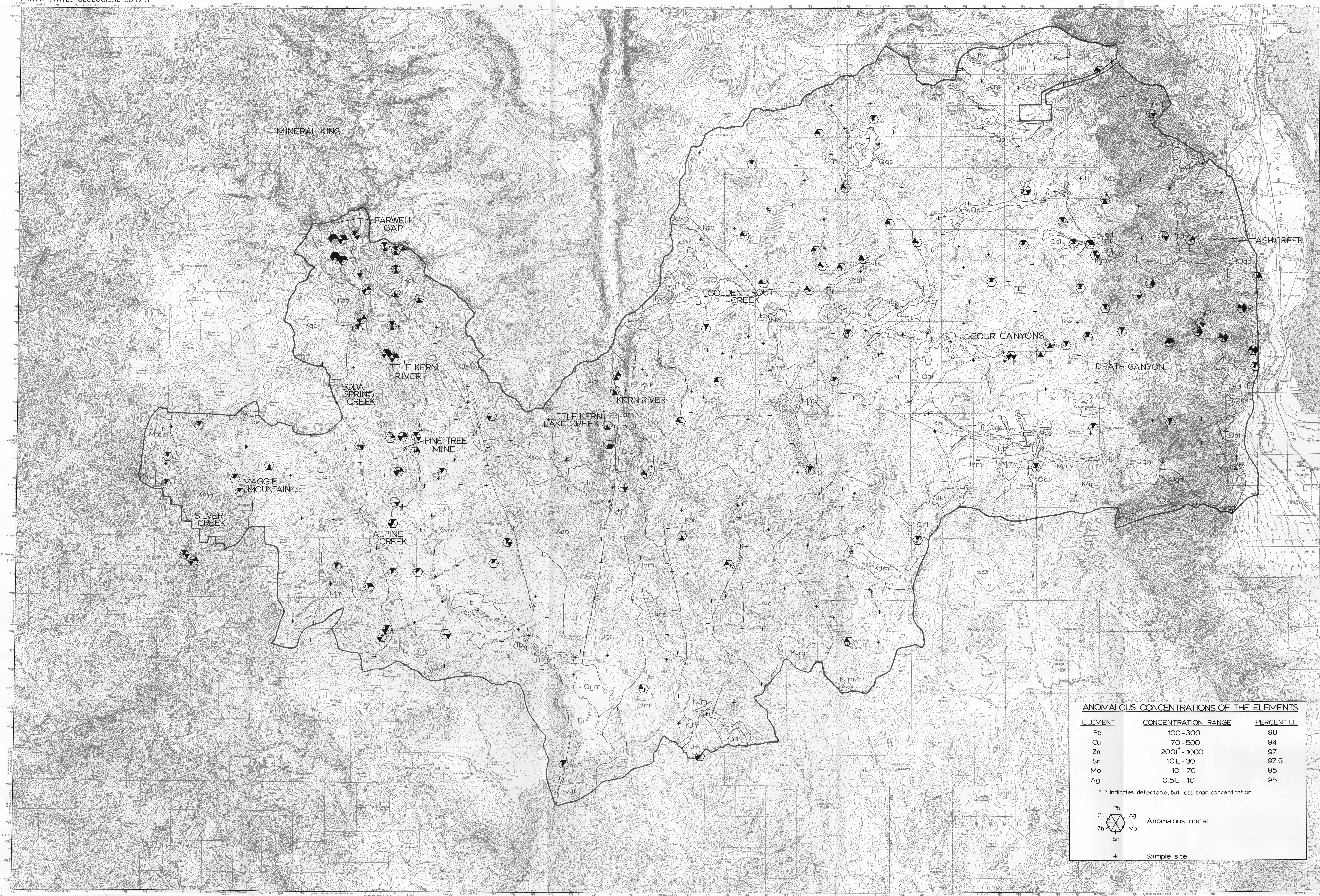
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1231-C

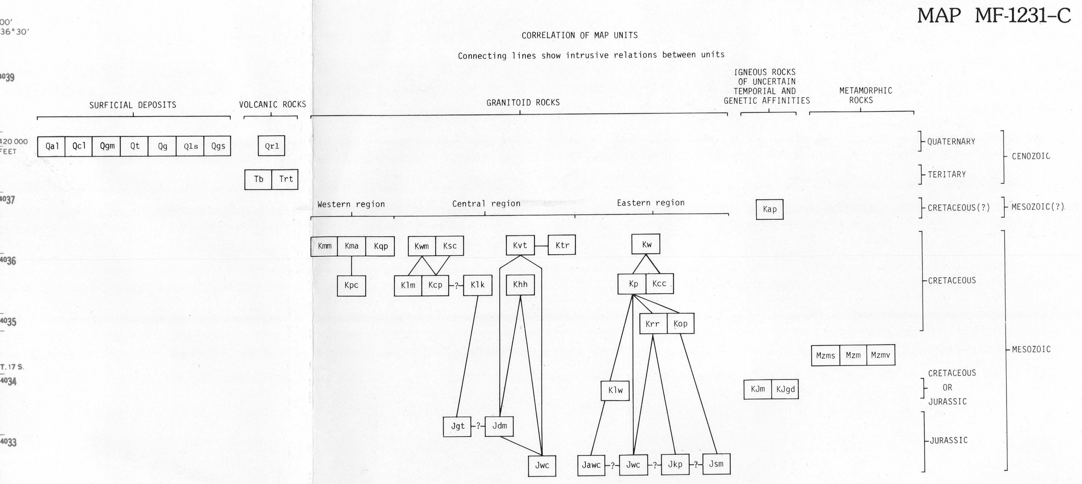


Base from U.S. Geological Survey, 1:62,500, 1956
Camp Nelson, Hockett Peak, Mineral King, Monache
Mtn, Olancha

SCALE 1:62 500

Geology from E.A. DuBray and D.A. Dellinger, 1981

CORRELATION OF MAP UNITS



LIST OF MAP UNITS

SURFICIAL DEPOSITS

Qal ALLUVIUM (QUATERNARY)
Qcl COLLUVIUM (QUATERNARY)
Qgm GLACIAL MORAINE (QUATERNARY)
Qt TALUS (QUATERNARY)
Qg GRAVEL (QUATERNARY)
Qls LANDSLIDE DEPOSIT (QUATERNARY)
Qgs GRUS AND SAND (QUATERNARY)

VOLCANIC ROCKS

Qrl RHYOLITE OF LONG CANYON (QUATERNARY)
Tb BASALT (TERTIARY)
Trt RHYOLITE OF TEMPLETON MOUNTAIN (TERTIARY)

GRANITOID ROCKS OF WESTERN REGION

Kmm ALASKITE OF MOSES MOUNTAIN (CRETACEOUS)
Kma ALASKITE OF MAGGIE MOUNTAIN (CRETACEOUS)
Kpq GRANODIORITE OF QUINN PEAK (CRETACEOUS)
Kpc GRANODIORITE OF PECK'S CANYON (CRETACEOUS)

GRANITE OF WHITE MOUNTAIN (CRETACEOUS)

Kwm GRANITE OF WHITE MOUNTAIN (CRETACEOUS)
Ksc GRANODIORITE OF SHEEP CREEK (CRETACEOUS)
Kvf GRANODIORITE OF VOLCANO FALLS (CRETACEOUS)
Ktr GRANODIORITE OF TOWER ROCK (CRETACEOUS)
Klm GRANODIORITE OF LOGGY MEADOW (CRETACEOUS)
Kcp ALASKITE OF COYOTE PASS (CRETACEOUS)
Klk GRANITE OF LITTLE KERN LAKE CREEK (CRETACEOUS)
Khh ALASKITE OF HELL'S HOLE (CRETACEOUS)
Jgf GRANITE OF GRASSHOPPER FLAT (JURASSIC)
Jdm GRANODIORITE OF DOE MEADOW (JURASSIC)
Jwc GRANITE OF WINDOW CLIFFS (JURASSIC)

GRANITOID ROCKS OF EASTERN REGION

Klw GRANITE OF LITTLE WHITNEY MEADOW (CRETACEOUS)
Kw WHITNEY GRANODIORITE (CRETACEOUS)
Kib INTRUSION BRECCIA OF TIMOSEA PEAK (CRETACEOUS)
Kp PARADISE GRANODIORITE (CRETACEOUS)
Kcc GRANITE OF CARROLL CREEK (CRETACEOUS)
Krr GRANODIORITE OF REDROCK MEADOW (CRETACEOUS)
Kop ALASKITE OF OLANCHA PEAK (CRETACEOUS)
Jawc ALASKITE OF WINDOW CLIFFS (JURASSIC)
Jwc GRANITE OF WINDOW CLIFFS (JURASSIC)
(Patterned area is a mafic phase)
Jkp ALASKITE OF KERN PEAK (JURASSIC)
Jsm GRANODIORITE OF SCHAEFFER MEADOW (JURASSIC)

IGNEOUS ROCKS

(OF UNCERTAIN TEMPORAL AND GENETIC AFFINITIES)

Kap APLITE (CRETACEOUS?)
KJm MAFIC PLUTONIC ROCK (JURASSIC or CRETACEOUS)
KJgd GRANODIORITE (JURASSIC or CRETACEOUS)

METAMORPHIC ROCKS

Mms METASEDIMENTARY ROCKS (MESOZOIC)
Mm METAMORPHIC ROCKS, UNDIFFERENTIATED (MESOZOIC)
Mmv METAVOLCANIC ROCKS (MESOZOIC)

APPROXIMATE BOUNDARY OF GOLDEN TROUT WILDERNESS

GEOLOGIC CONTACT--Arrow indicates dip direction

FAULT

Showing relative horizontal movement

Ball and bar on downthrown side

STUDIES RELATED TO WILDERNESS

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to determine their mineral resource potential. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a geochemical survey of the Golden Trout Wilderness, in the Inyo and Sequoia National Forests, Inyo and Tulane Counties, California.

INTRODUCTION

The Golden Trout Wilderness occupies 457 square miles in the southern Sierra Nevada range of California, south of Sequoia National Park. The study area includes at least a part of the Kern Peak, Olancha, Mineral King, Hockett Peak, Camp Nelson, and Monache Mountain 15-minute quadrangle maps. It is contained totally within lands belonging to the Inyo and Sequoia National Forests.

The geochemical map shows the locations of minus-80-mesh (<180 μm) stream sediments with anomalous concentrations of Pb, Cu, Zn, Sn, Mo, and Ag in the Golden Trout Wilderness, California. This suite of elements is shown on the map because they may indicate areas of possible mineralized rocks. Some potentially useful elements for example, Bi and As are not included on the map because only a few of the samples contained detectable concentrations.

Sample sites were selected on first- or second-order drainages as defined by 1:62,500 topographic maps. All sample sites on second-order drainages were chosen at least 300 feet below any first-order stream junction. Sample sites were selected at a density of one site per cell, each cell having an area of approximately one square mile. A few cells may not contain a sample site because of various factors including lack of small-order stream drainage or extreme relief and inaccessibility. At each site, five grab samples were collected along 30 feet of an active stream channel and composited into a single sample. In the laboratory, the samples were air dried and sieved with a 80-mesh (<180 μm) stainless steel screen. The material passing through the screen was pulverized and analyzed for 31 elements using an optical emission spectrograph, using the method outlined by Grimes and Marranzino (1968). A complete tabulation of the data, detailed discussion of the sampling and analytical methods, and statistical summaries of the data are presented by Leach and others (1981a). Maps showing the distribution of selected elements are shown by Leach and others (1981 b, c, d, e).

DISCUSSION

Distribution of Anomalous Samples

The anomalous concentrations of elements found in the samples are shown in table 1. Because the samples are derived from a variety of rock types, we arbitrarily chose as anomalous those concentrations that approximate as close as possible the top 5 percent of the data. For some elements, the anomalous percentile range was adjusted up or down from the 95th percentile to accommodate distinct breaks in the frequency distribution of the data. More than 95 percent of the samples had concentrations of Zn and Sn below the limit of detection; the detectable concentrations were considered anomalous. The concentration ranges defined as anomalous are also shown in table 1.

Little Kern River anomalous zone

Many anomalous samples are located in a north-south zone in the Little Kern River drainage. Most of the anomalous samples are underlain by the Mineral King roof pendant or lie within 1 to 2 miles of the contact with granitic rocks of the Sierra Nevada batholith. The northern part of this zone can be characterized by samples with anomalous concentrations of Ag, Pb, and Zn--samples with anomalous concentrations of Cu and Mo are also present. Anomalous concentrations of Sn are common to this area; however, the samples with anomalous concentrations of Sn are restricted to drainages with exposures of alaskite of Coyote Pass. The central part of the Little Kern River anomalous zone, extending from Soda Springs Creek to Alpine Creek, also can be characterized by samples with anomalous concentrations of Ag, Pb, and Zn. However, Cu is not anomalous in this area and only a few samples contain anomalous amounts of Mo. The southern part of the Little Kern River anomalous zone can be characterized by samples with anomalous concentrations of Pb and Zn. One sample contains anomalous concentrations of Ag and one contains anomalous concentrations of Mo.

There are numerous prospects and mining claims in the Little Kern River anomalous zone, including the Pine Tree mine which is currently producing small amounts of W. Occurrences of argentiferous galena, argentite, sphalerite, arsenopyrite, and other sulfides of copper, lead, and zinc are reported from the Mineral King district located several miles north of Farewell Gap. Therefore, the Little Kern River anomalous zone may represent a southern extension of the mineral occurrences characteristic of the Mineral King district.

Maggie Mountain anomalous area

Samples with anomalous concentrations of Pb characterize an area at the western edge of the study area. One sample collected in Silver Creek contains anomalous concentrations of Ag and Zn and one sample in Galena Creek contains anomalous Mo. In addition, one sample located in upper Pecks Canyon contains an anomalous concentration of Sn. The Maggie Mountain area is underlain by metasedimentary roof pendant, alaskite of Maggie Mountain, and granodiorite of Peck Canyon. There are two sulfide mineral prospects in this area and one W prospect.

Little Kern Lake Creek area

On the western side of the Kern River canyon near Little Kern Lake Creek, four samples contain anomalous concentrations of Sn and one sample contains anomalous Ag. These samples are located in drainages underlain by granite of Grasshopper Flats, granite of Little Kern Lake Creek, and alaskite of Coyote Pass.

Central Cu area

The central part of the study area, extending eastward from the Kern River to the Sierra Nevada range front, contains many samples with anomalous concentrations of Cu. Also, there are scattered samples with anomalous concentrations of Pb or Zn. Most of the anomalous samples in this central zone are single-element anomalies and are underlain by a variety of rock types. The significance of these isolated anomalous samples is uncertain. However, many of the samples with anomalous concentrations of Cu in the Golden Trout Creek area also contain high concentrations of Fe. Therefore, it is possible that many of the anomalous Cu values may be related to sorption of these metals onto Fe-oxyhydroxides.

Ash Creek anomalous area

The area bounded by Ash Creek, Four Canyons, Death Canyon, and the eastern boundary of the study area contains a number of anomalous samples. Anomalous concentrations of Mo are found throughout the Ash Creek and Braley Creek catchments. The eastern half of the Ash Creek-Braley Creek anoma ous area is characterized by anomalous concentrations of Ag and Cu, whereas the western half contains samples anomalous in Pb. This area is underlain by metasedimentary roof pendants, mafic plutonic rocks, granite and granodiorite. There are six sulfide mineral prospects and claims in the area.

REFERENCES

Du Bray, E. A., and Dellinger, D. A., 1981, Geologic map of the Golden Trout Wilderness, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1231-A.

Grimes, D. J., and Marranzino, A. P., 1968, Direct-current arc and alternating-current spark emission spectrographic field methods for semiquantitative analysis of geologic materials: U.S. Geological Survey Circular 591, 6 p.

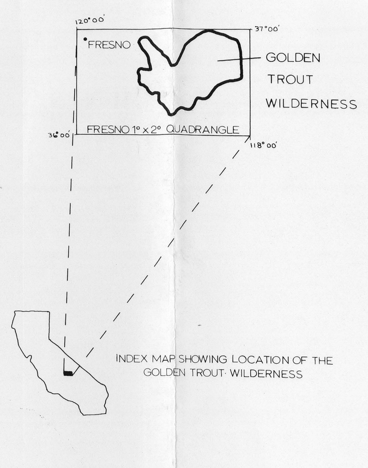
Leach, D. L., Goldfarb, R., and Domenico, J. A., 1981a, Basic data report and geochemical summary for stream sediments, heavy-mineral concentrates, rocks, and waters from the Golden Trout Wilderness California: U.S. Geological Survey Open-File Report 81-752.

_____ 1981b, Distribution of Sn in stream sediments and heavy-mineral concentrates from the Golden Trout Wilderness, California: U.S. Geological Survey Open-File Report 81-756.

_____ 1981c, Distribution of Cu in stream sediments and heavy-mineral concentrates from the Golden Trout Wilderness, California: U.S. Geological Survey Open-File Report 81-754.

_____ 1981d, Distribution of Pb, Zn, and Ag in stream sediments from the Golden Trout Wilderness, California: U.S. Geological Survey Open-File Report 81-755.

_____ 1981e, Distribution of Mo in stream sediments and W in heavy-mineral concentrates from the Golden Trout Wilderness, California: U.S. Geological Survey Open-File Report 81-990.



INDEX MAP SHOWING LOCATION OF THE GOLDEN TROUT WILDERNESS

Table 1.--Anomalous Concentrations of Elements

[L, indicates detectable concentration below limit of measurement; data in parts per million]

Element	Lower Limit of Anomalous Concentration	Lower Percentile of Anomalous Population	Maximum Concentration Reported
Pb	100	98	300
Cu	70	94	500
Zn	200(L)	97	1000
Sn	10(L)	97	30
Mo	10	95	70
Ag	0.5(L)	95	10

GEOCHEMICAL MAP SHOWING ANOMALOUS CONCENTRATIONS OF SELECTED ELEMENTS IN STREAM SEDIMENTS FROM THE GOLDEN TROUT WILDERNESS, CALIFORNIA

By

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