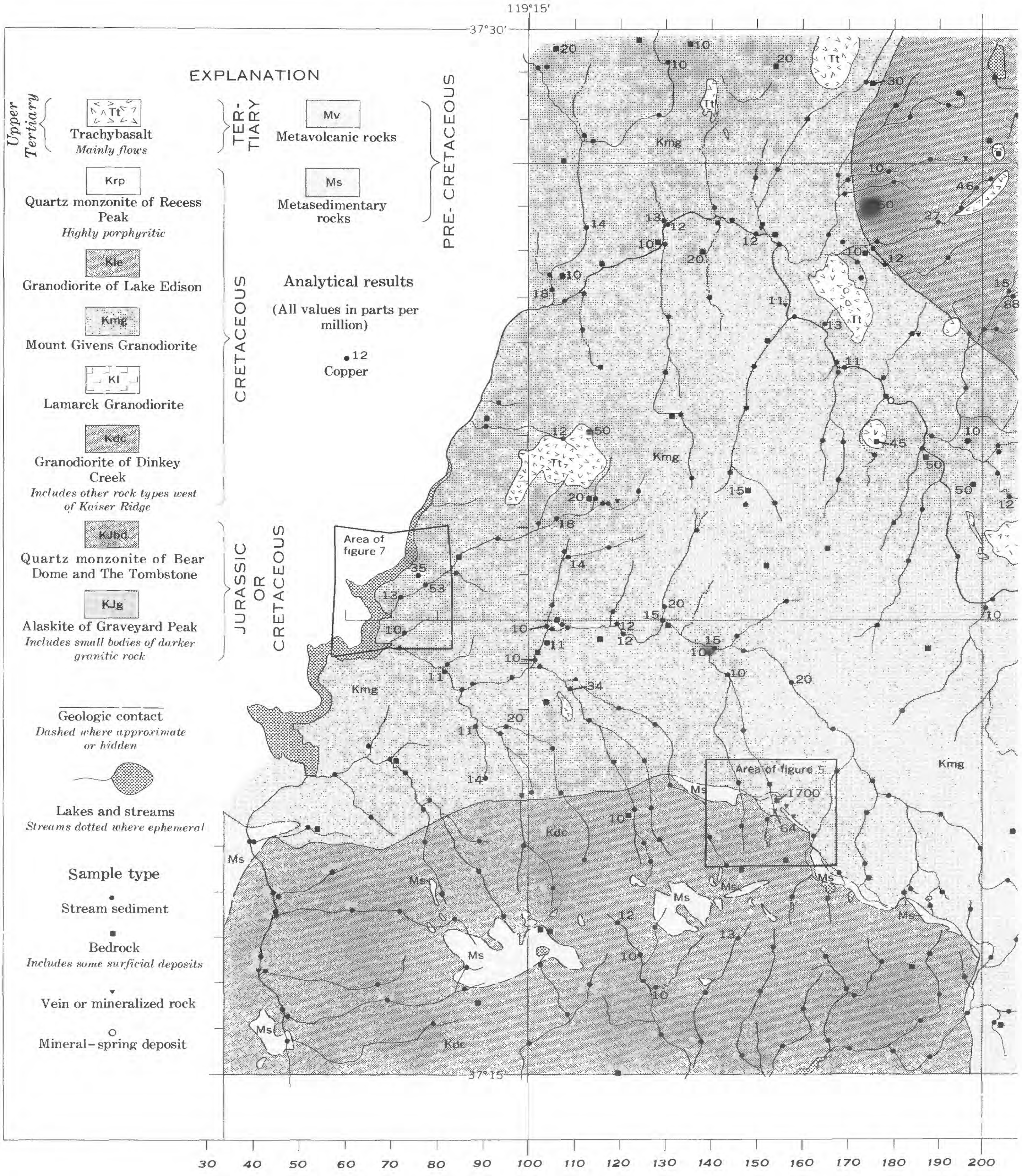
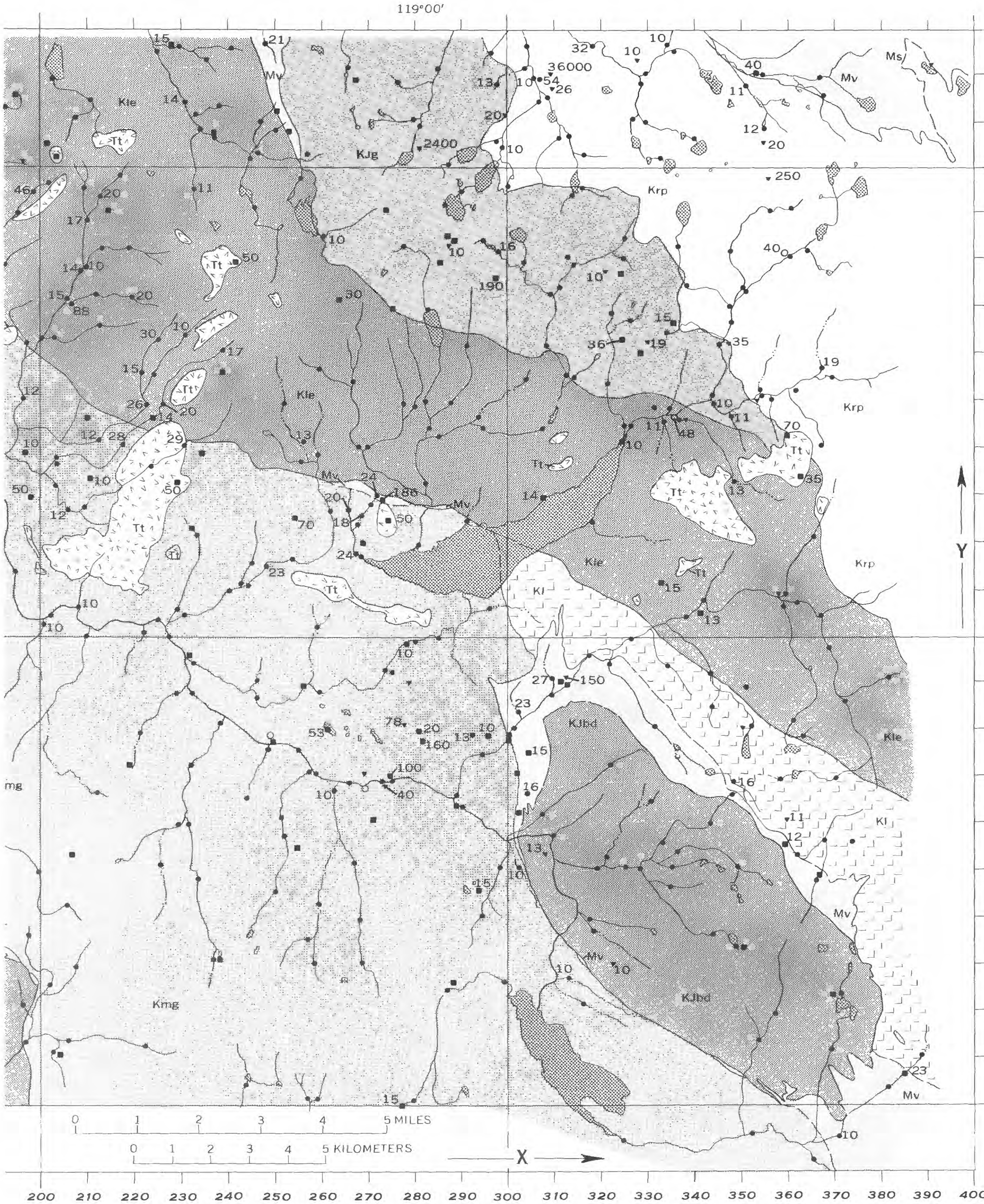


FIGURE 13.—Distribution of copper in the Sierra Demonstration Project area. Spectrographic data are shown for a few bedrock samples listed



samples for which chemical analyses are unavailable. Reference grid numbers along figure margins included as aid to locate in table 3.

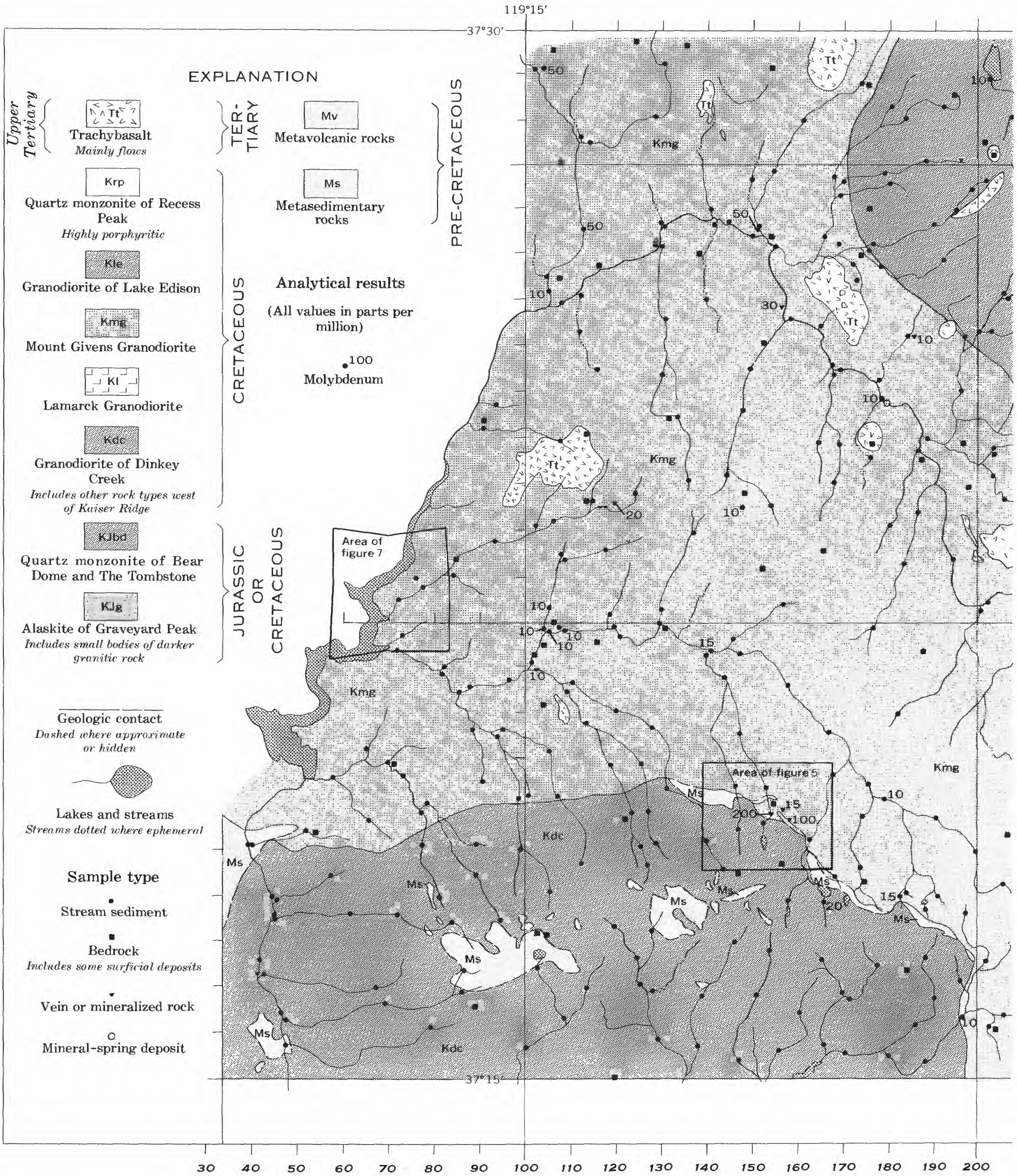
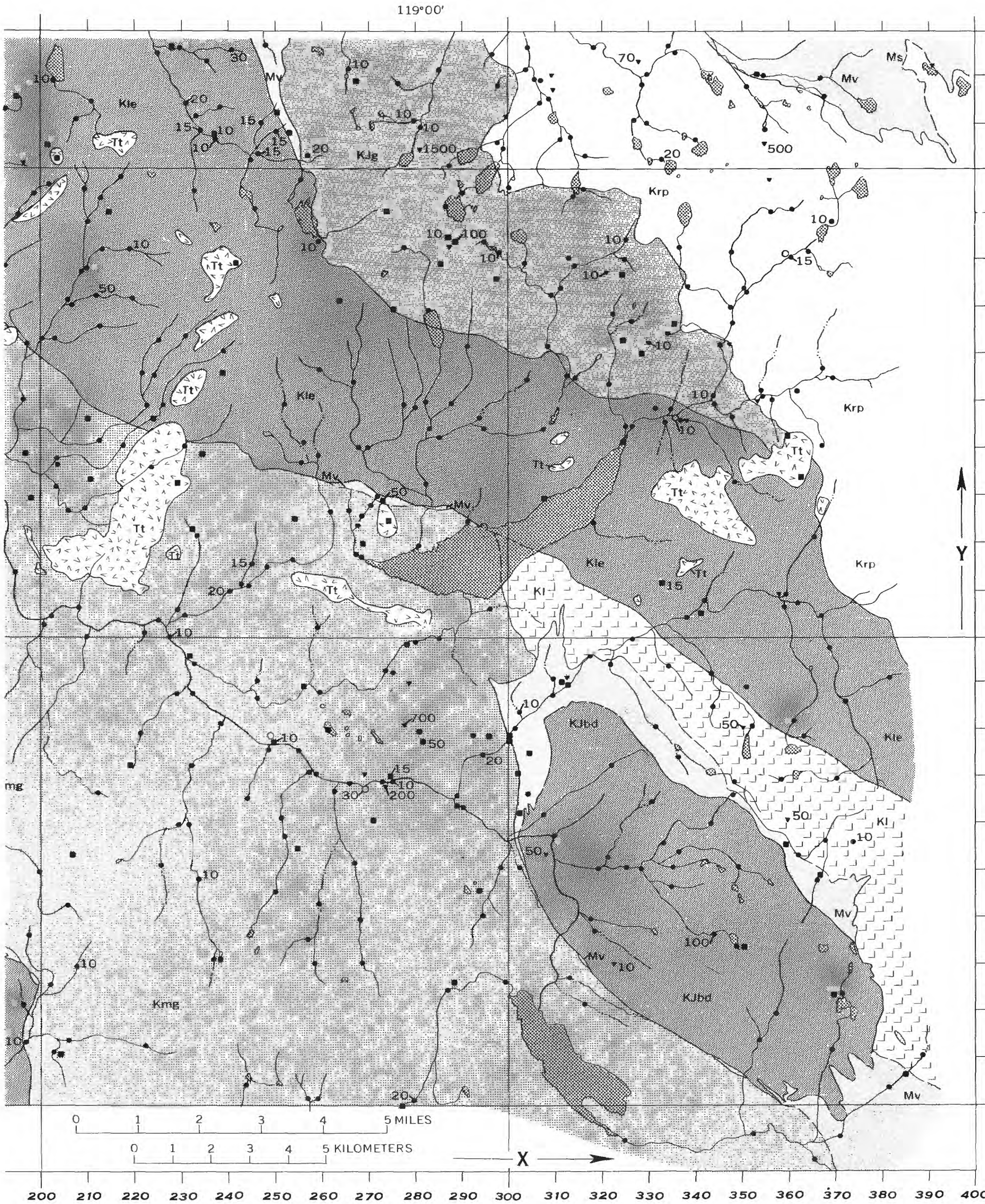


FIGURE 14.—Distribution of molybdenum in the Sierra Demonstration Project area. Values of less than 10



ppm not shown. Reference grid numbers along figure margins included as aid to locate samples listed in table 3.

and in one specimen of altered diorite (sample 217). Nowhere was it found in sufficient abundance to be considered a potential resource.

Most stream sediments of the project area contain less than 10 ppm of tin. Thirty-four stream-sediment samples that contain 10 ppm or more are chiefly from streams that drain Kaiser Ridge, streams near a small quartz monzonite body east of Hoffman Meadow, the San Joaquin River and Warm Creek west of Lake Edison, and from streams in the vicinity of the Pick and Shovel mine.

MOLYBDENUM

Molybdenite, the principal ore mineral for molybdenum, is present in silicified and chloritized joints throughout the project area and is a common minor constituent of veins in the northeast half of the area. The molybdenum content of some small veins is as high as 1,500 ppm (sample 1111). Molybdenum is largely restricted to these narrow veins, and there is no evidence for molybdenum mineralization of surrounding wallrocks. Although most samples of granitic bedrock contain no detectable molybdenum, one sample of Mount Givens Granodiorite (1148) does contain 10 ppm molybdenum and several samples of the alaskite of Graveyard Peak contain as much as 15 ppm molybdenum. One sample of metavolcanic schist (204) contains 50 ppm molybdenum, and mineral-spring deposits contain a maximum of 50 ppm. No deposits of commercial size or grade were found in the project area, although according to Mr. Jeff Winslow of Mono Hot Springs (oral commun., 1969), prospectors have developed small pits and recovered minor amounts of molybdenite from chlorite-rich mineralized joints near Chamberlain Lake, in the southeast corner of the project area. A stream-sediment sample downstream from this area (067) contains 100 ppm molybdenum, the highest value reported from any stream in the project area. Molybdenum in the range from 5 ppm (lower sensitivity limit) to 50 ppm is, however, present in most stream sediments of the project area, except in those southeast of Kaiser Ridge. These values are significantly higher than the average values of 0.1–1 ppm reported for clastic sediments by Hawkes and Webb (1962, p. 369) and suggest a low molybdenum anomaly in the area. Only values of 10 ppm or greater are plotted in figure 14.

OTHER METALS

In addition to the six metals described above, 19 others are listed in table 3, and their distribution can be plotted. Informal plots of these other elements show that none of them occur in concentrations suggesting potential resources in the project area.

Among these other metals, lead is one of the most interesting, as it appears to be a sensitive indicator of the presence of mineralized veins. Lead is present in all stream sediments of the area in amounts generally ranging from 20 to 50 ppm. Amounts higher than this are unusual and are mostly found near the northeastmost corner of the project area, where galena-bearing veins are most abundant. Sediments from a small stream draining the Pick and Shovel mine area, for example, contain 700 ppm lead, and a sample from Minnow Creek, a major stream draining the northeast corner of the area, contains 300 ppm lead downstream from the Pick and Shovel mine.

Zinc also has potential as an indicator of mineralized areas, but the high threshold sensitivity value (200 ppm) inherent in our analytical technique made evaluation by this element relatively useless in this study. Most high zinc values in streams are from areas near roads and bridges, where the zinc was probably derived from introduced contaminants, such as galvanized metal and batteries. The extraordinarily high value reported in stream sediment north of Huntington Lake (sample 3055) must reflect contamination, as high values do not appear downstream. Some zinc mineralization has occurred along the contact between the Mount Givens Granodiorite and metavolcanic rocks near Bear Creek Diversion Dam (table 3, sample 073 and 2031), and in tactites and diorite in the northeast corner of the area (samples 119, 120, and 217).

Iron content aids in interpreting concentrations of certain other elements in stream samples and also in comparing analyses with one another. "Black sand" concentrates of heavy minerals such as magnetite, ilmenite, hornblende, and zircon tend to have higher than normal concentration of associated heavy-mineral elements such as gold, chromium, iron, lanthanum, vanadium, tungsten, and zirconium. The iron content, plotted first among the spectrographic analyses of table 3, is an excellent indicator of the degree to which heavy minerals have been concentrated in each sample, either through panning or natural stream processes. High iron content implies abundant magnetite and indicates that the concentration of associated heavy elements is generally higher than in stream sediment with low "black sand" content.

EVALUATION OF MINERAL RESOURCE POTENTIAL

Our study indicates that no mineral deposits of major commercial importance are present in the Sierra Demonstration Project area. The only mining claims in the area that are being worked are the Lucky Blue tungsten claims on Kaiser Ridge, the Rose-Kay gold placer claims on lower Kaiser Creek, the industrial quartz claims on Pincushion Peak, and the Pick and Shovel mine claims north of Silver Divide. None of these is patented, and the average annual production is very small. At each of these claims small amounts of minable ore exist, but it is doubtful that any of them have sufficient reserves to support large-scale mining operations.

Each of the known metallic deposits in the project area is accompanied by moderate to strong metal anomalies in downstream sediments (or associated sediment in the case of placer gold). Our geochemical sampling program would have indicated the presence of each of these deposits had they not already been known to exist. With the exception of low copper and molybdenum anomalies, no other significant metal anomalies were found in the project area, so it is unlikely that large ore deposits will be discovered in the future. Small bodies of tungsten-bearing tactite may be found associated with the metamorphic rocks of the project area, low-grade placer gold deposits may be found along streams at lower elevations, and small deposits of copper, lead, molybdenum, silver, or zinc ore may be found associated with the widespread quartz veins in the northeast third of the area; however, none of these potential deposits could be expected to support major mining.

GEOLOGIC FEATURES AS NATURAL RESOURCES

The tens of thousands of people who visit parts of the project area every year pass by some of the most interesting and educational geological features of the Sierra Nevada, but most visitors are unaware of this. These tourist features may have greater long-range value than the mineral resources of the project area. The following is a brief summary of a few of the geological features of general interest.

GLACIAL FEATURES

At least 90 percent of the project area was covered by ice at one time or another during the ice ages of the Pleistocene Epoch. The Pleistocene Epoch lasted for more than 2 million years and ended with the retreat of the last glaciers only about 10,000 years ago, so relics of those cold and forbidding times abound. Enormous trunk glaciers a thousand feet thick flowed down both the main San Joaquin River and its South Fork, cutting deeply into underlying rocks and depositing bouldery lateral moraines along their margins. Smaller alpine glaciers were widespread along Kaiser Ridge, Silver Divide, and the east margin of the project area and carved U-shaped valleys and steep-walled cirque basins, now occupied by glacial lakes. Giant boulders, some weighing a hundred tons, were left behind by these glaciers as they retreated; these erratics now litter much of the landscape. Some of these huge ice-transported boulders can be seen along the road to Florence Lake in the immediate vicinity of the High Sierra Ranger Station. A few hundred feet east of the station, south of the road to Florence Lake, morainal ridges consisting of glacially transported boulders rest on a granitic bedrock surface that was polished and striated by rock debris carried along by the flowing ice.

Standing at this site, one can look directly north and clearly see on the opposite side of the South Fork of the San Joaquin River, 4 miles away, a huge lateral moraine that was deposited along the north margin of the ancient glacier that once occupied the river valley. This moraine extends from near Lake Edison westward for several miles and from a distance appears as a series of brush-covered, boulder-strewn green belts that contrast with the darker timbered areas above and below (frontispiece). If one then were to turn around and look directly south, he would see a steep forest-covered slope rising 1,200 feet above his level. This boulder-covered slope is the matching lateral moraine that formed on the south side of the glacier; this moraine is most clearly seen looking back from near Lake Edison. It takes little effort to imagine the flowing sea of thousand-foot-thick ice which once covered the South Fork between these two moraines.

VOLCANIC FEATURES

About three and a half million years ago, before the ice age of the Pleistocene Epoch, large volcanoes in the project area erupted huge quantities of basaltic lava that flowed downslope and along the ancestral valley of the San Joaquin River, which had not yet cut the deep inner canyon in which it now flows. Although erosion has removed most of this basalt, numerous remnants are preserved at the Brown Cone area near Kaiser Diggings, along Silver Divide from Pincushion Peak to Saddle Mountain, along Mono Creek, and at many localities in the broad valley of the South Fork of the San Joaquin. One of the best exposed and most easily visited remnants is Devil's Table, 1 mile northwest of Mono Hot Springs. Standing near the High Sierra Ranger Station and looking to the north, one can see the columnar-jointed Devil's Table and the high country beyond and can perhaps imagine the river of molten lava which once flowed down into the San Joaquin River from a volcano several miles up Mono Creek. From here other basalt flows can also be seen west of Devil's Table, along Silver Divide, and in the Volcanic Knob area of upper Mono Creek.

Visitors to the project area may notice fragments of rhyolite pumice scattered about the ground and concentrated in natural depressions. These fragments are mostly restricted to the east half of the Kaiser Peak and west half of the Mount Abbot quadrangles and are increasingly abundant northward. In some places north of Silver Divide, pumice deposits are more than 1 foot thick. This pumice records a violent volcanic eruption which occurred to the north, in the Mammoth Lakes area, several hundred years ago. Vast quantities of pumice and gas were blown high into the air, and northerly winds carried the fragments southward into and across the project area. Fragments of this pumice can be found in sandy depressions in granitic bedrock at many easily accessible localities, including Kaiser Ridge between Kaiser Pass and Mount Givens and near the High Sierra Ranger Station.

MINERAL SPRINGS

A small area around Mono Hot Springs has long been famous for its mineral baths. Mineral springs also are common along the South Fork of the San Joaquin River from Mono Hot Springs northwestward for about 12 miles, although the springs to the northwest are not as hot as those of Mono Hot Springs. Over several thousand years the mineral waters have built up thick travertine mounds; 2 miles west-northwest of Mono Hot Springs, for example, in a small area on the north bank of the San Joaquin River, brightly colored travertine formations have formed a delicately terraced landscape that is similar to parts of Yellowstone National Park.

GOLD DEPOSITS

The low-grade gold placers along Kaiser Creek (see section "Gold Placer Deposits of Kaiser Creek") have far greater recreational than commercial potential. During this mineral investigation, several families were observed panning gold along the creek. Although no one is likely to recover more than a few cents worth of gold without a major effort, a weekend gold-panning trip can be an enjoyable venture.

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TABLE 3

TABLE 3.—*Spectrographic and chemical analyses of samples*

Sample	Coordinates		Chemical analyses (ppm)				Semiquantitative spectrographic analyses (ppm)						
	X	Y	Au (.02)	Cu (10)	As (10)	W (20)	Fe (500)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Bi (10)	Co (5)
							Stream sediments						
001-20	275	169	L	L	20	L	100,000	N	10	700	L	N	10
001-80	275	169	L	L	10	L	150,000	.5	10	500	L	N	10
004-20	266	169	L	L	20	L	70,000	N	10	500	L	N	5
004-80	266	169	1.2	L	10	40	200,000	N	10	100	L	N	10
005-20	263	167	L	L	L	L	20,000	N	L	300	L	N	5
005-80	263	167	L	10	10	L	20,000	N	L	300	L	N	5
006-20	259	171	L	L	L	10	70,000	N	L	500	L	N	10
006-80	259	171	L	L	N	L	100,000	N	L	300	L	N	10
007-20	258	171	L	L	N	L	20,000	N	L	500	L	N	5
007-80	258	171	L	L	N	L	50,000	N	10	500	L	N	10
008-20	252	158	.02	L	N	L	20,000	N	L	300	L	N	5
008-80	252	158	L	L	N	L	50,000	N	10	300	L	N	10
009-20	296	206	L	L	N	L	100,000	N	L	500	L	N	10
009-80	296	206	.02	L	N	L	G200,000	N	20	100	L	N	20
010-20	269	217	.02	L	N	L	20,000	N	L	500	L	N	5
010-80	269	217	L	L	160	L	30,000	N	L	500	L	N	5
011-P	106	203	L	L	N	40	200,000	N	20	L	L	N	20
012-P	109	199	L	10	N	40	G200,000	N	50	L	L	N	20
013-20	109	199	L	L	N	L	30,000	N	L	300	L	N	L
013-80	109	199	13.0	L	N	L	70,000	N	L	300	L	N	5
014-P	108	199	3.0	L	N	L	200,000	N	20	50	L	N	20
016-P	104	199	L	10	N	L	200,000	N	20	50	L	20	20
018-P	102	191	9.7	10	N	L	200,000	N	20	50	L	N	20
019-P	111	187	L	L	L	L	200,000	N	10	50	L	N	15
020-P	110	185	L	--	10	10	200,000	N	10	50	L	N	20
022-80	208	301	L	L	N	L	20,000	N	L	150	L	N	L
023-80	211	315	L	L	L	L	30,000	N	L	200	L	N	10
024-20	203	319	L	L	N	L	200,000	N	20	70	L	N	20
026-80	192	313	L	L	L	L	50,000	N	L	200	L	N	10
027-80	184	310	L	L	10	L	30,000	N	L	300	L	N	5
028-80	181	313	L	L	N	L	50,000	N	L	300	L	N	5
029-80	175	318	L	L	10	L	50,000	N	L	300	L	N	10
030-80	162	310	L	L	N	L	30,000	N	L	500	L	N	10
031-80	155	299	L	L	N	L	50,000	N	L	200	L	N	10
032-80	151	297	L	L	L	L	50,000	N	L	300	L	N	10
035-80	268	225	.12	L	10	L	50,000	N	L	500	1.5	N	10
036-80	266	227	L	20	L	20	G200,000	N	N	150	N	N	20
037-80	262	227	L	L	L	L	50,000	N	L	500	1.5	N	10
038-80	254	216	L	L	L	L	100,000	N	L	500	1	N	15
039-80	239	131	L	L	L	20	100,000	N	L	300	1.5	N	10
041-80	244	136	.20	L	L	L	30,000	N	L	500	1.5	N	7
042-80	250	146	L	L	10	L	20,000	N	L	300	1	N	7
043-80	260	143	.08	L	L	L	150,000	N	L	200	1	N	15
044-80	257	136	.04	L	L	L	30,000	N	L	300	1.5	N	7
045-80	259	131	.08	L	L	L	30,000	N	L	300	1.5	N	10
046-80	269	131	L	L	L	L	70,000	N	L	300	1	N	15
047-80	268	140	L	L	L	L	50,000	N	L	300	2	N	10
048-80	267	152	L	L	L	L	50,000	N	L	300	1	N	10
049-80	368	157	L	L	L	L	20,000	N	L	500	1.5	N	L
050-80	362	153	L	L	L	L	30,000	N	10	700	1.5	N	5
053-80	348	166	L	L	10	L	70,000	N	L	700	1	N	15
054-80	349	169	.02	16	L	L	70,000	N	L	700	1	N	15
055-80	353	181	L	L	L	L	30,000	N	10	300	1.5	N	7
056-80	344	165	L	L	10	L	50,000	N	15	500	1.5	N	10
058-80	344	192	L	L	10	L	30,000	N	L	700	2	N	10

[Analytical details are discussed in text under "Analytical Methods and Procedures." Lower limits of determination are shown in parenthes below each element in the boxheads. N=not detected, H=interference, L=present but below determination limit, G=greater than value show. Coordinates refer to grid system in figs. 9–14. Results of spectrographic analyses are reported to the nearest number in the series 1, 0.7, 0.5, 0.3, 0.2, 0.15, 0.1, etc. The precision of the reported value is approximately plus 100 percent or minus 50 percent. In unusually favorable materials, concentrations somewhat lower than the values given may be detected. Cd and Sb were looked for, but were not found in any sampl

from the Sierra Demonstration Project area—Continued

Sample	Semiquantitative spectrographic analyses (ppm)--Continued													
	Cr (5)	La (20)	Mn (10)	Mo (5)	Nb (10)	Ni (5)	Pb (10)	Sc (5)	Sn (10)	Sr (100)	V (10)	Y (10)	Zn (200)	Zr (10)
						Stream sediments--Continued								
001-20	15	70	1,000	5	20	10	20	10	L	300	50	20	L	50
001-80	30	50	700	5	20	10	20	15	L	200	200	20	L	500
004-20	10	50	1,500	L	30	5	20	5	L	200	100	20	L	50
004-80	50	50	1,000	5	20	10	10	15	L	100	200	50	L	300
005-20	L	L	200	L	L	5	20	5	L	100	20	L	L	L
005-80	5	L	500	L	10	5	30	7	L	150	50	15	L	50
006-20	10	50	700	L	20	5	20	10	L	200	50	20	L	100
006-80	30	100	1,000	L	20	5	15	20	L	200	70	30	L	300
007-20	5	L	500	L	10	10	20	5	L	150	20	10	L	50
007-80	10	50	700	L	20	5	20	15	L	200	50	20	L	70
008-20	5	L	200	L	L	10	20	5	L	150	20	L	L	20
008-80	10	50	700	L	10	5	20	10	L	200	50	20	L	100
009-20	30	L	500	L	20	15	10	5	L	100	150	20	L	50
009-80	200	L	500	7	20	15	L	5	L	100	200	20	200	150
010-20	10	50	200	L	15	15	20	5	L	200	20	10	L	L
010-80	100	100	700	L	10	10	20	10	L	200	30	20	L	200
011-P	100	150	500	10	30	10	L	20	10	100	150	100	L	1,000
012-P	200	100	300	10	30	10	L	10	L	100	200	50	200	1,000
013-20	5	L	200	L	10	5	20	L	L	150	20	10	L	L
013-80	20	100	300	5	20	5	20	10	L	200	50	20	L	300
014-P	150	L	300	5	20	20	L	15	L	100	300	15	L	G1,000
016-P	150	L	500	10	50	5	L	10	L	100	300	30	L	200
018-P	150	L	300	7	30	5	L	5	L	100	300	30	L	300
019-P	100	L	200	5	20	5	L	10	L	L	200	15	L	70
020-P	100	L	300	5	20	5	L	20	L	L	200	10	L	200
022-80	20	L	200	L	L	10	20	L	L	70	20	L	L	20
023-80	50	70	300	5	10	20	20	10	L	100	20	15	L	100
024-20	70	200	500	10	10	20	L	10	L	100	150	20	L	100
026-80	50	100	200	L	10	30	15	10	L	100	50	10	L	200
027-80	50	50	300	L	10	20	20	10	L	100	30	10	L	50
028-80	20	L	500	L	10	10	15	10	L	200	50	10	L	30
029-80	20	L	500	L	10	10	20	15	L	150	50	10	L	20
030-80	20	L	500	L	20	10	20	10	L	200	50	10	L	50
031-80	20	L	700	L	20	7	15	20	L	150	50	20	L	150
032-80	30	L	500	L	20	20	20	10	L	100	50	10	L	100
035-80	100	50	1,500	L	20	70	15	15	N	300	150	50	N	200
036-80	200	100	1,500	N	20	30	N	15	N	150	500	70	N	1,000
037-80	100	30	1,000	N	10	20	20	10	N	500	200	20	N	200
038-80	150	150	3,000	5	50	30	20	15	N	500	200	100	N	1,000
039-80	70	30	2,000	L	30	L	15	15	N	300	200	70	N	1,000
041-80	15	20	1,000	5	15	5	20	15	N	300	150	30	N	150
042-80	10	20	700	L	10	L	30	15	N	300	100	30	N	200
043-80	100	50	1,000	L	30	5	15	15	N	200	300	70	N	1,000
044-80	15	50	1,000	5	30	5	30	15	N	300	150	50	N	200
045-80	15	50	1,000	7	20	7	30	15	N	300	150	50	N	100
046-80	20	70	2,000	5	30	7	20	30	N	300	200	100	N	700
047-80	20	30	1,000	5	15	5	20	15	N	300	200	30	N	150
048-80	15	30	700	5	20	5	20	15	N	300	150	30	N	200
049-80	7	30	700	L	20	5	30	5	N	200	70	20	N	200
050-80	10	70	1,500	7	30	L	30	7	N	200	70	50	N	200
053-80	50	50	1,000	N	30	10	20	15	N	300	200	30	N	200
054-80	50	30	1,500	N	20	15	30	15	N	500	200	30	N	300
055-80	7	30	700	5	20	5	30	10	N	200	70	20	N	150
056-80	20	50	1,000	5	30	7	30	15	N	300	150	30	N	300
058-80	15	50	1,000	7	30	5	20	15	N	300	100	50	N	200

Averages for each group of analyses calculated as arithmetic mean of the reported values, arbitrarily assuming N=0, L=one-half lower determination limit, and G=upper determination limit; parentheses indicate averages were derived from too few values to be reliably represented. Most chemical analyses by J. G. Viets; others by R. N. Babcock, R. R. Carlson, R. E. Culbertson, J. G. Frisken, J. R. Hassemer, H. D. King, R. W. Leinz, R. L. Miller, D. G. Murrey, M. S. Rickard, L. A. Vinnola, and A. W. Wells. Spectrographic analyses by E. F. Cooley, G. W. Day, J. M. Motooka, D. F. Seims, and K. C. Watts]

TABLE 3.—*Spectrographic and chemical analyses of samples*

Sample	Coordinates		Chemical analyses (ppm)				Semiquantitative spectrographic analyses (ppm)						
	X	Y	Au (.02)	Cu (10)	As (10)	W (20)	Fe (500)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Bi (10)	Co (5)
							Stream sediments--Continued						
059-80	155	226	L	L	L	L	70,000	N	L	700	2	N	5
060-80	136	231	L	L	L	L	30,000	N	L	500	1.5	N	5
061-80	135	244	.08	L	L	L	30,000	N	20	700	5	N	7
063-80	137	220	L	L	L	L	50,000	N	L	700	2	N	7
064-80	322	173	L	L	L	L	200,000	N	L	700	1	N	15
065-80	349	134	L	L	L	L	30,000	N	10	700	2	N	7
067-80	344	136	L	L	L	80	30,000	N	10	700	3	N	5
070-80	293	179	L	13	L	20	G200,000	N	L	700	N	N	30
071-80	295	175	L	L	L	L	70,000	N	L	700	L	N	15
074-80	303	184	L	23	L	L	30,000	N	20	1,000	1	N	10
075-80	251	285	L	L	10	4	30,000	N	L	500	1.5	N	7
076-80	246	291	L	L	L	L	30,000	N	L	500	2	N	5
077-80	233	295	L	11	L	40	100,000	N	L	700	1.5	N	10
078-80	245	302	L	L	10	L	50,000	N	L	700	1.5	N	7
079-80	260	286	L	10	L	L	50,000		20	1,500	3	N	7
080-80	256	298	.12	L	L	L	30,000	N	10	700	1.5	N	7
081-80	257	303	L	L	L	L	100,000	N	L	700	1	N	5
082-80	251	308	L	L	L	L	70,000	N	L	700	1.5	N	5
083-80	246	304	L	L	L	L	50,000	N	L	700	2	N	7
084-80	247	303	L	L	L	L	30,000	N	10	700	1	N	7
085-80	238	306	L	L	L	L	70,000	N	L	1,000	1.5	N	15
086-80	235	308	L	L	L	20	50,000	N	10	1,000	3	N	5
087-80	233	311	L	L	L	20	70,000	N	L	1,000	L	N	10
088-80	231	314	L	14	L	40	G200,000	N	L	1,000	L	N	15
089-80	173	279	.04	L	L	20	50,000	N	L	1,000	N	N	5
090-80	176	281	L	L	L	20	70,000	N	L	1,000	1	N	15
091-80	213	294	L	20	10	L	70,000	N	10	300	2	N	10
093-80	219	283	L	17	L	20	100,000	N	L	300	2	N	10
094-80	220	272	L	20	L	L	100,000	N	L	300	2	N	10
095-80	226	263	L	30	L	L	100,000	N	L	150	N	N	10
096-80	231	264	L	10	L	L	100,000	N	10	300	2	N	15
097-80	240	261	L	L	10	L	30,000	N	10	300	2	N	7
103-80	307	319	.02	54	L	L	30,000	1	20	200	3	N	5
104-80	306	319	L	10	L	L	30,000	L	20	200	2	N	5
106-80	319	326	L	32	10	L	50,000	N	15	300	3	N	5
108-80	335	326	.06	10	N	L	20,000	N	10	300	2	N	5
109-80	336	325	.04	L	N	L	20,000	N	15	200	3	N	L
110-80	330	320	L	L	N	L	50,000	N	15	300	3	N	5
111-80	329	318	L	L	L	L	50,000	2	10	300	3	N	5
112-80	327	310	.04	L	L	L	30,000	2	10	300	3	N	5
113-80	330	310	.06	L	N	L	5,000	N	10	150	2	N	L
114-80	301	296	L	L	L	L	30,000	N	10	300	1.5	N	L
115-80	274	170	L	L	N	L	G200,000	N	L	700	1	N	20
117-80	292	262	L	L	L	L	100,000	N	L	300	1.5	N	15
121-80	367	319	L	L	L	L	30,000		20	500	2	N	5
122-80	368	315	.02	L	L	L	30,000	N	20	50	2	N	5
124-80	318	196	L	L	L	L	50,000	N	L	500	N	N	L
128-80	310	191	L	27	L	L	50,000	N	10	1,500	N	N	30
129-80	310	187	.02	L	10	L	70,000	N	10	700	N	N	7
130-80	305	167	L	16	L	L	200.000	N	70	1,500	N	N	7
134-80	352	318	.02	11	L	L	10,000	N	20	500	1	N	L
135-80	355	320	.02	L	L	L	10,000	N	20	700	1	N	5
137-80	356	308	.02	12	L	L	15,000		10	500	1.5	N	5
140-80	361	291	L	L	N	L	10,000	N	20	300	1.5	N	L
141-80	368	288	L	L	N	L	10,000	N	15	500	1	N	N
142-80	361	281	.02	L	L	L	10,000	N	10	500	2	N	L
144-80	346	262	L	L	N	L	50,000	N	L	700	L	N	20
145-80	344	251	L	L	L	L	30,000	N	10	500	1	N	10
146-80	322	249	.02	L	N	L	10,000	N	L	500	1	N	10
147-80	327	245	L	L	L	L	70,000	N	L	300	1	N	15

from the Sierra Demonstration Project area—Continued

Sample	Semiquantitative spectrographic analyses (ppm)--Continued													
	Cr (5)	La (20)	Mn (10)	Mo (5)	Nb (10)	Ni (5)	Pb (10)	Sc (5)	Sn (10)	Sr (100)	V (10)	Y (10)	Zn (200)	Zr (10)
							Stream sediments--Continued							
059-80	20	50	1,000	5	30	5	30	10	L	500	150	30	N	300
060-80	15	50	500	5	30	7	20	10	N	300	150	50	N	300
061-80	15	70	1,500	N	30	5	50	15	N	700	100	50	N	500
063-80	20	30	1,000	5	20	10	30	10	N	300	150	30	N	200
064-80	30	70	300	5	30	L	N	15	N	150	300	50	N	300
065-80	10	50	1,000	7	20	5	50	10	N	200	100	30	N	200
067-80	5	50	700	100	20	L	30	7	N	200	70	30	N	500
070-80	300	50	500	N	15	15	N	15	N	200	700	50	N	1,000
071-80	30	70	1,000	20	20	10	30	15	N	300	200	50	N	200
074-80	10	20	1,000	10	10	7	50	10	N	300	100	15	N	70
075-80	10	30	1,000	5	10	7	50	10	N	300	150	30	N	150
076-80	10	70	1,000	7	30	5	30	10	N	300	100	30	N	200
077-80	70	150	1,500	30	50	20	30	10	N	300	200	70	N	1,000
078-80	15	50	1,000	5	15	5	20	10	N	300	150	20	N	150
079-80	7	50	1,500	10	20	5	70	10	N	500	100	30	N	200
080-80	10	30	1,000	7	20	10	50	7	L	300	150	30	N	200
081-80	10	50	1,000	20	30	L	20	7	L	150	150	50	N	300
082-80	15	70	2,000	15	30	5	30	7	10	150	150	50	N	1,000
083-80	15	50	1,500	15	20	7	50	10	L	200	100	30	N	200
084-80	15	30	700	15	20	7	50	10	N	200	100	20	N	150
085-80	30	100	3,000	10	30	15	70	20	L	500	200	50	N	500
086-80	50	150	1,000	15	30	20	50	7	N	500	100	30	N	300
087-80	50	70	1,000	5	20	15	50	15	N	300	200	30	N	200
088-80	100	200	5,000	20	50	15	50	15	N	300	300	100	N	1,000
089-80	20	30	1,500	L	20	10	30	15	N	500	150	30	N	300
090-80	50	70	1,500	7	30	15	30	15	N	500	200	70	N	1,000
091-80	100	150	700	7	10	50	30	7	N	200	150	20	N	150
093-80	50	70	700	10	15	10	20	7	N	200	150	20	N	500
094-80	20	70	700	N	15	7	20	7	N	300	150	20	N	500
095-80	50	30	300	N	L	20	20	5	N	100	200	20	N	70
096-80	70	50	1,000	7	15	30	20	10	N	300	150	20	N	1,000
097-80	15	30	700	L	10	5	30	10	N	300	100	20	N	100
103-80	7	30	1,000	7	10	5	700	5	N	150	70	20	500	150
104-80	7	30	1,000	5	15	5	300	5	N	200	50	20	N	200
106-80	15	100	700	L	15	5	30	10	N	200	200	20	N	200
108-80	15	70	1,000	N	15	5	50	10	N	200	70	20	N	200
109-80	10	30	700	5	10	15	50	5	N	L	20	20	N	100
110-80	15	30	700	L	10	5	20	10	N	200	50	20	N	150
111-80	10	100	700	L	15	5	30	7	N	300	70	30	N	200
112-80	7	70	700	L	10	5	30	5	N	500	50	10	N	70
113-80	L	30	500	N	L	5	30	L	N	100	20	10	N	100
114-80	L	N	1,000	N	10	5	50	L	N	200	50	10	N	70
115-80	50	300	2,000	15	100	N	L	30	N	300	300	300	N	1,500
117-80	70	70	2,000	N	15	20	50	20	N	200	300	50	L	150
121-80	50	50	500	7	20	30	50	10	N	100	100	30	N	150
122-80	10	50	500	7	20	70	30	7	N	100	50	30	N	150
124-80	L	50	500	L	10	N	10	5	N	200	70	15	N	200
128-80	30	100	2,000	5	15	20	70	20	N	1,000	150	70	N	300
129-80	30	50	1,000	L	30	L	20	15	N	300	200	50	N	1,000
130-80	30	50	1,500	L	30	N	20	20	N	500	300	70	N	G1,000
134-80	15	50	700	5	20	10	30	L	N	200	20	20	N	100
135-80	30	50	500	L	20	15	20	5	N	150	50	20	N	150
137-80	20	50	500	5	20	10	30	5	N	200	20	15	N	200
140-80	20	30	500	7	20	10	70	5	N	150	20	15	N	200
141-80	15	70	500	10	20	10	30	5	N	200	15	15	N	100
142-80	15	30	1,000	15	20	10	30	5	N	200	20	15	N	100
144-80	20	30	1,000	5	20	10	20	15	N	300	100	30	N	300
145-80	15	100	700	10	20	7	30	10	N	300	70	20	N	200
146-80	15	30	700	5	20	7	20	10	N	200	30	30	N	300
147-80	50	100	700	L	30	15	15	15	N	300	100	50	N	200

TABLE 3.—*Spectrographic and chemical analyses of samples*

Sample	Coordinates X	Coordinates Y	Chemical analyses (ppm) Au (.02)	Cu (10)	As (10)	W (20)	Semiquantitative spectrographic analyses (ppm) Fe (500)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Bi (10)	Co (5)
							Stream sediments--Continued						
148-80	317	122	0.02	L	N	L	150,000	N	L	500	1	N	20
150-80	313	128	L	10	L	L	50,000	N	10	500	1	N	20
155-80	370	255	.02	L	N	L	15,000	N	15	700	1.5	N	5
156-80	357	251	L	L	N	L	100,000	N	L	700	L	N	50
157-80	368	258	L	19	N	L	50,000	N	10	500	1	N	7
158-80	355	253	L	L	N	L	70,000	N	L	300	1	N	10
159-80	355	251	L	L	N	L	30,000	N	10	500	1	N	7
160-80	362	252	L	L	L	L	30,000	N	10	500	1	N	7
161-80	348	247	L	11	10	L	30,000	N	10	500	L	N	20
162-80	337	246	L	L	10	L	30,000	N	10	700	L	N	20
163-80	334	246	L	11	L	10	30,000	N	10	500	1	N	15
167-80	366	221	L	L	L	L	30,000	N	L	1,000	1	N	7
168-80	349	233	L	13	N	L	100,000	N	L	1,000	1	N	7
170-80	179	281	10	12	N	L	200,000	N	L	700	1	N	10
171-80	174	275	L	L	N	L	50,000	N	10	700	1.5	N	10
174-80	052	155	L	L	N	L	70,000	N	L	700	1.5	N	7
175-P	045	136	L	31	10	20	G200,000	N	N	20	1	N	20
176-80	045	135	L	L	N	L	100,000	N	L	1,000	1.5	N	7
177-80	042	126	L	12	10	20	G200,000	N	L	700	1	N	10
178-80	043	123	L	L	L	L	30,000	N	L	1,000	1.5	N	5
181-80	179	253	L	L	N	L	50,000	N	10	700	1.5	N	7
182-80	169	255	L	L	L	20	50,000	N	20	700	2	N	7
183-80	168	254	L	L	N	L	50,000	N	15	700	2	N	5
184-80	165	265	L	13	N	20	50,000	N	10	700	2	N	7
185-80	158	266	L	L	N	L	30,000	N	10	700	2	N	5
188-80	150	285	L	12	N	L	70,000	N	10	700	2	N	10
189-80	145	288	L	L	10	20	150,000	N	L	700	2	N	10
190-80	142	287	L	L	N	20	70,000	N	10	700	1	N	10
191-80	132	287	L	12	10	30	G200,000	N	L	700	1.5	N	15
192-80	130	282	L	L	L	20	50,000	N	10	700	1	N	5
193-80	106	273	L	18	20	500	G200,000	N	L	500	2	N	15
194-80	105	276	L	L	N	L	30,000	N	L	500	2	N	5
195-80	113	286	L	14	10	500	G200,000	N	L	200	3	N	20
196-80	318	140	L	L	L	L	50,000	N	L	1,000	2	N	7
197-80	319	137	L	L	N	L	30,000	N	L	700	1.5	N	5
199-P	268	218	L	24	10	L	G200,000	N	N	70	1	N	30
201-P	269	226	L	18	L	20	200,000	N	N	300	1	N	15
202-80	271	228	L	L	N	L	50,000	N	L	700	2	N	7
203-80	272	230	L	24	N	L	150,000	N	L	700	2	N	15
205-80	094	248	L	L	L	L	30,000	N	L	700	2	N	5
207-80	125	228	L	L	L	60	100,000	N	10	700	2	N	7
209-80	118	225	L	L	N	L	70,000	N	10	700	2	N	7
210-P	117	225	L	L	L	40	G200,000	N	N	50	L	N	20
211-80	115	226	L	L	10	L	50,000	N	L	700	2	N	10
212-80	118	216	L	L	L	L	50,000	N	10	500	2	N	7
213-P	109	214	.63	14	L	240	G200,000	N	N	100	L	N	20
214-80	108	215	L	L	L	L	50,000	N	10	500	2	N	7
215-80	314	279	L	L	L	L	100,000	N	10	500	1.5	N	5
218-80	322	254	L	L	L	L	50,000	N	L	500	2	N	5
219-P	245	216	L	L	L	80	100,000	N	L	300	1	N	15
220-P	249	215	L	23	L	40	G200,000	N	N	150	N	N	30
221-80	295	284	L	L	L	L	50,000	N	15	300	2	N	7
222-P	106	222	L	18	N	40	G200,000	N	N	100	N	N	20
223-80	103	221	L	L	N	L	70,000	N	L	700	2	N	10
224-80	94	218	L	L	N	L	50,000	N	L	700	2	N	7
226-80	85	211	L	L	N	L	70,000	N	10	700	2	N	7
227-P	76	210	1.40	35	10	40	G200,000	N	N	70	N	N	20
228-P	78	208	L	53	10	60	G200,000	N	N	20	N	N	30
229-80	72	205	L	13	N	L	150,000	N	L	700	2	N	15
230-80	368	240	L	L	N	L	70,000	N	10	500	2	N	10

from the Sierra Demonstration Project area—Continued

Sample	Semiquantitative spectrographic analyses (ppm)--Continued													
	Cr (5)	La (20)	Mn (10)	Mo (5)	Nb (10)	Ni (5)	Pb (10)	Sc (5)	Sn (10)	Sr (100)	V (10)	Y (10)	Zn (200)	Zr (10)
						Stream sediments--Continued								
148-80	30	100	1,000	N	30	5	20	15	N	200	200	50	N	300
150-80	20	30	1,000	L	10	10	20	15	N	200	100	30	N	200
155-80	20	70	300	L	20	10	30	5	N	500	30	20	N	70
156-80	700	30	700	N	20	100	50	20	N	300	200	30	N	100
157-80	20	100	500	5	30	7	50	10	N	300	70	30	N	200
158-80	20	100	500	L	20	7	50	10	N	300	100	30	N	300
159-80	50	100	700	5	30	15	50	10	N	300	70	50	N	150
160-80	30	100	500	L	30	10	20	10	N	300	50	30	N	150
161-80	200	50	700	N	20	70	30	15	N	300	70	30	N	100
162-80	70	70	1,000	N	20	20	20	20	N	500	70	50	N	100
163-80	200	70	700	5	20	30	50	15	N	300	70	50	N	100
167-80	20	70	700	N	10	20	15	5	N	300	50	10	N	150
168-80	30	50	700	N	10	50	15	10	N	300	200	20	N	300
170-80	150	70	500	N	10	10	10	10	N	300	500	30	N	1,000
171-80	20	50	1,500	L	10	10	20	10	N	300	100	20	N	200
174-80	20	100	500	N	10	5	15	10	N	300	100	30	N	700
175-P	200	150	5,000	N	20	15	N	5	N	N	700	70	N	G1,000
176-80	50	20	500	N	15	L	20	50	N	300	200	30	N	1,000
177-80	100	50	500	N	15	5	10	10	N	300	300	30	N	700
178-80	5	20	200	N	10	L	50	5	N	300	70	10	N	200
181-80	15	20	300	N	10	10	20	7	N	500	100	10	N	150
182-80	20	30	500	L	10	10	30	7	N	300	100	20	N	200
183-80	15	50	500	L	10	5	20	7	N	300	70	20	N	200
184-80	70	70	500	L	10	20	30	10	N	500	100	15	N	150
185-80	5	30	300	5	15	5	20	5	N	300	70	20	N	300
188-80	15	50	500	N	10	5	15	10	N	500	150	20	N	300
189-80	50	100	700	5	50	15	15	15	N	300	300	50	N	200
190-80	20	50	700	5	10	7	20	15	N	500	150	20	N	200
191-80	70	100	700	N	20	5	10	15	N	200	300	70	N	G1,000
192-80	15	20	500	L	10	5	15	7	N	300	70	15	N	300
193-80	150	70	5,000	10	20	10	L	10	20	200	500	70	N	1,000
194-80	15	50	700	N	15	5	20	5	N	300	70	15	N	300
195-80	150	100	G5,000	50	20	50	N	15	50	200	500	70	N	150
196-80	10	20	1,000	5	10	L	10	10	N	150	100	30	N	300
197-80	10	30	700	N	10	L	10	7	N	200	70	20	N	150
199-P	200	200	G5,000	N	100	10	N	30	N	N	700	150	N	200
201-P	150	150	2,000	N	30	30	L	20	N	200	300	100	N	150
202-80	15	70	700	5	15	10	10	7	N	200	100	20	N	200
203-80	70	30	1,000	10	10	20	15	20	N	300	200	30	L	200
205-80	10	70	700	N	10	5	20	L	N	200	70	20	N	300
207-80	20	30	700	5	20	5	15	7	N	300	150	50	N	300
209-80	15	30	500	N	15	5	15	10	N	300	100	30	N	500
210-P	300	70	500	N	20	10	N	5	N	N	500	150	N	700
211-80	70	30	500	N	10	10	15	10	N	300	70	20	N	200
212-80	5	50	700	L	15	5	15	10	L	200	70	30	N	700
213-P	200	150	300	N	50	10	N	10	N	L	500	150	N	700
214-80	15	50	300	L	15	5	15	10	N	300	70	30	N	150
215-80	15	300	1,000	N	50	L	15	7	N	150	100	70	N	300
218-80	20	50	700	5	15	5	10	7	N	150	70	30	N	700
219-P	30	200	5,000	15	100	7	10	70	20	200	100	200	N	G1,000
220-P	150	300	1,500	N	50	15	N	7	N	L	300	200	N	G1,000
221-80	70	50	700	N	15	15	15	15	N	200	70	30	N	300
222-P	150	200	700	N	50	10	N	7	N	L	300	200	N	G1,000
223-80	200	70	700	N	10	20	15	15	N	300	100	20	N	700
224-80	70	20	300	N	10	10	15	10	N	300	100	15	N	300
226-80	15	30	500	N	10	5	15	10	N	300	100	20	N	200
227-P	150	70	500	N	15	15	N	7	N	L	300	30	N	500
228-P	150	70	700	N	15	15	N	5	N	N	500	30	N	700
229-80	150	20	700	N	10	15	15	15	N	300	300	20	N	500
230-80	100	50	500	N	10	20	15	10	N	300	100	20	N	150

TABLE 3.—*Spectrographic and chemical analyses of samples*

Sample	Coordinates		Chemical analyses (ppm)				Semiquantitative spectrographic analyses (ppm)						
	X	Y	Au (.02)	Cu (10)	As (10)	W (20)	Fe (500)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Bi (10)	Co (5)
							Stream sediments--Continued						
232-80	335	265	L	L	N	N	30,000	N	10	700	2	N	5
233-80	116	196	L	L	L	N	150,000	N	L	700	1.5	N	7
234-P	122	197	33.6	12	L	160	G200,000	1	N	30	N	N	20
235-P	241	210	.06	L	L	80	150,000	N	L	300	N	N	15
1001-20	275	169	L	--	L	10	100,000	N	L	200	L	N	5
1001-20	275	169	L	L	10	L	70,000	N	L	500	L	N	5
1001-80	275	169	L	--	L	L	150,000	N	L	200	L	N	10
1001-80	275	169	L	L	60	L	200,000	N	10	500	L	N	10
1002-20	263	167	L	L	40	L	30,000	N	L	700	L	N	5
1002-80	263	167	L	L	20	L	70,000	N	L	500	L	N	5
1003-20	259	171	.02	L	N	L	10,000	N	L	500	L	N	5
1003-80	259	171	L	L	N	L	30,000	N	L	300	L	N	5
1004-20	258	171	L	L	N	L	10,000	N	10	700	L	N	5
1004-80	258	171	L	--	N	L	50,000	N	10	500	L	N	10
1005-20	251	161	L	L	10	L	20,000	N	10	500	L	N	5
1005-80	251	161	L	L	N	L	20,000	N	10	500	L	N	5
1006-20	286	200	.02	L	L	L	10,000	N	L	500	L	N	L
1006-80	286	200	L	L	L	L	30,000	N	10	500	L	N	L
1007-20	286	200	L	10	N	L	10,000	N	L	500	L	N	L
1007-80	286	200	L	L	N	L	20,000	N	L	500	L	N	L
1008-20	286	200	L	L	80	L	G200,000	N	50	50	L	N	20
1008-80	286	200	L	--	N	L	G200,000		20	50	L	N	10
1009-20	296	206	L	L	N	L	20,000	N	L	1,000	L	N	L
1009-80	296	206	L	L	N	L	200,000	N	10	500	L	N	10
1010-20	106	203	L	--	N	L	20,000	N	L	300	L	N	L
1010-80	106	203	L	L	N	L	20,000	N	L	200	L	N	L
1011-P	105	199	L	L	N	10	G200,000	N	50	L	L	N	20
1012-P	102	191	.15	L	N	40	200,000	N	20	L	L	N	20
1013-P	103	190	L	L	N	L	200,000	N	30	50	L	N	10
1014-20	110	185	L	34	L	L	20,000	N	L	300	L	N	L
1014-80	110	185	L	L	N	L	20,000	N	L	20	L	N	L
1016-80	189	301	L	L	N	L	70,000	N	10	200	L	N	10
1017-80	180	298	L	10	N	L	20,000	N	10	200	L	N	5
1018-80	181	296	L	L	N	L	30,000	N	10	300	L	N	5
1019-80	170	297	L	L	10	L	20,000	N	10	200	L	N	5
1020-80	169	297	L	L	N	L	50,000	N	10	500	L	N	5
1021-80	170	294	L	L	N	L	70,000	N	10	500	L	N	5
1022-80	170	283	L	L	N	L	100,000	N	10	150	L	N	10
1023-80	166	284	L	L	N	L	50,000	N	10	150	L	N	5
1024-80	280	199	L	L	L	20	50,000	N	L	1,000	1.5	N	5
1025-80	276	192	L	L	L	L	50,000	N	L	1,000	1	N	7
1026-80	274	193	L	L	L	L	100,000	N	L	700	1	N	10
1027-80	260	188	L	L	L	20	70,000	N	L	1,000	1	N	10
1028-80	259	202	.16	L	L	20	100,000	N	10	1,000	2	N	15
1029-80	243	211	.08	L	L	20	50,000	N	L	1,000	1	N	15
1030-80	245	211	.20	L	L	20	70,000	N	L	700	1	N	15
1031-80	231	205	.06	L	L	L	50,000	N	10	700	2	N	10
1032-80	230	206	.10	L	N	L	30,000	N	10	500	2	N	5
1034-80	233	195	.04	L	L	L	70,000	N	10	700	1	N	5
1035-80	247	191	L	L	L	L	30,000	N	10	300	1	N	5
1036-80	247	187	L	L	L	L	50,000	N	10	500	2	N	5
1037-80	244	105	L	L	L	20	100,000	N	L	500	N	N	30
1038-80	257	101	L	L	L	20	50,000	N	10	1,000	2	N	10
1039-80	259	101	L	L	L	20	G200,000	N	L	500	N	N	30
1040-80	280	101	L	L	L	20	150,000	N	15	1,000	2	N	20
1041-80	287	124	L	L	L	L	70,000	N	10	1,500	2	N	15
1044-80	231	241	L	17	L	L	G200,000	N	L	500	N	N	30
1045-P	231	241	L	29	L	L	G200,000	N	L	50	N	N	50
1047-80	226	250	L	20	L	L	200,000	N	L	1,000	1	N	20
1048-80	223	249	L	26	L	L	200,000	N	L	700	L	N	15

from the Sierra Demonstration Project area—Continued

Sample	Semiquantitative spectrographic analyses (ppm)--Continued													
	Cr (5)	La (20)	Mn (10)	Mo (5)	Nb (10)	Ni (5)	Pb (10)	Sc (5)	Sn (10)	Sr (100)	V (10)	Y (10)	Zn (200)	Zr (10)
							Stream sediments--Continued							
232-80	5	20	700	N	10	20	15	5	N	150	50	10	N	700
233-80	20	N	200	N	10	7	15	7	N	150	150	10	N	700
234-P	150	70	700	N	70	10	N	5	N	N	500	150	N	G1,000
235-P	100	500	3,000	20	70	10	10	20	15	150	200	G200	N	700
1001-20	20	150	300	5	20	5	10	5	L	50	50	20	L	50
1001-20	10	50	300	L	20	5	10	5	L	100	50	15	L	50
1001-80	30	L	500	10	20	7	20	10	L	100	200	20	L	100
1001-80	30	100	1,000	5	20	5	20	20	L	100	300	30	200	500
1002-20	5	50	200	L	20	5	30	10	L	200	30	10	L	50
1002-80	10	200	500	L	20	5	30	20	L	200	50	20	L	100
1003-20	L	L	200	L	10	5	10	5	L	150	20	10	L	20
1003-80	5	L	200	L	10	5	20	15	L	150	30	20	L	50
1004-20	L	50	300	L	10	5	30	5	L	300	20	10	L	20
1004-80	10	50	1,500	L	20	5	20	20	L	200	30	20	L	100
1005-20	L	50	200	L	15	5	20	L	L	200	20	10	L	30
1005-80	5	50	500	L	10	5	20	10	L	200	20	15	L	50
1006-20	L	50	100	L	10	5	20	L	L	150	20	L	L	L
1006-80	10	L	200	L	10	5	100	5	L	150	30	10	200	20
1007-20	5	L	100	L	10	5	20	L	L	200	20	L	L	20
1007-80	10	L	100	L	10	5	20	L	L	150	20	10	L	50
1008-20	150	100	1,500	7	30	5	L	20	L	L	200	50	L	200
1008-80	30	L	500	7	30	5	L	5	L	L	200	10	L	500
1009-20	20	50	700	L	10	10	30	5	L	300	20	10	L	50
1009-80	100	L	1,000	5	30	5	20	20	L	100	200	20	L	300
1010-20	5	50	150	L	10	5	20	5	L	200	20	10	L	70
1010-80	10	50	200	L	10	5	15	10	L	200	20	15	L	100
1011-P	200	L	500	10	20	5	L	10	L	L	200	50	L	700
1012-P	150	L	300	7	20	10	L	15	L	L	200	20	L	1,000
1013-P	150	L	300	10	20	5	L	10	L	100	200	50	L	500
1014-20	5	L	200	L	L	5	20	5	L	100	20	L	L	L
1014-80	10	L	200	L	10	5	20	5	L	100	20	10	L	L
1016-80	200	50	500	L	10	30	20	5	L	100	100	10	L	100
1017-80	100	L	300	L	L	30	20	5	L	100	20	L	L	20
1018-80	100	70	500	L	10	30	20	10	L	100	20	15	L	70
1019-80	75	50	200	L	10	30	20	5	L	100	20	10	L	30
1020-80	50	70	500	L	10	20	20	15	L	200	50	15	L	50
1021-80	100	70	500	L	10	30	20	15	L	200	50	20	L	50
1022-80	150	100	700	L	10	30	20	20	L	150	70	20	L	100
1023-80	30	50	500	L	10	20	20	7	L	150	50	10	L	50
1024-80	20	100	1,000	N	20	10	20	10	N	500	100	30	N	100
1025-80	15	50	1,500	N	30	5	20	15	N	500	200	50	N	300
1026-80	50	30	700	N	20	5	15	7	N	300	200	20	N	200
1027-80	50	70	500	L	30	15	10	10	N	300	200	50	N	150
1028-80	70	50	1,500	5	30	20	30	15	N	500	200	50	N	500
1029-80	50	20	1,000	L	30	15	20	20	N	300	200	50	N	150
1030-80	200	100	2,000	5	50	20	20	20	L	300	200	100	N	1,000
1031-80	30	50	1,500	5	15	10	30	30	N	500	100	50	N	700
1032-80	15	20	1,000	N	10	10	30	15	N	300	100	20	N	100
1034-80	20	50	700	L	15	10	30	15	N	700	100	20	N	150
1035-80	10	20	700	L	10	7	30	10	N	200	100	15	N	30
1036-80	15	70	700	N	15	5	30	10	N	300	100	30	N	300
1037-80	50	50	1,500	5	30	30	10	50	10	200	300	150	N	1,000
1038-80	15	100	1,500	L	30	L	30	20	N	500	200	70	N	1,000
1039-80	700	30	1,500	N	30	20	N	30	N	150	1,500	100	N	G1,000
1040-80	100	70	5,000	20	20	10	50	30	L	500	300	100	N	G1,000
1041-80	20	30	1,500	N	20	7	50	30	N	700	200	70	N	300
1044-80	200	30	1,000	5	20	20	N	10	N	200	700	50	N	G1,000
1045-P	500	50	1,000	N	20	30	N	7	N	N	1,000	70	N	1,000
1047-80	200	150	1,500	5	30	50	20	15	N	700	500	20	N	G1,000
1048-80	150	100	1,000	5	30	50	20	10	N	500	300	70	N	500

TABLE 3.—*Spectrographic and chemical analyses of samples*

Sample	Coordinates		Chemical analyses (ppm)				Semiquantitative spectrographic analyses (ppm)						
	X	Y	Au (.02)	Cu (10)	As (10)	W (20)	Fe (500)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Bi (10)	Co (5)
							Stream sediments--Continued						
1049-80	213	242	.04	12	L	L	100,000	N	L	700	1	N	15
1050-80	218	241	L	28	L	L	G200,000	N	L	1,000	1	N	30
1051-80	224	236	L	L	L	L	100,000	N	L	1,000	1.5	N	15
1053-80	367	148	L	L	L	L	20,000	N	L	1,000	1.5	N	5
1054-80	374	156	L	L	L	L	50,000	N	L	1,000	1.5	N	10
1055-80	371	170	L	L	L	L	50,000	N	10	1,000	2	N	10
1056-80	364	179	L	L	L	L	70,000	N	20	1,500	3	N	10
1057-80	362	182	L	L	L	L	50,000	N	L	1,000	2	N	10
1058-80	351	189	.20	L	L	L	70,000	N	10	1,000	2	N	10
1059-80	148	225	.04	L	L	L	50,000	N	L	500	2	N	5
1060-80	145	233	.06	L	L	L	20,000	N	L	500	1.5	N	5
1061-80	148	246	.02	L	L	L	15,000	N	L	500	2	N	5
1062-80	165	240	L	L	L	L	30,000	N	L	700	2	N	7
1063-80	170	239	L	L	L	L	30,000	N	L	700	3	N	7
1064-80	169	231	L	L	L	L	30,000	N	L	700	3	N	7
1066-80	234	222	L	L	L	L	50,000	N	L	700	1.5	N	15
1067-80	206	227	L	12	L	L	G200,000	N	L	300	N	N	20
1068-80	209	228	L	L	L	L	50,000	N	10	500	1.5	N	10
1069-80	344	160	.04	L	L	L	200,000	N	L	700	1.5	N	7
1070-80	337	154	L	L	L	L	50,000	N	L	1,000	2	N	5
1071-80	336	151	.04	L	L	L	100,000	N	10	300	2	N	5
1072-80	334	156	L	L	L	20	50,000	N	L	1,000	2	N	5
1073-80	350	151	L	L	L	20	20,000	N	L	700	2	N	5
1074-80	335	147	L	L	L	L	200,000	N	L	300	2	N	10
1075-80	326	151	.02	L	L	L	70,000	N	L	700	1.5	N	7
1076-80	322	153	L	L	L	L	70,000	N	L	1,000	1.5	N	7
1077-80	308	162	L	L	L	L	100,000	N	L	700	1.5	N	7
1078-80	180	161	L	L	L	L	200,000	N	L	700	1	N	10
1079-80	168	167	.02	L	L	L	50,000	N	L	700	2	N	10
1080-80	120	199	.04	L	L	L	70,000	N	L	700	1.5	N	10
1080-P	120	199	19.0	12	L	300	G200,000	1.5	N	70	N	N	30
1081-80	119	202	.50	L	L	20	70,000	.5	10	1,000	3	N	5
1081-P	119	202	.12	L	L	40	G200,000	N	L	100	N	N	50
1082-80	130	203	.06	L	L	20	200,000	N	10	700	2	N	10
1082-P	130	203	L	20	L	300	G200,000	N	L	50	N	N	30
1084-80	141	194	1.3	L	L	40	G200,000	N	L	500	L	N	10
1084-P	141	194	11.0	15	L	600	200,000	N	L	100	N	N	30
1085-80	197	262	.06	L	L	L	50,000	N	L	700	1.5	N	10
1086-80	185	263	.02	L	L	L	150,000	N	L	1,000	1	N	20
1088-80	204	232	L	L	L	L	200,000	N	L	700	1	N	20
1089-80	204	237	L	L	L	L	150,000	N	L	500	L	N	20
1090-80	204	238	L	L	L	L	70,000	N	L	1,500	2	N	15
1091-80	203	264	L	L	L	L	70,000	N	L	1,000	1	N	10
1092-80	256	237	.06	L	L	L	50,000	N	10	300	3	N	5
1093-80	260	239	.06	L	N	L	100,000	N	10	500	1.5	N	15
1094-80	257	241	L	13	L	L	200,000	N	10	300	1.5	N	20
1095-80	252	250	L	L	L	L	150,000	N	L	300	2	N	15
1096-80	260	257	L	L	L	L	70,000	N	10	300	1.5	N	10
1097-80	267	254	L	L	N	L	30,000	N	10	300	2	N	5
1098-80	371	93	L	10	10	L	200,000	N	20	700	L	N	15
1099-80	382	104	.02	L	L	L	100,000	N	50	1,500	2	N	15
1101-80	389	111	L	L	L	L	50,000	N	L	700	1	N	10
1103-80	372	123	L	L	L	L	50,000	N	L	1,000	1	N	7
1104-80	370	112	L	L	L	L	30,000	N	10	500	2	N	5
1105-80	212	167	.06	L	L	L	50,000	N	10	300	2	N	5
1107-80	222	180	L	L	L	L	30,000	N	10	500	2	N	5
1108-80	287	292	.04	L	L	L	20,000	N	15	300	1.5	N	5
1109-80	305	326	L	L	L	L	15,000	N	10	300	2	N	5
1110-80	306	319	L	L	N	N	15,000	N	10	500	1.5	N	5
1112-80	282	309	L	L	L	L	20,000	N	20	500	3	N	L

from the Sierra Demonstration Project area—Continued

Sample	Semiquantitative spectrographic analyses (ppm)--Continued													
	Cr (5)	La (20)	Mn (10)	Mo (5)	Nb (10)	Ni (5)	Pb (10)	Sc (5)	Sn (10)	Sr (100)	V (10)	Y (10)	Zn (200)	Zr (10)
						Stream sediments--Continued								
1049-80	150	70	1,000	5	30	50	20	15	N	500	300	70	N	300
1050-80	700	100	1,000	5	30	50	10	15	N	500	500	70	N	G1,000
1051-80	50		1,500	5	20	20	30	15	N	500	200	50	N	300
1053-80	10	30	700	5	15	5	50	7	N	150	70	30	N	200
1054-80	10	30	700	10	20	5	30	15	N	200	150	30	N	200
1055-80	15	30	1,500	5	30	5	30	20	N	500	150	50	N	500
1056-80	15	50	1,500	5	30	5	50	20	N	500	150	70	N	300
1057-80	10	30	1,500	5	20	5	50	15	N	300	150	30	N	70
1058-80	15	70	1,500	5	30	5	30	20	N	300	200	70	N	500
1059-80	15	30	700	10	20	L	20	7	L	300	150	50	N	200
1060-80	10	30	500	N	20	L	50	7	L	500	100	30	N	700
1061-80	5	20	300	N	15	5	50	5	N	500	50	15	N	70
1062-80	15	100	1,000	7	50	5	70	15	10	500	150	50	N	200
1063-80	10	50	2,000	5	70	L	50	15	10	700	100	70	N	1,000
1064-80	15	50	2,000	5	20	5	70	15	10	700	100	100	N	500
1066-80	100	70	1,500	L	30	20	30	20	L	500	150	70	N	1,000
1067-80	200	50	1,500	5	30	20	10	15	N	300	700	70	N	G1,000
1068-80	30	50	1,000	N	10	20	50	10	N	500	150	15	N	200
1069-80	20	150	5,000	L	50	L	20	15	N	200	200	70	N	1,000
1070-80	10	70	5,000	L	30	5	50	10	L	300	100	70	N	300
1071-80	15	70	700	N	15	5	30	10	N	100	150	30	N	300
1072-80	7	50	2,000	L	20	5	20	10	10	300	100	50	N	150
1073-80	5	20	1,000	5	20	5	30	5	N	300	50	30	N	100
1074-80	15	30	1,500	L	30	5	20	15	N	150	300	70	N	500
1075-80	10	70	1,000	L	20	L	20	10	N	200	150	30	N	300
1076-80	10	20	1,000	N	20	5	20	10	N	300	150	30	N	1,000
1077-80	10	70	3,000	N	50	L	20	10	L	200	200	70	N	300
1078-80	70	70	1,000	10	50	10	20	15	10	500	300	100	N	200
1079-80	30	L	1,000	N	15	10	30	20	10	300	150	30	N	300
1080-80	30	50	700	N	20	5	30	10	10	300	150	30	N	300
1080-P	500	50	1,000	N	30	20	N	15	N	N	500	100	N	300
1081-80	20	N	1,000	N	30	L	30	7	N	500	150	30	N	500
1081-P	1,000	N	1,000	N	20	10	N	N	N	N	700	50	N	G1,000
1082-80	100	30	1,000	N	30	L	50	10	N	700	200	70	N	500
1082-P	1,000	N	1,000	N	15	20	N	N	N	N	700	50	N	700
1084-80	150	20	1,000	10	30	7	20	10	N	300	300	70	N	500
1084-P	1,000	30	1,000	15	50	20	N	7	N	N	1,000	200	N	1,000
1085-80	50	50	1,500	L	30	15	30	20	N	500	200	70	N	300
1086-80	100	50	1,500	5	30	20	30	20	N	500	300	50	N	700
1088-80	150	100	1,500	7	30	20	20	30	N	500	300	100	N	G1,000
1089-80	150	70	1,000	5	30	50	15	20	N	500	300	70	N	500
1090-80	100	70	1,500	L	20	50	50	20	N	1,000	200	50	N	200
1091-80	30	30	1,000	5	20	20	30	15	N	700	200	30	N	200
1092-80	15	N	700	N	10	5	30	10	N	300	100	10	N	300
1093-80	70	50	1,000	N	10	30	50	15	N	300	150	20	N	150
1094-80	200	50	700	N	10	15	20	10	N	200	300	30	N	300
1095-80	150	20	700	N	10	20	30	10	N	300	300	15	N	70
1096-80	20	50	700	N	10	10	30	10	N	300	150	15	N	150
1097-80	10	30	700	L	L	7	30	10	N	300	100	10	N	50
1098-80	100	70	1,500	N	30	10	20	15	N	300	500	50	N	1,000
1099-80	70	100	2,000	L	30	15	30	20	N	1,000	200	100	N	150
1101-80	10	50	1,000	7	30	7	30	15	N	300	150	50	N	500
1103-80	5	30	1,000	7	20	5	20	15	N	200	150	30	N	200
1104-80	10	30	700	5	10	5	30	10	N	200	100	30	N	500
1105-80	20	20	700	N	10	5	50	10	L	300	150	20	N	200
1107-80	10	70	500	N	10	5	30	7	N	300	100	20	N	70
1108-80	15	20	500	5	10	15	70	5	N	100	30	20	N	70
1109-80	5	20	700	L	10	5	70	5	10	200	30	30	N	30
1110-80	5	100	700	L	10	5	30	5	N	200	30	20	N	70
1112-80	5	20	1,500	10	10	5	50	L	N	150	200	10	N	70

TABLE 3.—*Spectrographic and chemical analyses of samples*

Sample	Coordinates		Chemical analyses (ppm)				Semiquantitative spectrographic analyses (ppm)						
	X	Y	Au (.02)	Cu (10)	As (10)	W (20)	Fe (500)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Bi (10)	Co (5)
							Stream sediments--Continued						
1113-80	278	310	L	L	N	L	50,000	N	20	700	3	N	5
1114-80	266	321	L	L	N	L	70,000	N	20	700	3	N	5
1115-80	277	318	L	L	N	L	70,000	N	20	300	3	N	5
1116-80	286	321	L	L	N	L	50,000	N	10	300	3	N	7
1118-80	298	318	L	13	L	L	100,000	N	10	300	3	N	5
1119-80	297	325	L	L	N	L	70,000	N	50	500	3	N	5
1120-80	313	281	L	L	N	L	50,000	N	20	300	3	N	5
1121-80	299	282	L	16	L	L	50,000	N	20	300	2	N	10
1122-80	295	141	L	L	N	L	50,000	N	10	300	2	N	10
1123-80	299	151	L	L	L	L	70,000	N	10	500	3	N	10
1124-80	303	150	L	10	60	L	30,000	N	10	500	2	N	7
1125-80	291	164	L	L	L	L	50,000	N	20	500	3	N	10
1127-80	289	166	L	11	N	L	50,000	N	20	500	2	N	10
1128-80	278	283	L	L	N	L	15,000	N	20	100	2	N	7
1130-80	325	285	L	12	N	N	100,000	N	10	700	2	N	7
1131-80	325	281	L	L	N	N	50,000	N	L	300	2	N	10
1133-80	323	269	L	L	N	N	30,000	N	L	300	2	N	7
1134-80	327	267	L	L	N	N	30,000	N	20	700	2	N	7
1137-80	315	256	L	L	N	N	30,000	N	10	300	1.5	N	7
1138-80	283	233	L	L	N	N	150,000	N	L	300	1	N	15
1139-80	288	250	L	L	N	N	100,000	N	L	300	1.5	N	15
1140-80	304	255	L	L	N	N	50,000	N	10	300	1.5	N	10
1141-80	294	247	L	L	N	N	50,000	N	10	300	2	N	10
1142-80	295	244	L	L	N	N	50,000	N	10	300	2	N	7
1143-80	286	243	L	L	N	N	50,000	N	L	300	2	N	7
1144-80	284	244	L	L	N	L	70,000	N	L	300	1.5	N	10
1145-80	283	250	L	L	N	N	30,000	N	10	200	2	N	5
1146-80	255	176	L	L	N	L	70,000	N	15	500	2	N	10
1147-80	249	176	.02	L	N	L	70,000	N	15	500	2	N	10
1150-20	104	321	L	L	10	L	20,000	N	10	700	5	N	7
1150-80	104	321	L	L	L	80	100,000	N	20	300	7	N	15
1151-80	131	323	.02	10	10	L	100,000	N	20	500	2	N	15
1152-80	129	311	L	L	N	L	70,000	N	20	500	2	N	10
1153-80	229	188	.02	L	L	L	50,000	N	L	1,000	N	N	7
1154-80	225	204	.02	L	20	L	50,000	N	L	1,000	N	N	5
1155-80	208	207	L	10	L	L	70,000	N	50	1,500	N	N	10
1156-80	201	203	.02	10	100	L	70,000	N	50	1,500	N	N	10
1157-80	195	214	.02	L	10	L	150,000	N	70	1,000	N	N	7
1158-80	187	238	.04	L	L	L	50,000	N	10	1,000	N	N	5
1159-80	190	241	L	L	20	10	50,000	N	10	500	N	N	5
1160-80	185	248	L	L	20	L	100,000	N	10	300	N	N	7
1161-80	198	136	.02	L	N	L	150,000	N	L	500	1	N	20
1162-80	191	140	.02	L	N	L	15,000	N	10	500	1.5	N	10
1163-80	184	141	.02	L	N	L	20,000	N	15	1,000	1	N	15
1164-80	183	140	L	L	N	6	20,000	N	10	1,000	1	N	15
1165-80	188	137	.02	L	N	L	30,000	N	L	1,000	1	N	15
1166-80	357	291	L	L	N	L	10,000	N	10	700	2	N	L
1167-80	348	282	L	L	N	L	20,000	N	L	700	1.5	N	L
1168-80	337	283	.02	L	N	L	100,000	N	L	700	1.5	N	20
1169-80	337	275	L	L	N	L	50,000	N	L	700	1	N	20
1170-80	348	271	L	L	N	L	50,000	N	L	700	1	N	20
1171-80	351	274	L	L	N	L	20,000	N	10	700	1	N	5
1172-80	352	274	.02	L	L	L	50,000	N	L	700	1	N	7
1173-80	365	282	L	L	N	L	10,000	N	10	500	1.5	N	L
1174-80	349	267	.02	L	N	L	15,000	N	10	500	1	N	7
1176-80	345	250	L	10	N	L	100,000	N	L	500	L	L	20
1177-80	335	246	.02	L	N	L	20,000	N	L	700	1	N	15
1178-80	326	245	.02	L	N	L	70,000	N	L	700	L	N	20
1179-80	358	119	L	L	N	L	50,000	N	L	700	1	N	15
1180-80	354	113	L	L	N	L	100,000	N	L	500	1	N	15

from the Sierra Demonstration Project area—Continued

Sample	Semiquantitative spectrographic analyses (ppm)--Continued												
	Cr (5)	La (20)	Mn (10)	Mo (5)	Nb (10)	Ni (5)	Pb (10)	Sc (5)	Sn (10)	Sr (100)	V (10)	Y (10)	Zn (200)	Zr (10)
							Stream sediments--Continued							
1113-80	7	70	1,500	10	20	5	50	15	L	200	100	50	N	500
1114-80	10	70	1,500	10	20	7	50	10	N	200	100	30	N	300
1115-80	10	50	2,000	7	20	5	50	20	L	200	100	50	N	300
1116-80	7	150	1,500	7	20	5	30	20	L	200	150	50	N	300
1118-80	10	200	3,000	L	50	5	30	L	10	100	100	50	N	700
1119-80	7	50	1,500	5	20	5	50	10	10	100	70	20	N	1,000
1120-80	10	200	1,500	5	20	5	30	10	10	100	100	100	N	300
1121-80	10	20	1,000	10	10	7	70	10	L	300	70	10	N	50
1122-80	20	20	1,500	L	10	5	30	20	L	200	150	20	N	300
1123-80	20	20	1,500	5	15	5	30	30	L	300	150	50	N	500
1124-80	15	30	1,500	7	15	7	30	15	L	100	100	30	N	150
1125-80	10	50	1,000	7	15	5	30	15	L	300	100	20	N	300
1127-80	20	50	1,500	7	15	10	30	15	L	500	150	20	N	200
1128-80	L	30	1,000	L	10	5	50	5	L	200	30	15	N	100
1130-80	15	200	1,500	10	20	L	50	10	N	500	200	50	N	500
1131-80	5	30	1,500	N	15	5	30	15	N	300	100	20	N	70
1133-80	5	20	1,000	N	10	5	30	15	N	300	100	15	N	70
1134-80	5	50	1,500	N	15	5	50	15	N	300	70	30	N	700
1137-80	10	30	1,000	5	15	5	30	15	N	300	150	30	N	300
1138-80	70	50	3,000	N	30	L	20	20	N	100	300	30	N	500
1139-80	70	70	2,000	N	15	15	30	20	N	500	300	30	N	300
1140-80	15	30	1,000	N	15	5	30	15	N	300	100	20	N	300
1141-80	15	70	1,000	L	15	7	30	15	N	300	100	30	N	100
1142-80	10	30	1,500	L	15	5	50	10	N	300	100	30	N	300
1143-80	10	20	1,500	5	15	5	50	10	N	500	100	20	N	200
1144-80	70	30	1,000	5	15	7	20	15	N	100	200	30	N	300
1145-80	5	20	1,500	5	15	L	50	7	N	100	30	20	N	100
1146-80	15	30	700	5	20	5	30	20	N	200	200	30	N	200
1147-80	20	50	700	5	20	10	30	30	N	300	200	50	N	G1,000
1150-20	20	20	2,000	20	10	20	20	10	50	300	50	15	N	30
1150-80	50	50	5,000	50	20	20	10	15	100	500	200	30	300	200
1151-80	70	50	700	L	15	50	20	15	N	300	200	30	N	300
1152-80	70	50	700	L	15	30	20	15	N	300	150	20	N	200
1153-80	5	70	1,000	5	20	N	20	15	N	700	100	70	N	1,000
1154-80	5	50	300	L	15	L	15	10	N	700	100	30	N	70
1155-80	50	50	1,500	7	20	N	30	30	N	1,500	200	50	N	G1,000
1156-80	20	100	2,000	7	30	N	70	20	N	1,500	200	70	N	1,000
1157-80	30	100	1,500	7	30	N	70	20	N	500	300	70	N	G1,000
1158-80	5	50	1,000	L	20	N	20	20	N	1,000	100	50	N	700
1159-80	30	50	700	L	15	7	20	10	N	300	70	20	N	300
1160-80	30	50	1,000	5	20	N	15	15	N	200	200	50	N	G1,000
1161-80	50	50	700	L	20	10	20	15	N	300	200	20	N	500
1162-80	20	30	1,000	7	10	5	20	7	N	200	50	20	N	300
1163-80	30	30	500	5	10	20	20	10	N	300	50	20	N	100
1164-80	20	50	1,000	15	15	15	20	10	N	200	70	30	N	150
1165-80	50	50	500	L	15	20	20	15	N	200	50	20	N	150
1166-80	15	70	700	L	20	10	30	5	N	200	15	20	N	150
1167-80	10	70	700	L	30	7	20	5	N	300	30	20	N	200
1168-80	15	100	1,000	5	30	7	50	10	N	200	100	50	N	500
1169-80	10	70	1,000	5	20	10	20	10	N	300	70	20	N	150
1170-80	10	70	1,000	5	30	5	30	15	N	300	70	30	N	500
1171-80	N	100	700	5	20	7	20	5	N	300	20	20	N	200
1172-80	20	70	700	5	15	7	50	5	N	300	50	30	N	150
1173-80	10	50	500	L	20	5	20	5	N	200	15	20	N	100
1174-80	N	70	1,000	L	30	7	20	10	N	300	50	30	N	150
1176-80	100	150	1,000	N	50	20	20	15	N	300	150	50	N	500
1177-80	30	50	1,000	N	15	10	15	10	N	300	30	20	N	70
1178-80	50	70	2,000	L	30	10	20	20	N	300	100	50	N	300
1179-80	10	30	1,000	N	20	7	20	10	N	200	100	50	N	200
1180-80	20	100	1,000	N	30	7	15	10	N	200	150	50	N	200

TABLE 3.—*Spectrographic and chemical analyses of samples*

Sample	Coordinates		Chemical analyses (ppm)				Semiquantitative spectrographic analyses (ppm)						
	X	Y	Au (.02)	Cu (10)	As (10)	W (20)	Fe (500)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Bi (10)	Co (5)
							Stream sediments--Continued						
1181-80	351	101	L	L	N	L	150,000	N	10	500	1	N	20
1182-80	366	88	.02	L	N	L	20,000	N	20	700	1	N	15
1183-80	353	90	L	L	L	L	70,000	N	20	500	L	N	20
1184-80	325	92	L	L	L	L	20,000	N	15	500	L	N	15
1185-80	127	147	L	L	L	L	15,000	N	20	1,000	1	N	7
1186-80	126	151	L	L	40	L	10,000	N	20	500	1	N	5
1187-80	129	152	L	L	N	L	20,000	N	10	1,000	1	N	5
1188-80	127	159	L	L	10	L	10,000	N	10	700	1.5	N	5
1189-80	131	164	L	L	L	L	20,000	N	10	700	1	N	7
1190-80	124	158	L	L	N	L	10,000	N	20	700	1.5	N	7
1192-80	153	164	L	L	L	L	30,000	N	10	500	1	N	20
1193-80	147	164	L	L	N	L	15,000	N	10	1,000	L	N	7
1194-80	148	155	L	L	L	L	50,000	N	L	700	1	N	10
1195-80	140	152	L	L	L	L	20,000	N	10	700	L	N	5
1196-80	144	146	L	L	L	L	20,000	N	10	700	L	N	5
1197-80	113	147	.02	L	N	L	10,000	N	10	700	L	N	5
1198-80	106	141	L	L	N	L	50,000	N	10	700	L	N	5
1199-80	99	151	L	L	N	L	30,000	N	L	700	1	N	10
1200-80	99	162	L	L	L	L	30,000	N	10	700	L	N	5
1201-80	101	162	L	L	N	L	70,000	N	L	500	1	N	10
1202-80	107	162	L	L	N	L	50,000	N	L	700	L	N	7
1203-80	106	172	L	L	L	L	50,000	N	L	500	1	N	10
1204-80	79	112	.02	L	L	L	20,000	N	15	700	1.5	N	10
1205-80	86	124	L	L	N	L	30,000	N	10	500	1	N	10
1207-80	87	124	L	L	L	L	15,000	N	20	500	1.5	N	7
1208-80	84	134	L	L	N	L	10,000	N	15	500	1	N	L
1209-80	81	140	L	L	N	L	50,000	N	10	500	1	N	10
1210-80	286	220	L	L	N	L	20,000	N	10	500	1	N	10
1211-80	292	225	L	L	L	5	50,000	N	L	500	1	N	10
1213-80	319	224	L	L	L	L	30,000	N	10	500	1	N	15
1214-80	95	135	L	L	N	L	15,000	N	15	700	L	N	10
1215-80	89	145	L	L	L	L	30,000	N	L	700	1	N	20
1216-80	90	152	L	L	N	L	50,000	N	10	1,000	1	N	20
1217-80	77	151	L	L	L	L	150,000	N	10	700	1	N	20
1218-80	77	159	L	L	L	L	50,000	N	10	700	1	N	20
1219-80	79	161	L	L	L	L	30,000	N	L	700	1	N	20
1220-80	91	165	L	10	N	L	30,000	N	10	500	1	N	20
1221-80	114	178	L	L	20	L	20,000	N	10	500	1	N	10
1222-80	119	169	L	L	L	L	15,000	N	10	500	1.5	N	7
1223-80	126	169	L	L	N	L	15,000	N	15	500	1.5	N	5
1224-80	177	128	L	L	N	L	20,000	N	10	500	1.5	N	7
1225-80	120	181	L	L	L	L	30,000	N	L	500	1	N	7
1226-80	108	240	L	12	N	L	50,000	N	10	700	1	N	30
1227-80	116	255	L	L	N	L	10,000	N	15	500	1	N	7
1228-80	112	264	L	L	N	L	20,000	N	10	300	1	N	10
1229-80	131	266	L	L	N	L	10,000	N	10	500	1	N	7
1230-80	140	271	L	L	N	L	10,000	N	10	300	1.5	N	10
1231-80	150	256	L	L	15	L	10,000	N	15	500	1	N	7
1232-80	131	254	L	L	L	10	70,000	N	N	700	5	N	N
1233-80	146	197	L	L	L	L	50,000	N	N	700	5	N	N
1234-80	157	154	L	L	L	L	70,000	N	N	700	5	N	N
1235-80	167	176	L	L	L	L	50,000	N	N	700	5	N	N
1236-80	177	199	L	L	L	L	100,000	N	N	700	5	N	10
1237-80	183	180	L	L	30	160	15,000	N	20	500	1	N	5
1238-80	359	169	L	11	N	N	50,000	N	20	500	2	N	7
1239-80	337	174	L	L	N	N	20,000	N	L	700	2	N	L
1240-80	332	181	L	L	N	L	50,000	N	15	700	2	N	7
1241-80	335	194	L	L	L	L	50,000	N	15	300	2	N	10
1242-80	338	191	L	L	N	N	30,000	N	15	700	2	N	5
1243-80	248	310	L	L	N	N	70,000	N	10	500	2	N	10

from the Sierra Demonstration Project area—Continued

Sample	Semiquantitative spectrographic analyses (ppm)--Continued													
	Cr (5)	La (20)	Mn (10)	Mo (5)	Nb (10)	Ni (5)	Pb (10)	Sc (5)	Sn (10)	Sr (100)	V (10)	Y (10)	Zn (200)	Zr (10)
							Stream sediments--Continued							
1181-80	20	70	1,000	N	30	5	15	15	N	200	200	50	N	500
1182-80	20	50	700	L	15	10	20	15	N	300	50	20	N	200
1183-80	50	100	1,000	L	50	5	20	20	N	300	150	100	N	500
1184-80	15	50	700	5	15	10	15	15	N	300	50	20	N	150
1185-80	15	30	500	N	20	10	15	10	N	200	20	30	N	200
1186-80	20	50	500	N	15	10	15	10	N	200	30	20	N	200
1187-80	15	30	500	N	20	10	15	10	N	300	30	30	N	200
1188-80	15	20	200	N	L	10	15	5	N	200	15	15	N	70
1189-80	20	50	700	N	15	10	15	10	N	200	50	30	N	200
1190-80	20	20	500	N	15	10	15	10	N	200	20	20	N	500
1192-80	20	30	700	5	20	10	30	15	N	200	100	20	N	300
1193-80	10	150	500	5	15	10	30	7	N	300	30	30	N	150
1194-80	10	30	1,000	N	15	5	15	10	N	200	70	30	N	700
1195-80	20	30	700	N	10	10	20	10	N	200	20	20	N	500
1196-80	10	70	500	N	10	10	30	10	N	200	30	20	N	150
1197-80	10	50	500	N	10	10	30	7	N	200	20	15	N	150
1198-80	10	50	700	N	10	15	30	10	N	200	50	20	N	70
1199-80	15	30	1,000	N	15	15	20	15	N	200	70	30	N	150
1200-80	10	70	1,000	N	10	10	15	10	N	200	50	30	N	200
1201-80	15	N	1,000	N	10	5	20	15	N	200	100	30	N	700
1202-80	10	20	1,500	N	L	5	15	10	N	200	50	20	N	150
1203-80	20	30	1,000	N	20	7	15	15	N	200	100	50	N	1,000
1204-80	20	50	1,000	N	20	15	20	15	N	300	50	50	N	300
1205-80	20	30	700	N	15	10	15	15	N	150	70	30	N	700
1207-80	20	50	300	N	20	10	15	10	N	150	150	50	N	300
1208-80	15	20	200	N	15	5	15	10	N	200	30	20	N	500
1209-80	50	30	500	N	20	10	10	20	N	150	70	50	N	1,000
1210-80	20	70	1,000	L	20	10	15	15	N	300	50	20	N	150
1211-80	30	50	1,000	5	20	20	20	7	N	300	50	20	N	100
1213-80	200	30	500	N	20	30	20	10	N	300	50	20	N	150
1214-80	20	30	300	N	10	10	20	10	N	200	20	20	N	100
1215-80	15	20	1,500	N	20	7	15	15	N	300	100	30	N	300
1216-80	20	20	1,000	N	20	10	30	20	N	300	50	50	N	500
1217-80	50	30	1,000	N	30	7	20	20	N	300	200	70	N	G1,000
1218-80	20	20	700	N	15	7	15	15	N	200	70	30	N	300
1219-80	20	50	1,000	N	20	7	20	15	N	300	70	20	N	200
1220-80	30	50	1,000	N	10	15	20	10	N	300	50	15	N	100
1221-80	20	30	500	N	15	10	20	10	N	200	30	20	N	150
1222-80	10	30	500	N	10	10	15	10	N	200	30	20	N	200
1223-80	15	30	700	N	20	10	15	10	N	200	30	30	N	300
1224-80	15	30	500	N	15	10	15	10	N	200	50	20	N	200
1225-80	20	30	500	N	10	10	15	10	N	200	50	20	N	150
1226-80	700	30	1,000	N	10	70	20	30	N	500	100	20	N	150
1227-80	15	50	300	N	10	10	15	10	N	300	30	20	N	150
1228-80	20	30	200	N	10	10	15	7	N	200	50	15	N	150
1229-80	10	20	150	N	10	10	20	10	N	300	20	20	N	200
1230-80	20	70	200	N	15	15	20	10	N	200	30	10	N	200
1231-80	20	30	150	N	30	10	20	10	N	300	20	30	N	150
1232-80	20	50	1,000	N	50	5	10	20	N	500	100	70	N	1,000
1233-80	15	N	500	5	30	5	15	10	N	500	100	50	N	500
1234-80	20	50	1,000	N	20	5	50	15	N	500	100	50	N	500
1235-80	20	50	700	N	20	5	20	15	N	200	100	50	N	500
1236-80	30	50	500	N	30	5	20	10	N	300	200	50	N	500
1237-80	15	50	700	N	20	10	20	10	N	200	30	30	N	150
1238-80	10	50	500	N	10	5	20	10	N	200	70	15	N	150
1239-80	L	20	500	L	L	5	15	5	N	150	30	15	N	100
1240-80	10	70	500	L	10	5	15	10	N	200	70	30	N	100
1241-80	15	30	500	5	10	10	20	10	N	200	70	30	N	150
1242-80	5	50	300	L	10	5	20	5	N	300	50	10	N	70
1243-80	30	20	1,500	15	10	15	50	15	N	200	100	30	N	150

TABLE 3.—*Spectrographic and chemical analyses of samples*

Sample	Coordinates		Chemical analyses (ppm)			Semiquantitative spectrographic analyses (ppm)							
	X	Y	Au (.02)	Cu (10)	As (10)	W (20)	Fe (500)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Bi (10)	Co (5)
						Stream sediments--Continued							
1244-80	249	326	L	21	L	L	100,000	N	10	300	1.5	N	20
1245-80	239	313	L	L	N	N	50,000	N	15	500	2	N	7
1246-80	236	323	L	L	N	N	50,000	N	20	500	2	N	7
1247-80	241	326	L	L	N	N	50,000	N	15	500	2	N	10
1248-80	230	326	L	L	N	N	70,000	N	15	500	2	N	10
1249-80	225	325	L	L	10	N	20,000	N	10	500	2	N	5
1250-80	40	151	L	L	10	N	50,000	N	10	700	1.5	N	7
1251-80	39	152	L	10	20	N	150,000	N	10	500	1.5	N	7
1252-80	46	140	L	L	10	N	100,000	N	10	700	1.5	N	15
1253-80	45	140	L	L	10	N	70,000	N	10	500	1.5	N	7
1254-80	48	108	L	L	10	N	30,000	N	L	700	2	N	5
1255-80	47	113	L	L	N	N	50,000	N	10	700	2	N	7
1256-80	46	115	L	L	10	L	100,000	N	10	700	1.5	N	7
1257-80	179	249	L	L	10	L	50,000	N	15	500	2	N	7
1258-80	170	255	L	11	10	N	100,000	N	10	700	1.5	N	10
1259-80	159	267	L	L	L	N	70,000	N	10	700	2	N	7
1260-80	155	282	L	L	10	N	100,000	N	10	500	2	N	10
1261-80	152	287	L	L	10	N	100,000	N	10	700	1	N	15
1262-80	142	290	L	L	N	N	50,000	N	10	700	1.5	N	10
1263-80	130	288	L	13	L	L	150,000	N	10	700	2	N	10
1264-80	218	298	L	L	L	N	30,000	N	15	700	1.5	N	5
1265-80	113	272	L	L	N	N	70,000	N	10	500	1.5	N	5
1266-80	108	270	L	L	L	N	100,000	N	10	700	1.5	N	10
1267-80	300	126	L	L	20	N	100,000	N	15	700	1.5	N	10
1268-80	91	243	L	L	L	N	50,000	N	10	700	2	N	7
1269-80	58	145	L	L	10	N	100,000	N	10	500	1.5	N	15
1271-80	177	236	L	L	L	N	30,000	N	20	700	2	N	5
1272-80	184	213	L	L	L	N	30,000	N	10	700	1.5	N	5
1273-80	187	224	L	L	L	N	20,000	N	20	500	1.5	N	5
1274-80	181	221	L	L	10	N	30,000	N	20	700	2	N	7
1275-80	373	186	L	L	L	N	30,000	N	20	700	2	N	7
1276-80	369	198	L	L	10	N	30,000	N	20	500	2	N	7
1277-80	368	205	L	L	N	N	30,000	N	15	500	3	N	5
1278-80	362	207	L	L	20	N	100,000	N	10	500	1.5	N	7
1279-80	360	206	L	L	N	N	30,000	N	20	500	2	N	5
1280-80	360	209	L	L	N	N	30,000	N	20	500	2	N	5
1282-80	343	208	L	L	L	N	50,000	N	20	500	2	N	10
1284-80	339	204	L	L	L	N	30,000	N	20	700	2	N	5
1285-80	327	200	L	L	L	N	70,000	N	20	700	2	N	10
1286-80	322	194	L	L	L	N	50,000	N	10	1,000	2	N	7
1287-80	202	297	L	L	L	N	100,000	N	10	700	2	N	15
1288-80	196	290	L	L	L	N	100,000	N	10	700	1.5	N	10
1289-80	210	288	L	17	L	N	70,000	N	10	700	2	N	7
1290-80	213	283	L	L	L	N	20,000	N	10	700	2	N	5
1291-80	212	273	L	L	L	N	70,000	N	10	700	1.5	N	7
1292-80	213	266	L	L	N	N	100,000	N	10	700	1.5	N	10
1293-80	222	256	0.20	15	L	L	150,000	N	10	700	1.5	N	15
1294-80	225	256	L	L	L	N	70,000	N	10	700	1.5	N	10
1295-80	97	188	L	L	10	N	30,000	N	10	700	1.5	N	7
1296-80	88	186	L	L	10	N	50,000	N	10	700	1.5	N	7
1297-80	86	185	L	L	N	N	15,000	N	L	300	2	N	N
1298-80	82	189	L	11	10	N	30,000	N	10	700	1.5	N	7
1299-80	82	190	L	L	L	N	30,000	N	10	700	1.5	N	7
1300-80	72	194	L	L	L	N	70,000	N	10	700	1.5	N	7
1301-80	73	197	L	10	L	N	150,000	N	10	7	1	N	15
2001-80	234	148	L	L	L	L	70,000	N	10	1,000	1	N	10
2002-80	225	151	L	L	L	L	50,000	N	15	700	3	N	10
2003-80	230	160	L	L	L	L	100,000	N	10	1,000	1	N	15
2004-80	232	160	L	L	L	L	200,000	N	10	700	N	N	15
2005-80	344	160	.04	L	N	L	100,000	N	20	700	2	N	10

from the Sierra Demonstration Project area—Continued

Sample	Semiquantitative spectrographic analyses (ppm)--Continued													
	Cr (5)	La (20)	Mn (10)	Mo (5)	Nb (10)	Ni (5)	Pb (10)	Sc (5)	Sn (10)	Sr (100)	V (10)	Y (10)	Zn (200)	Zr (10)
							Stream sediments--Continued							
1244-80	70	20	1,000	30	10	20	L	30	N	200	150	30	N	100
1245-80	10	30	1,000	5	10	10	20	5	N	200	70	30	N	200
1246-80	10	30	700	5	10	10	20	5	N	150	70	20	N	150
1247-80	10	100	700	N	10	5	20	10	N	300	100	30	N	200
1248-80	15	100	700	N	15	7	15	10	N	300	100	30	N	500
1249-80	10	30	700	5	10	10	20	10	N	300	50	10	N	50
1250-80	15	20	500	N	10	7	15	7	N	300	70	10	N	100
1251-80	50	50	500	N	15	7	10	10	N	200	150	50	N	300
1252-80	30	30	700	N	10	7	15	30	N	300	150	50	N	200
1253-80	30	50	500	N	10	10	15	20	N	200	100	30	N	150
1254-80	10	50	500	N	10	5	20	5	L	200	50	15	N	150
1255-80	10	20	500	N	10	5	20	10	L	300	50	20	N	150
1256-80	20	50	700	N	10	7	15	10	N	300	100	30	N	200
1257-80	30	50	700	10	10	15	20	10	N	300	70	20	N	150
1258-80	30	70	700	L	30	15	15	15	N	200	150	50	N	150
1259-80	20	100	700	L	15	10	20	10	N	300	70	30	N	100
1260-80	30	50	700	L	15	10	15	10	N	200	100	30	N	200
1261-80	30	30	700	N	10	15	15	15	N	500	200	20	N	200
1262-80	100	30	700	5	10	20	15	10	N	300	100	20	N	150
1263-80	30	70	700	L	15	10	15	10	N	300	150	30	N	500
1264-80	70	70	300	5	10	15	20	5	N	200	50	15	N	100
1265-80	15	70	500	N	10	7	20	5	N	300	100	15	N	100
1266-80	50	70	700	5	30	15	10	15	N	300	150	50	N	150
1267-80	30	30	700	L	20	10	15	20	N	300	150	50	N	150
1268-80	70	30	500	N	10	15	20	7	N	300	70	10	N	150
1269-80	30	30	700	N	10	7	10	20	N	300	150	30	N	150
1271-80	10	50	200	7	10	5	15	5	N	300	50	20	N	150
1272-80	10	30	200	5	10	5	15	10	N	300	70	30	N	300
1273-80	10	30	300	5	15	5	15	10	N	300	70	30	N	700
1274-80	15	50	500	5	10	7	10	10	N	300	70	30	N	200
1275-80	10	50	700	5	15	5	10	10	N	300	70	30	N	300
1276-80	10	50	700	5	15	5	15	10	N	300	70	30	N	150
1277-80	10	50	500	L	10	5	30	7	N	300	50	20	N	100
1278-80	10	50	700	5	20	5	15	7	N	300	100	30	N	150
1279-80	7	30	700	5	10	7	20	7	N	200	70	20	N	100
1280-80	7	30	300	5	10	5	15	5	N	300	70	15	N	100
1282-80	30	50	700	L	10	15	30	15	N	300	100	20	N	100
1284-80	5	50	700	L	10	5	20	70	N	300	50	20	N	100
1285-80	20	70	700	5	20	10	50	10	N	300	100	70	N	200
1286-80	5	30	700	5	10	L	15	7	N	200	70	30	N	300
1287-80	150	30	700	N	10	50	20	10	N	300	150	20	N	300
1288-80	150	50	700	N	10	30	15	10	N	300	150	30	N	200
1289-80	70	20	700	N	50	20	20	5	N	300	100	50	N	200
1290-80	15	30	300	5	10	10	20	L	N	300	50	10	N	150
1291-80	15	50	500	5	10	10	20	10	N	300	100	15	N	300
1292-80	20	70	700	L	10	15	15	15	N	500	150	30	N	200
1293-80	150	70	700	N	10	50	20	10	N	300	150	30	N	100
1294-80	50	70	500	L	10	20	15	10	N	500	100	30	N	70
1295-80	10	30	500	N	10	15	15	7	N	300	70	20	N	200
1296-80	15	30	300	N	10	5	15	7	N	300	100	20	N	300
1297-80	5	20	150	N	10	L	L	7	N	200	50	20	N	150
1298-80	15	30	300	N	10	7	15	10	N	300	70	20	N	150
1299-80	15	30	200	N	10	7	15	7	N	300	70	30	N	150
1300-80	15	50	300	N	10	7	20	10	N	300	70	20	N	300
1301-80	50	70	300	N	10	10	10	15	N	500	200	50	N	300
2001-80	30	30	1,000	10	20	7	30	15	N	300	200	70	N	200
2002-80	15	30	1,500	7	15	7	30	20	N	700	150	30	N	1,000
2003-80	50	30	1,000	5	20	7	20	20	N	500	300	50	N	500
2004-80	100	20	1,000	L	20	10	15	15	N	200	300	70	N	G1,000
2005-80	20	50	1,500	L	15	5	50	15	L	200	150	30	N	200

TABLE 3.—*Spectrographic and chemical analyses of samples*

Sample	Coordinates		Chemical analyses (ppm)				Semiquantitative spectrographic analyses (ppm)						
	X	Y	Au (.02)	Cu (10)	As (10)	W (20)	Fe (500)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Bi (10)	Co (5)
						Stream sediments--Continued							
2006-80	329	150	L	L	N	L	20,000	N	20	500	2	N	7
2007-80	320	150	L	L	N	L	70,000	N	10	700	2	N	10
2008-80	320	150	L	L	N	40	200,000	N	20	150	2	N	15
2009-80	206	143	L	L	N	L	20,000	N	10	1,500	2	N	5
2011-80	200	150	L	L	L	L	30,000	N	L	700	1	N	5
2012-80	191	158	L	L	L	L	30,000	N	10	700	1	N	7
2013-80	158	175	L	L	N	L	70,000	N	10	700	2	N	7
2014-80	165	176	L	L	N	L	50,000	N	10	700	2	N	7
2015-80	130	200	L	L	N	40	200,000	N	10	300	2	N	10
2015-P	130	200	7.4	15	10	500	200,000	N	L	70	N	N	30
2016-80	140	193	L	L	N	L	70,000	N	10	700	1.5	N	7
2016-P	140	193	L	10	L	40	200,000	N	N	50	N	N	30
2017-80	177	283	L	L	N	L	70,000	N	10	500	1.5	N	15
2018-80	293	279	.02	L	N	L	100,000	N	10	700	2	N	15
2019-80	200	263	L	L	N	L	100,000	N	L	300	2	N	10
2020-80	197	251	L	12	N	L	70,000	N	10	500	2	N	10
2021-80	291	295	L	L	N	L	30,000	N	10	300	2	N	7
2022-80	298	306	L	L	N	L	30,000	N	15	300	3	N	5
2023-80	300	305	L	10	N	L	30,000	N	15	300	2	N	7
2024-80	312	307	L	L	N	L	50,000	N	15	300	2	N	7
2025-80	317	303	L	L	N	L	70,000	N	10	300	2	N	7
2026-80	314	294	L	L	N	L	20,000	N	15	300	1.5	N	5
2027-80	307	314	L	L	N	L	20,000	N	10	200	2	N	5
2028-80	341	306	L	L	N	L	20,000	N	15	300	2	N	5
2029-80	334	302	L	L	N	L	30,000	N	10	300	2	N	5
2030-80	304	280	.02	L	N	L	50,000	N	15	300	2	N	10
2034-80	274	170	L	L	L	L	100,000	N	10	300	1.5	N	20
2035-80	103	321	L	L	N	L	100,000	N	15	500	2	N	10
2036-80	113	306	L	L	N	L	70,000	N	15	300	2	N	7
2037-80	115	305	L	L	N	L	150,000	N	15	500	1	N	7
2038-80	238	182	.02	L	20	L	50,000	N	L	700	N	N	5
2039-80	233	188	.02	L	10	L	50,000	N	L	700	N	N	L
2040-80	228	200	.02	L	L	L	150,000	N	30	1,000	N	N	15
2041-80	222	201	.02	L	L	L	50,000	N	L	1,000	N	N	10
2042-80	210	200	.02	L	L	L	30,000	N	L	1,000	N	N	L
2043-80	202	204	.02	L	L	L	100,000	N	10	1,000	N	N	10
2501-80	148	194	.06	L	L	L	50,000	N	10	700	1.5	N	5
2501-P	148	194	.20	L	N	80	200,000	N	20	70	1	N	20
2502-80	145	189	L	L	N	L	20,000	N	10	150	2	N	5
2502-P	145	189	L	10	L	20	G200,000	N	L	70	N	N	50
2503-80	190	288	L	27	L	L	200,000	N	L	700	N	N	30
2504-80	199	296	L	46	10	L	200,000	N	L	700	1	N	30
2505-80	210	279	L	10	L	L	100,000	N	10	1,000	2	N	10
2506-80	209	279	L	14	L	L	150,000	N	L	700	1.5	N	10
2507-80	208	272	L	88	L	L	200,000	N	L	500	N	N	50
2508-80	207	273	L	15	10	L	200,000	N	L	700	2	N	15
2509-80	210	196	L	L	N	L	20,000	N	10	300	2	N	7
2510-80	239	261	.10	17	L	L	70,000	N	10	200	1.5	N	10
2511-80	244	166	L	L	N	L	20,000	N	10	300	2	N	7
2512-80	232	173	.02	L	N	L	70,000	N	10	300	2	N	7
2513-80	288	300	L	L	N	L	70,000	N	20	200	3	N	L
2514-80	314	307	L	L	N	L	50,000	N	L	200	3	N	5
2515-80	316	296	L	10	N	L	G200,000	N	L	300	2	N	10
2516-80	309	315	L	L	N	L	20,000	N	10	150	2	N	5
2517-80	302	180	L	L	N	L	20,000	N	10	300	2	N	7
2519-80	283	270	L	L	N	L	15,000	N	10	150	2	N	L
2520-80	311	275	L	L	N	L	50,000	N	10	300	2	N	7
2521-80	310	273	L	L	N	L	50,000	N	10	300	2	N	10
2522-80	309	262	L	L	N	N	50,000	N	20	300	2	N	5
2523-80	313	256	L	L	N	N	20,000	N	10	300	2	N	5

from the Sierra Demonstration Project area—Continued

Sample	Semiquantitative spectrographic analyses (ppm)--Continued													
	Cr (5)	La (20)	Mn (10)	Mo (5)	Nb (10)	Ni (5)	Pb (10)	Sc (5)	Sn (10)	Sr (100)	V (10)	Y (10)	Zn (200)	Zr (10)
							Stream sediments--Continued							
2006-80	5	20	700	L	10	5	30	5	L	200	50	10	N	50
2007-80	10	70	1,500	L	20	5	20	7	N	200	150	30	N	300
2008-80	50	200	1,500	5	15	20	20	15	L	100	300	70	N	700
2009-80	15	150	1,500	5	20	5	30	10	N	300	100	50	N	300
2011-80	10	20	700	L	10	7	30	7	N	500	70	20	N	200
2012-80	10	20	700	L	10	7	30	10	N	500	100	20	N	100
2013-80	20	20	1,000	5	15	5	50	15	N	300	150	30	N	500
2014-80	15	30	1,000	N	15	5	30	15	L	300	100	30	N	200
2015-80	200	20	700	N	20	5	10	10	N	100	300	30	N	G1,000
2015-P	1,000	20	1,000	5	30	15	N	N	N	N	1,000	150	N	1,000
2016-80	30	20	700	5		15	50	15	N	200	150	30	N	1,000
2016-P	1,000	N	1,000	N	30	15	N	N	N	N	1,500	150	N	1,000
2017-80	150	50	700	L	15	50	20	15	N	300	150	30	N	200
2018-80	50	50	1,000	L	20	15	30	15	N	500	150	30	N	500
2019-80	70	50	1,000	L	20	15	20	10	L	300	150	30	N	300
2020-80	50	70	700	L	20	15	20	15	L	500	150	50	N	300
2021-80	15	20	1,000	5	15	7	50	10	N	200	70	20	N	70
2022-80	5	30	1,000	5	20	5	50	10	N	200	70	20	N	300
2023-80	10	20	1,000	7	15	10	100	10	N	500	70	20	N	100
2024-80	10	50	1,500	5	20	5	70	10	N	100	100	50	N	700
2025-80	10	50	700	7	20	5	30	7	N	500	100	50	N	200
2026-80	5	50	700	L	10	5	70	5	N	100	20	20	N	70
2027-80	5	50	700	L	15	5	20	5	N	200	30	20	N	100
2028-80	5	50	1,000	5	15	5	70	5	N	300	20	10	N	70
2029-80	5	30	500	20	15	5	30	5	N	300	50	20	N	150
2030-80	15	30	700	L	15	7	30	15	N	200	70	30	N	150
2034-80	50	150	2,000	5	20	5	20	20	N	200	300	150	N	700
2035-80	100	30	700	L	20	50	30	15	N	500	150	30	N	300
2036-80	15	20	500	5	15	7	50	5	N	200	100	10	N	150
2037-80	70	30	700	L	15	30	20	15	N	200	150	20	N	300
2038-80	5	50	700	L	10	N	15	15	N	500	100	50	N	700
2039-80	5	50	500	L	10	5	10	10	100	200	100	30	N	150
2040-80	70	150	1,000	10	30	N	15	30	150	700	300	70	N	G1,100
2041-80	10	50	700	7	10	N	20	20	50	500	150	50	N	300
2042-80	5	L	500	L	15	N	15	15	50	500	100	30	N	1,000
2043-80	30	50	1,000	5	20	L	10	15	50	300	300	70	N	50
2501-80	20	N	1,000	N	15	5	30	10	N	500	100	20	N	300
2501-P	200	50	700	L	20	10	N	20	N	200	300	200	N	700
2502-80	15	20	500	N	10	5	30	10	N	200	100	10	N	70
2502-P	1,000	20	1,000	N	15	20	N	7	N	N	1,000	100	N	1,000
2503-80	500	50	1,000	N	15	50	N	7	N	300	500	50	N	G1,000
2504-80	300	30	1,500	N	15	50	N	10	N	500	500	50	N	1,000
2505-80	30	70	1,500	5	30	10	50	10	N	700	200	70	N	200
2506-80	70	50	1,000	5	30	20	30	7	N	500	200	30	N	700
2507-80	500	50	1,500	N	20	70	N	7	N	100	700	100	N	G1,000
2508-80	150	150	2,000	5	50	50	30	10	N	500	300	70	N	1,000
2509-80	10	20	500	N	10	10	30	5	N	500	150	10	N	50
2510-80	50	30	700	L	15	5	30	15	N	200	300	30	N	500
2511-80	5	20	700	N	10	5	30	10	N	300	70	15	N	70
2512-80	20	30	1,000	L	15	5	30	15	N	500	150	50	N	700
2513-80	10	30	700	L	15	5	50	5	N	100	30	20	N	100
2514-80	5	50	700	L	10	5	50	5	N	300	70	15	N	100
2515-80	15	100	700	N	15	5	30	7	N	500	300	30	N	300
2516-80	5	30	700	7	15	5	50	5	N	300	50	15	N	70
2517-80	10	100	1,000	L	10	5	30	10	N	300	70	30	N	150
2519-80	5	20	700	N	10	5	50	5	N	100	20	L	N	30
2520-80	5	150	1,500	7	15	5	50	10	N	300	100	30	N	150
2521-80	15	20	1,000	L	15	5	30	10	N	300	150	15	N	70
2522-80	10	50	1,500	L	15	5	30	10	N	300	100	15	N	100
2523-80	7	30	500	5	10	5	30	5	N	300	70	10	N	50

TABLE 3.—*Spectrographic and chemical analyses of samples*

Sample	Coordinates		Chemical analyses (ppm)				Semiquantitative spectrographic analyses (ppm)						
	X	Y	Au (.02)	Cu (10)	As (10)	W (20)	Fe (500)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Bi (10)	Co (5)
							Stream sediments--Continued						
2524-80	308	244	L	L	N	L	50,000	N	10	1,000	2	N	7
2525-80	268	240	L	L	N	N	50,000	N	10	300	2	N	10
2526-80	270	240	L	L	N	N	20,000	N	10	700	2	N	5
2527-80	280	249	.02	L	N	L	15,000	N	10	300	2	N	5
2528-80	278	250	L	L	N	N	70,000	N	10	500	2	N	10
2535-80	158	186	L	--	N	L	70,000	N	10	700	2	N	10
2535-P	158	186	1.6	20	L	80	G200,000	N	10	70	N	N	30
2536-80	148	175	L	L	N	L	100,000	N	10	500	2	N	15
3001-80	208	129	.12	L	L	30	200,000	N	30	500	N	N	10
3002-80	202	126	L	L	N	L	G200,000	N	30	100	1	N	30
3003-80	196	122	.02	L	L	L	100,000	N	L	1,000	N	N	5
3004-80	223	113	L	L	L	L	70,000	N	10	1,000	2	N	15
3006-80	203	112	L	L	L	L	70,000	N	L	700	L	N	15
3007-80	207	114	.02	L	L	L	200,000	N	L	700	L	N	15
3008-80	189	105	.04	L	L	L	200,000	N	L	700	L	N	20
3009-80	197	114	.02	L	L	L	100,000	N	20	1,000	N	N	5
3010-80	189	117	.02	L	L	L	100,000	N	30	1,500	N	N	15
3011-80	188	126	.02	L	L	L	200,000	N	L	1,500	L	N	20
3012-80	186	112	L	L	L	L	200,000	N	L	1,000	L	N	15
3013-80	180	106	L	L	10	L	150,000	N	L	500	1	20	15
3014-80	166	107	L	L	L	L	150,000	N	L	1,000	2	N	15
3015-80	171	106	.04	L	L	20	G200,000	N	L	150	N	N	30
3016-80	147	104	L	L	L	L	100,000	N	L	1,000	2	N	7
3017-80	170	118	L	L	L	L	100,000	N	L	500	1	N	15
3018-80	172	117	L	L	L	L	G200,000	N	30	500	L	N	30
3019-80	178	125	.02	L	L	L	200,000	N	20	500	L	N	15
3020-20	166	126	L	L	L	L	700	N	L	300	1	N	L
3020-80	166	126	.10	L	L	L	100,000	.5	L	700	1.5	N	5
3021-80	154	128	L	L	L	L	100,000	N	L	500	N	N	5
3022-80	161	114	1.1	L	L	L	100,000	N	20	700	N	N	5
3023-80	138	107	3.8	L	N	L	30,000	N	10	300	2	N	7
3024-80	140	109	L	L	N	L	30,000	N	10	300	2	N	7
3025-80	128	119	L	10	N	L	50,000	N	10	200	2	N	7
3026-80	126	121	L	L	N	L	30,000	N	10	150	2	N	7
3027-80	125	126	L	10	N	L	50,000	N	10	200	2	N	7
3028-80	120	133	.04	12	N	L	20,000	N	L	150	2	N	5
3029-80	95	177	L	20	N	L	70,000	N	L	150	2	N	7
3030-80	94	175	.02	L	N	L	70,000	N	L	200	2	N	7
3031-80	89	178	L	L	N	20	100,000	N	10	7	2	N	5
3032-80	89	177	L	11	N	L	G200,000	N	L	150	1	N	20
3033-80	66	157	L	L	N	L	150,000	N	L	5	2	N	10
3034-80	58	166	L	L	N	L	150,000	N	L	500	2	N	10
3035-80	65	172	.16	L	N	L	150,000	N	L	200	1.5	N	7
3036-80	70	170	L	L	N	L	G200,000	N	20	100	1	N	30
3038-80	73	167	L	L	N	L	100,000	N	L	300	2	N	10
3039-80	139	118	L	L	N	20	20,000	N	10	300	2	N	5
3040-80	128	132	L	L	N	L	30,000	N	30	300	2	N	7
3041-80	146	130	L	13	N	L	30,000	N	10	300	2	N	7
3042-80	101	107	L	L	N	L	50,000	N	L	300	2	N	5
3043-80	109	113	L	L	N	L	50,000	.5	10	200	2	N	5
3044-80	114	120	L	L	N	L	30,000	N	20	300	2	N	5
3047-80	103	124	L	L	N	L	70,000	N	10	200	2	N	7
3048-80	67	120	L	L	N	L	100,000	N	15	200	1	N	10
3049-80	70	116	L	L	N	L	30,000	N	L	200	1.5	N	5
3050-80	62	136	L	L	N	L	50,000	N	10	300	1.5	N	10
3051-80	72	136	L	L	N	L	50,000	N	10	300	2	N	7
3052-80	163	152	.02	11	N	L	50,000	N	30	300	2	N	10
3053-80	153	156	L	L	N	L	20,000	N	10	300	2	N	7
3054-80	156	106	.04	L	N	L	150,000	N	10	500	2	N	10
3055-80	151	118	L	L	N	L	70,000	N	20	700	2	N	7

from the Sierra Demonstration Project area—Continued

Sample	Semiquantitative spectrographic analyses (ppm)--Continued													
	Cr (5)	La (20)	Mn (10)	Mo (5)	Nb (10)	Ni (5)	Pb (10)	Sc (5)	Sn (10)	Sr (100)	V (10)	Y (10)	Zn (200)	Zr (10)
							Stream sediments--Continued							
2524-80	15	70	1,500	L	10	5	30	15	N	500	100	30	N	300
2525-80	50	20	700	N	10	10	30	10	N	300	100	20	N	70
2526-80	5	30	1,000	N	10	10	30	7	N	300	50	20	N	50
2527-80	5	150	1,500	N	15	5	30	7	N	100	30	50	N	150
2528-80	15	50	1,500	5	50	5	30	20	N	300	150	50	N	300
2535-80	20	30	700	L	10	10	30	15	N	200	150	50	N	300
2535-P	1,000	50	700	N	10	5	10	70	N	N	300	200	N	G1,000
2536-80	50	20	700	N	10	10	10	20	N	300	200	50	N	300
3001-80	150	50	700	10	15	N	15	20	30	300	300	70	N	G1,000
3002-80	150	N	700	N	10	15	20	7	N	100	300	30	N	500
3003-80	30	L	1,000	L	15	N	20	30	20	300	300	70	N	G1,000
3004-80	30	30	1,500	N	20	7	70	15	L	500	200	30	N	500
3006-80	50	50	1,500	5	50	L	20	15	L	200	300	100	N	300
3007-80	150	N	1,500	N	15	5	20	15	N	200	700	50	N	700
3008-80	200	30	1,500	N	20	10	20	15	N	300	700	100	N	G1,000
3009-80	50	50	1,000	10	20	N	20	30	20	700	300	70	N	G1,000
3010-80	20	L	1,500	7	20	N	20	50	15	700	300	100	N	1,000
3011-80	150	50	1,500	L	30	N	50	50	N	1,000	300	70	N	1,000
3012-80	100	N	1,500	N	20	5	10	20	L	200	500	70	N	1,000
3013-80	150	50	1,000	N	30	5	20	15	N	300	500	70	N	700
3014-80	100	50	1,500	N	20	5	20	30	L	300	300	100	N	G1,000
3015-80	700	30	1,000	N	20	N	N	10	N	N	1,000	70	N	G1,000
3016-80	30	200	1,500	N	20	L	10	20	L	500	200	100	N	G1,000
3017-80	30	50	1,500	L	30	L	15	20	10	150	300	100	N	G1,000
3018-80	200	L	1,000	L	20	N	20	30	N	200	500	70	N	G1,000
3019-80	70	N	1,000	L	15	N	15	30	N	150	300	50	N	G1,000
3020-20	N	N	100	N	10	10	15	N	N	100	15	10	N	70
3020-80	20	30	1,000	5	20	L	20	5	10	150	200	100	N	G1,000
3021-80	L	50	500	L	10	N	15	15	N	200	100	50	N	700
3022-80	10	50	1,000	L	20	N	20	20	N	300	200	70	N	G1,000
3023-80	7	50	1,000	N	10	5	30	10	N	200	70	30	N	1,000
3024-80	10	20	1,000	N	10	5	30	10	N	200	70	30	N	150
3025-80	15	20	1,000	N	10	5	30	15	N	200	100	30	N	300
3026-80	10	50	1,000	N	10	5	30	10	N	100	70	30	N	200
3027-80	15	50	1,000	N	10	5	30	15	N	100	100	30	N	200
3028-80	10	30	700	N	15	5	30	10	N	100	50	20	N	200
3029-80	20	50	1,500	N	15	5	30	15	N	200	150	30	N	500
3030-80	15	50	1,000	N	10	5	30	15	N	200	150	30	N	300
3031-80	20	70	1,500	N	15	L	20	5	N	300	150	20	N	300
3032-80	150	N	700	N	10	10	N	5	N	N	500	50	300	700
3033-80	50	30	1,000	N	15	L	20	5	N	300	200	20	N	300
3034-80	50	20	1,500	N	15	L	30	10	N	500	200	30	N	1,000
3035-80	50	30	700	N	10	L	30	5	N	300	150	50	N	300
3036-80	150	30	700	N	10	L	10	5	N	L	300	30	N	700
3038-80	30	N	700	N	15	L	20	10	N	300	150	50	N	200
3039-80	5	20	700	N	10	L	30	10	L	100	70	20	N	150
3040-80	15	20	700	N	10	7	30	10	N	100	70	20	N	300
3041-80	15	50	700	N	15	L	30	15	N	200	100	30	N	700
3042-80	15	70	1,500	N	15	L	20	30	N	100	100	70	N	G1,000
3043-80	15	20	500	N	10	L	20	15	N	100	70	30	N	500
3044-80	10	50	700	N	10	5	30	15	L	200	70	50	N	200
3047-80	20	20	1,000	N	10	L	10	10	N	N	100	30	N	300
3048-80	70	20	1,500	N	10	L	10	15	N	200	300	30	N	300
3049-80	15	20	1,000	N	10	L	30	15	N	200	150	30	N	300
3050-80	20	20	1,000	N	15	L	30	15	N	300	150	30	N	300
3051-80	20	20	1,000	N	15	L	30	15	N	300	100	20	N	500
3052-80	30	20	1,000	5	15	10	30	7	150	L	150	30	N	300
3053-80	5	30	1,000	N	15	5	50	5	10	200	50	20	N	150
3054-80	50	20	1,500	N	20	5	20	30	L	100	300	100	N	500
3055-80	15	30	1,000	N	10	L	30	20	L	300	150	70	5,000	300

TABLE 3.—*Spectrographic and chemical analyses of samples*

Sample	Coordinates		Chemical analyses (ppm)				Semiquantitative spectrographic analyses (ppm)						
	X	Y	Au (.02)	Cu (10)	As (10)	W (20)	Fe (500)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Bi (10)	Co (5)
							Stream sediments--Continued						
3056-80	169	144	L	L	N	L	70,000	N	L	300	1.5	N	7
3057-80	158	139	L	L	N	L	30,000	N	10	700	1.5	N	7
3058-80	166	139	L	L	N	L	50,000	N	10	700	2	N	7
3060-80	174	146	L	L	N	20	G200,000	N	10	300	1.5	N	20
Average metal content of the above 599 samples (see headnote)			0.20	1.02	4.50	16.3	75,300	(.02)	9.24	542	1.40	(.08)	10.2
							Granitic bedrock						
021	202	305	L	L	10	L	20,000	N	L	700	L	N	5
025	195	316	L	L	L	L	10,000	N	L	200	L	N	5
040	238	131	L	L	10	L	30,000	N	L	700	1	N	10
062	132	244	L	L	L	L	30,000	N	L	2,000	3	N	5
066	351	134	L	L	10	L	20,000	N	L	700	2	N	5
092	215	291	L	L	L	L	15,000	N	L	200	2	N	L
098	239	256	L	L	L	L	50,000	N	L	1,500	L	N	10
100	287	286	L	L	N	N	10,000	N	10	150	2	N	L
101	289	284	.02	L	N	N	10,000	N	L	150	3	N	L
116	298	276	.08	190	N	L	100,000	N	L	200	1.5	N	70
206	091	244	L	L	L	N	20,000	N	10	700	2	N	5
225	85	214	L	L	L	N	50,000	N	10	700	1.5	N	10
231	336	267	L	15	L	L	10,000	30	10	150	2	150	N
1033	232	196	L	L	L	20	50,000	N	L	1,000	1	N	15
1042	289	126	L	L	L	L	100,000	N	10	2,000	1.5	N	20
1043	235	239	.02	L	L	L	70,000	N	L	2,000	1.5	N	15
1046	224	247	L	14	L	L	70,000	N	L	2,000	1	N	10
1065	233	223	L	L	L	L	50,000	N	L	700	1	N	10
1083	131	199	L	L	10	L	70,000	N	L	1,000	2	N	5
1102	370	123	L	L	L	L	70,000	N	L	1,500	1	N	15
1106	219	173	L	L	L	L	50,000	N	L	1,500	L	N	10
1126	289	164	L	10	N	L	30,000	N	10	500	1.5	N	7
1129	286	280	L	L	N	L	50,000	N	10	700	2	N	7
1132	325	277	L	L	N	N	10,000	N	10	200	2	N	L
1135	325	263	L	36	N	N	70,000	N	L	700	2	N	20
1136	329	260	L	L	N	N	10,000	N	10	70	1.5	N	L
1148	250	178	L	L	N	L	70,000	N	10	500	2	N	15
1191	122	157	L	10	40	L	15,000	N	L	700	1	N	7
1206	89	116	.02	L	10	L	30,000	N	L	700	1	N	15
1212	308	229	L	14	L	L	20,000	N	L	1,000	L	N	20
1283	342	205	L	13	10	N	70,000	N	L	700	1	N	10
2010	207	153	L	L	10	L	70,000	N	L	1,000	1	N	10
2032	301	177	L	L	N	L	20,000	N	10	500	1.5	N	7
2033	296	179	L	10	N	L	30,000	N	10	300	1.5	N	15
2529	271	161	L	L	N	L	20,000	N	10	500	1.5	N	7
2530	255	155	L	L	N	L	30,000	N	10	300	1.5	N	10
2531	155	160	L	20	N	L	70,000	N	10	200	1	N	20
3005	204	111	L	L	N	L	30,000	N	10	300	1	N	10
3037	71	169	L	L	N	L	20,000	N	L	500	2	N	10
3045	105	132	L	L	N	L	20,000	N	10	300	2	N	L
3059	175	143	L	L	N	L	50,000	N	10	700	1.5	N	10
A-107							20,000	N	10	500	N	N	10
A-406							3,000	N	10	200	3	N	N
A-454B							30,000	N	N	1,500	N	N	10
KPa-9							30,000	N	10	500	1	N	10
KPa-11							15,000	N	N	1,500	2	N	N
KPa-50							30,000	N	10	1,000	2	N	7
KPa-62							20,000	N	10	1,000	N	N	5
KPa-66							20,000	N	10	1,000	2	N	5
KPa-67							15,000	N	15	500	2	N	2

from the Sierra Demonstration Project area—Continued

Sample	Cr (5)	La (20)	Mn (10)	Mo (5)	Nb (10)	Ni (5)	Pb (10)	Sc (5)	Sn (10)	Sr (100)	V (10)	Y (10)	Zn (200)	Zr (10)
	Semiquantitative spectrographic analyses (ppm)--Continued													
	Stream sediments--Continued													
3056-80	15	30	700	N	10	5	30	5	L	N	150	15	L	300
3057-80	10	30	700	5	10	5	30	10	L	200	70	15	N	70
3058-80	10	20	700	20	15	L	30	15	10	200	100	50	N	300
3060-80	150	300	1,000	5	15	5	10	30	N	200	300	100	700	700
	59.8	51.9	957	2.82	19.5	10.7	25.7	12.3	2.72	275	155	39.7	(24.2)	354
	Granitic bedrock													
021	10	50	300	L	10	5	20	5	L	500	20	L	L	20
025	5	L	100	L	L	5	20	L	L	100	30	L	L	20
040	15	20	700	N	10	7	30	10	N	300	150	15	N	70
062	7	30	700	N	10	15	30	5	N	700	70	10	N	150
066	L	20	700	N	10	L	20	5	N	200	70	20	N	70
092	L	N	300	N	10	5	50	N	N	N	20	N	N	20
098	10	20	700	N	10	10	20	10	N	500	150	10	N	70
100	5	50	500	10	10	L	30	5	N	N	10	15	N	70
101	5	20	500	N	10	L	50	5	N	N	10	15	N	30
116	150	N	1,500	N	N	70	30	30	N	1,000	500	10	L	30
206	5	30	150	N	L	7	15	L	N	300	30	L	N	150
225	15	30	300	N	L	10	15	7	N	500	70	10	N	100
231	5	N	300	L	L	5	70	N	N	100	20	N	N	10
1033	10	N	700	N	L	7	20	10	N	300	200	15	N	200
1042	30	20	1,500	N	20	10	30	20	N	700	300	50	N	150
1043	20	50	1,000	N	15	10	30	15	N	500	200	30	N	70
1046	20	50	700	N	10	10	20	7	N	500	200	L	N	50
1065	15	L	1,000	N	L	5	50	10	N	700	200	10	N	20
1083	10	20	700	N	20	5	30	5	N	700	100	20	N	300
1102	7	70	1,000	N	15	5	15	15	N	500	200	30	N	200
1106	10	50	700	N	10	7	30	7	N	500	150	15	N	150
1126	10	20	1,000	5	10	5	30	15	L	300	100	15	N	30
1129	L	30	1,000	N	10	5	20	10	L	1,000	150	15	N	150
1132	5	20	500	N	10	5	30	5	N	N	10	10	N	50
1135	15	20	1,500	N	10	20	20	20	N	1,000	200	20	N	50
1136	L	30	300	N	15	5	30	L	N	N	N	10	N	20
1148	7	20	700	10	10	5	30	15	N	500	200	10	N	70
1191	10	50	700	N	10	10	10	7	N	200	30	20	N	100
1206	10	30	500	N	20	10	15	10	N	200	70	70	N	100
1212	20	100	700	N	10	15	20	10	N	500	70	20	N	100
1283	15	30	700	N	L	10	15	10	N	500	150	15	N	100
2010	15	100	1,000	N	20	5	50	7	N	500	150	50	N	200
2032	5	20	700	N	10	L	30	7	N	200	50	20	N	100
2033	15	20	700	5	10	5	30	10	N	300	100	20	N	70
2529	15	50	300	N	15	L	30	10	N	200	100	10	N	200
2530	10	20	500	N	10	15	30	10	N	200	100	10	N	100
2531	50	50	700	N	10	10	10	15	N	200	300	10	N	20
3005	15	30	700	N	10	5	50	7	N	500	100	15	N	100
3037	7	30	700	N	10	5	30	5	N	500	70	10	N	70
3045	L	20	300	N	L	L	30	5	N	100	50	L	N	30
3059	30	N	700	N	L	5	30	10	N	500	100	10	N	150
A-107	10	N	500	N	N	5	30	15	N	500	100	20	N	50
A-406	N	N	300	15	15	N	30	N	N	30	N	20	N	50
A-454B	10	50	700	N	10	7	10	7	N	700	100	20	N	100
KPa-9	7	50	500	N	7	5	30	7	N	500	100	10	N	150
KPa-11	3	N	300	N	N	N	50	N	N	300	20	10	N	100
KPa-50	5	N	500	N	10	5	30	7	N	700	70	15	N	150
KPa-62	3	N	300	N	N	15	50	3	N	500	50	7	N	100
KPa-66	5	50	500	N	10	N	50	N	N	300	30	15	N	100
KPa-67	2	30	300	N	N	N	30	N	N	300	30	10	N	100

TABLE 3.—*Spectrographic and chemical analyses of samples*

Sample	Coordinates		Chemical analyses (ppm)				Semiquantitative spectrographic analyses (ppm)						
	X	Y	Au (.02)	Cu (10)	As (10)	W (20)	Fe (500)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Bi (10)	Co (5)
Granitic bedrock--Continued													
KPa-74							20,000	N	15	500	2	N	5
KPa-79							30,000	N	10	700	2	N	10
KPa-84							15,000	N	10	500	1.5	N	5
KPa-89							30,000	N	N	300	N	N	15
KPa-96							15,000	N	10	700	1.5	N	5
KPa-97							15,000	N	10	700	1.5	N	3
KPa-98							5,000	N	10	500	1.5	N	N
KPa-99							15,000	N	10	700	1.5	N	3
KPa-100							20,000	N	10	1,000	1.5	N	7
KPa-102							7,000	N	10	1,000	2	N	N
KPa-103							10,000	N	10	700	2	N	2
KPb-10							30,000	N	10	1,000	2	N	10
KPb-26							30,000	N	N	500	1	N	10
KPb-34							20,000	N	N	1,500	1.5	N	7
KPb-53							3,000	N	N	300	1.5	N	N
KPb-59							30,000	N	10	1,000	1.5	N	10
KPb-60							30,000	N	10	500	N	N	10
KPb-61							30,000	N	10	500	1	N	10
KPb-64							30,000	N	10	500	1	N	7
KPb-74							30,000	N	N	1,500	2	N	10
KPb-83							3,000	N	N	300	3	N	N
KPc-1							20,000	N	N	1,500	1.5	N	5
KPc-9							30,000	N	N	700	1.5	N	10
KPc-26							20,000	N	N	1,500	1	N	5
KPc-30							30,000	N	N	700	1.5	N	10
KPc-37							15,000	N	20	700	2	N	2
KPc-42							30,000	N	10	1,000	1.5	N	7
KPc-50							20,000	N	N	500	2	N	3
KPc-138							30,000	N	N	700		N	7
KPd-17							30,000	N	10	500	1.5	N	7
KPd-50							30,000	N	N	500	N	N	10
KPd-51							30,000	N	10	700	1	N	10
KPd-52							20,000	N	10	700	3	N	7
KPd-61							20,000	N	10	700	3	N	7
Average metal content of the above 84 samples (see headnote)			(.012)	11.9	2.68	(8.29)	30,000	(0.36)	7.08	751	1.45	(1.79)	7.75
Metamorphic bedrock													
051	360	155	L	12	10	L	70,000	N	L	1,000	N	N	20
073	300	179	L	L	10	L	50,000	N	L	5,000	L	N	15
125	313	190	L	L	L	L	50,000	N	L	2,000	N	N	L
126	312	190	L	11	20	L	20,000	N	L	1,000	N	N	N
133	303	162	.02	14	N	L	700	N	L	1,000	L	N	N
136	354	320	L	40	N	L	50,000	N	L	2,000	L	N	20
204	273	230	.08	186	10	L	100,000	3	L	1,000	2	N	15
1052	367	149	L	L	L	L	50,000	N	L	3,000	1	N	10
1100	386	107	L	23	10	L	70,000	N	L	2,000	L	N	20
2031	302	171	L	L	N	L	50,000	N	L	300	1.5	N	20
2518A	305	175	L	10	L	L	15,000	L	15	300	2	N	L
3046	103	132	.02	L	N	L	7,000	N	10	300	2	N	L
KPb-37							G200,000	N	N	700	N	N	30
KPb-39							G200,000	N	10	150	1.5	N	10
Average metal content of the above 14 samples (see headnote)			.018	26.8	6.25	--	66,600	(0.23)	6.07	1,410	0.86	--	12.0

from the Sierra Demonstration Project area—Continued

Sample	Semiquantitative spectrographic analyses (ppm)--Continued													
	Cr (5)	La (20)	Mn (10)	Mo (5)	Nb (10)	Ni (5)	Pb (10)	Sc (5)	Sn (10)	Sr (100)	V (10)	Y (10)	Zn (200)	Zr (10)
							Granitic bedrock--Continued							
KPa-74	5	N	300	N	10	15	50	5	N	500	50	15	N	100
KPa-79	10	30	500	2	10	7	30	7	N	500	100	20	N	100
KPa-84	5	N	300	N	15	3	15	5	N	300	50	20	N	100
KPa-89	10	N	700	3	7	7	15	15	N	500	150	20	N	150
KPa-96	3	30	300	N	10	3	30	3	N	500	50	15	N	100
KPa-97	5	N	300	N	N	1.5	30	3	N	500	50	N	N	100
KPa-98	1	N	100	N	N	N	30	N	N	300	10	N	N	30
KPa-99	5	30	300	N	N	1.5	30	3	N	300	50	7	N	100
KPa-100	7	50	300	N	N	2	30	5	N	500	70	10	N	100
KPa-102	1.5	N	200	N	N	N	50	2	N	200	7	10	N	100
KPa-103	1.5	N	300	N	10	N	30	N	N	300	15	10	N	70
KPb-10	10	N	500	N	10	10	50	7	N	300	100	20	N	100
KPb-26	10	30	700	N	10	5	20	15	N	300	100	20	N	100
KPb-34	5	N	500	N	10	N	30	5	N	500	70	15	N	150
KPb-53	N	30	200	N	10	N	50	N	N	20	5	15	N	70
KPb-59	15	100	500	N	10	10	50	10	N	200	100	20	N	100
KPb-60	20	N	500	N	10	5	15	15	N	500	100	20	N	100
KPb-61	20	30	700	N	10	5	15	15	N	500	150	20	N	150
KPb-64	10	30	500	N	15	5	30	15	N	300	100	30	N	70
KPb-74	5	N	2,000	N	10	7	20	10	N	300	100	20	N	150
KPb-83	3	30	500	N	15	N	20	N	N	20	5	30	N	70
KPc-1	5	50	500	N	N	N	30	7	N	150	30	20	N	100
KPc-9	10	50	500	N	10	7	30	10	N	200	100	30	N	150
KPc-26	7	N	300	N	N	5	50	5	N	200	50	15	N	100
KPc-30	7	50	500	N	10	7	30	10	N	200	70	30	N	150
KPc-37	1.5	N	300	N	N	N	50	N	N	300	30	10	N	100
KPc-42	10	50	500	N	10	7	50	5	N	300	70	15	N	150
KPc-50	3	30	500	N	10	1	30	2	N	300	50	10	N	70
KPc-138	7	N	700	N	10	N	20	5	N	500	70	15	N	70
KPd-17	10	N	500	N	10	3	30	10	N	300	100	20	N	150
KPd-50	10	N	700	N	7	7	20	15	N	300	150	30	N	150
KPd-51	10	N	500	N	N	5	20	10	N	500	100	20	N	150
KPd-52	5	N	500	N	10	3	15	7	N	500	70	15	N	100
KPd-61	7	N	700	N	N	5	50	7	N	150	70	15	N	100
	11.0	24.3	580	(0.77)	8.29	7.61	30.2	7.52	--	191	92.5	16.3	--	98.9
							Metamorphic bedrock							
051	20	30	1,500	N	20	10	20	20	N	700	300	30	N	150
073	150	20	2,000	N	N	20	20	15	N	300	200	20	200	100
125	L	200	1,000	N	20	N	30	10	N	700	70	70	N	500
126	L	100	500	N	20	N	10	5	N	200	10	30	N	700
133	20	50	100	L	10	10	15	N	N	L	L	10	N	150
136	20	30	1,500	N	10	10	20	20	N	500	100	20	N	100
204	50	30	3,000	50	L	15	15	15	30	500	200	30	L	150
1052	10	50	1,500	L	20	5	50	15	N	150	100	50	L	300
1100	150	20	1,500	N	10	50	20	20	N	500	200	30	N	150
2031	7	30	1,500	N	10	7	50	15	N	L	150	15	500	50
2518A	5	20	300	N	10	15	30	5	N	100	30	L	N	50
3046	10	20	70	N	L	L	N	L	N	N	20	L	N	70
KPb-37	150	N	1,500	N	10	100	50	30	N	500	500	50	N	150
KPb-39	50	30	1,000	N	10	20	30	15	N	300	100	30	N	150
	46.2	45.0	1,210	(3.93)	11.4	18.9	25.7	12.3	(2.14)	325	142	28.2	(64.3)	198

TABLE 3.—*Spectrographic and chemical analyses of samples*

Sample	Coordinates		Chemical analyses (ppm)				Semiquantitative spectrographic analyses (ppm)						
	X	Y	Au (.02)	Cu (10)	As (10)	W (20)	Fe (500)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Bi (10)	Co (5)
							Mineralized veins						
002	274	168	L	40	20	L	30,000	50	10	200	L	500	5
033	269	171	L	L	L	L	50,000	N	L	50	L	N	L
052	360	161	.04	L	10	20	20,000	1	L	200	N	10	L
057	351	180	L	L	20	40	50,000	.7	L	70	1.5	N	20
068	278	181	L	78	20	600	20,000	50	L	300	3	300	L
099	288	284	L	10	10	20	30,000	.5	10	100	1.5	300	L
102	310	317	.08	26	10	L	30,000	100	L	300	1.5	300	L
107	328	323	L	10	L	L	3,000	N	10	70	1	N	L
132	308	154	.02	13	N	10	700	1.5	L	500	L	N	N
138	355	305	L	20	N	H	30,000	20	10	200	1.5	700	N
139	356	297	L	250	N	H	200,000	2	N	100	L	N	20
164	354	250	L	L	L	L	20,000	N	10	1,000	1.5	N	5
165	339	246	L	L	30	480	30,000	N	L	200	L	N	50
179	041	123	L	12	10	N	100,000	N	20	500	1.5	N	30
186	157	269	L	11	80	N	3,000	N	10	70	1.5	N	N
208	120	226	L	L	20	N	70,000	N	15	500	1.5	N	7
216	321	278	L	10	20	40	15,000	N	L	150	2	N	N
1087	186	263	L	17	L	L	100,000	.7	30	700	2	N	15
1111	282	304	.04	2400	10	L	20,000	7	L	150	2	30	5
1117	300	311	L	20	N	L	20,000	2	10	100	1.5	N	L
1175	348	262	.02	35	N	L	100,000	50	L	500	L	1,000	20
1281	359	209	L	L	L	N	150,000	N	10	300	1	N	7
2518-B			L	15	L	L	20,000	L	10	150	15	N	L
Average metal content of the above 23 samples (see headnote)			.017	129	12.6	62.4	48,300	12.4	8.91	279	1.8	137	8.87
							Mineralized rocks						
118	384	336	.02	15	20	L	70,000	.5	15	200	1.5	N	7
119	391	322	L	L	N	L	70,000	N	L	100	1.5	N	15
120	396	317	L	75	N	L	100,000	N	L	300	2	N	20
127	313	191	L	150	20	L	50,000	1	10	1,500	N	N	10
149	323	130	.02	10	N	L	15,000	N	L	1,000	1	N	N
217	330	263	L	19	N	N	150,000	N	10	100	2	N	N
Average metal content of the above 6 samples (see headnote)			.013	45.7	6.67	--	75,800	0.25	8.33	533	1.33	--	8.67
							Mineral spring precipitates						
003	270	168	.08	L	2,500	40	5,000	10	L	3,000	L	N	L
143	360	282	.02	40	1,000	L	50,000	N	L	10	30	N	7
166	336	247	L	48	G10,000	L	50,000	N	200	150	20	N	N
180	180	248	L	L	20	N	5,000	N	100	N	N	N	N
187	152	286	L	L	8,000	N	100,000	N	100	500	2	N	7
1149	250	179	L	L	600	20	15,000	N	50	150	2	N	15
Average metal content of the above 6 samples (see headnote)			.023	18.0	3,690	13.3	37,500	(1.67)	76.7	635	9.08	--	5.25

from the Sierra Demonstration Project area—Continued

Sample	Semiquantitative spectrographic analyses (ppm)--Continued													
	Cr (5)	La (20)	Mn (10)	Mo (5)	Nb (10)	Ni (5)	Pb (10)	Sc (5)	Sn (10)	Sr (100)	V (10)	Y (10)	Zn (200)	Zr (10)
							Mineralized veins							
002	L	L	500	200	20	10	70	5	L	200	30	L	L	L
033	L	L	700	5	10	5	20	5	L	500	100	L	L	L
052	5	N	200	50	L	5	30	L	N	L	30	L	N	20
057	L	N	200	150	L	5	N	N	N	100	50	N	N	N
068	5	N	150	700	L	5	50	5	N	100	70	L	N	20
099	5	N	70	100	10	5	20	L	N	N	N	L	N	100
102	5	N	150	7	10	5	100	L	N	100	10	N	200	5
107	L	N	20	70	10	5	N	L	N	N	10	N	N	N
132	10	N	100	50	L	5	10	N	N	100	15	L	N	20
138	15	N	1,000	500	10	5	50	N	N	700	30	L	N	20
139	20	N	1,000	200	L	5	20	L	N	L	300	N	N	15
164	20	20	1,000	10	10	7	20	5	N	500	50	L	N	70
165	15	N	700	5	20	5	15	15	N	300	70	10	N	15
179	10	20	2,000	7	20	10	N	15	N	300	100	15	N	20
186	5	N	100	30	L	5	L	L	N	N	10	N	N	N
208	15	50	500	20	L	7	20	5	N	300	100	10	N	150
216	5	70	100	10	10	5	N	N	N	N	15	L	N	100
1087	30	N	1,500	10	10	15	20	15	N	300	200	15	N	200
1111	L	50	300	1,500	10	5	100	5	15	N	15	10	N	50
1117	5	20	150	7	10	5	30	L	N	L	20	L	N	N
1175	10	N	500	5	10	5	200	5	N	300	100	L	N	50
1281	10	20	1,000	5	L	5	70	30	N	700	300	15	N	50
2518-B	5	20	500	N	10	5	N	5	N	100	20	L	N	30
	9.02	12.6	541	158	9.56	6.04	37.0	5.76	(1.09)	213	75.2	5.87	(17.4)	41.1
							Mineralized rocks							
118	150	20	2,000	L	L	50	10	7	N	500	150	50	N	300
119	150	30	1,500	L	10	70	10	10	N	500	200	50	300	150
120	200	30	2,000	L	10	70	N	10	N	100	200	30	300	150
127	15	100	1,000	5	15	5	20	30	N	1,500	200	50	N	150
149	15	50	200	10	10	7	15	5	N	150	15	15	N	100
217	5	N	G5,000	10	L	L	10	N	15	N	20	30	300	150
	89.2	38.3	1,950	5.41	9.17	34.1	10.8	10.3	(2.5)	458	131	37.5	150	167
							Mineral spring precipitates							
003	10	L	5,000	30	10	5	L	L	20	1,500	10	L	L	50
143	N	N	5,000	N	L	N	10	N	N	200	10	L	N	15
166	10	N	1,000	10	L	L	10	5	N	1,500	L	10	N	N
180	10	N	3,000	N	N	L	20	L	N	1,000	20	L	N	30
187	10	20	150	50	L	5	10	5	N	1,500	50	10	N	30
1149	5	20	2,000	N	10	5	10	15	N	5,000	20	L	N	20
	7.5	8.33	2,690	15	5.83	3.33	10.8	5.00	(3.33)	1,780	19.2	6.67	--	24.2

TABLE 3.—*Spectrographic and chemical analyses of samples*

Sample	Coordinates		Chemical analyses (ppm)				Semiquantitative spectrographic analyses (ppm).						
	X	Y	Au (.02)	Cu (10)	As (10)	W (20)	Fe (500)	Ag (0.5)	B (10)	Ba (20)	Be (1)	Bi (10)	Co (5)
							Trachybasalt flows						
169	363	234	0.90	35	L	N	100,000	N	10	1,000	1	N	50
236	262	180	L	53	L	N	100,000	N	L	700	1	N	30
1015	204	302	L	L	N	L	50,000	N	L	700	L	N	20
1270	177	239	L	45	L	N	100,000	N	10	700	1.5	N	20
A-419A							70,000	N	N	1,500	N	N	50
KPa-52							G200,000	N	10	1,500	1.5	N	30
KPa-85							G200,000	N	N	1,500	1.5	N	50
KPb-1							G200,000	N	N	3,000	2	N	30
KPb-14							G200,000	N	10	2,000	1.5	N	30
KPb-18							G200,000	N	N	2.000	2	N	50
Average metal content of the above 10 samples (see headnote)			(0.22)	34.5	--	--	(142,000)	--	5.0	1,460	1.25	--	36.0
							Air-transported pumice bomb						
198	237	308	L	L	40	N	30,000	N	20	700	2	N	N
							Glacial sand and gravel						
015-P	107	200	L	-	N	L	200,000	N	20	70	L	N	20
017-P	104	195	0.04	11	N	L	200,000	N	20	50	L	N	20
200-80	269	220	L	L	L	L	100,000	N	10	700	2	N	7
							Vein quartz pebble in glacial till						
069-B	282	178	04	L	L	L	10,000	N	L	200	N	N	N
							Soil above granitic bedrock						
173-80	054	154	L	10	N	20	70,000	N	10	1,000	1.5	N	10

from the Sierra Demonstration Project area—Continued

Sample	Semiquantitative spectrographic analyses (ppm)--Continued													
	Cr (5)	La (20)	Mn (10)	Mo (5)	Nb (10)	Ni (5)	Pb (10)	Sc (5)	Sn (10)	Sr (100)	V (10)	Y (10)	Zn (200)	Zr (10)
	Trachybasalt flows													
169	300	50	700	N	L	300	10	15	N	700	150	20	N	150
236	300	50	700	N	L	200	15	20	N	1,000	200	15	N	150
1015	300	50	1,000	L	L	50	20	10	L	500	50	10	L	30
1270	200	50	700	N	L	150	15	20	N	1,000	200	15	N	150
A-419A	700	50	1,000	N	7	300	7	30	N	1,500	300	20	N	150
KPa-52	500	100	1,000	N	N	500	50	20	N	1,500	300	20	N	200
KPa-85	700	70	1,000	N	15	500	30	30	N	1,000	500	30	N	200
KPb-1	500	100	700	N	N	500	50	20	N	1,500	300	20	N	200
KPb-14	500	50	1,000	N	N	200	50	20	N	1,000	300	30	N	150
KPb-18	700	100	1,000	N	15	500	20	30	N	1,000	500	30	N	200
	400	67.0	880	--	5.7	320	26.7	21.5	--	1,070	280	21.0	--	158
	Air-transported pumice bomb													
198	5	70	500	10	15	L	50	L	N	200	15	20	N	500
	Glacial sand and gravel													
015-P	200	L	300	5	20	20	L	20	L	100	300	20	L	200
017-P	150	L	200	7	10	5	L	5	L	100	300	30	L	300
200-80	20	50	300	N	10	10	15	5	N	300	100	20	N	300
	Vein quartz pebble in glacial till													
069-B	L	N	500	N	N	L	N	N	N	N	10	N	N	N
	Soil above granitic bedrock													
173-80	20	50	700	N	10	10	15	10	N	500	100	20	N	300

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