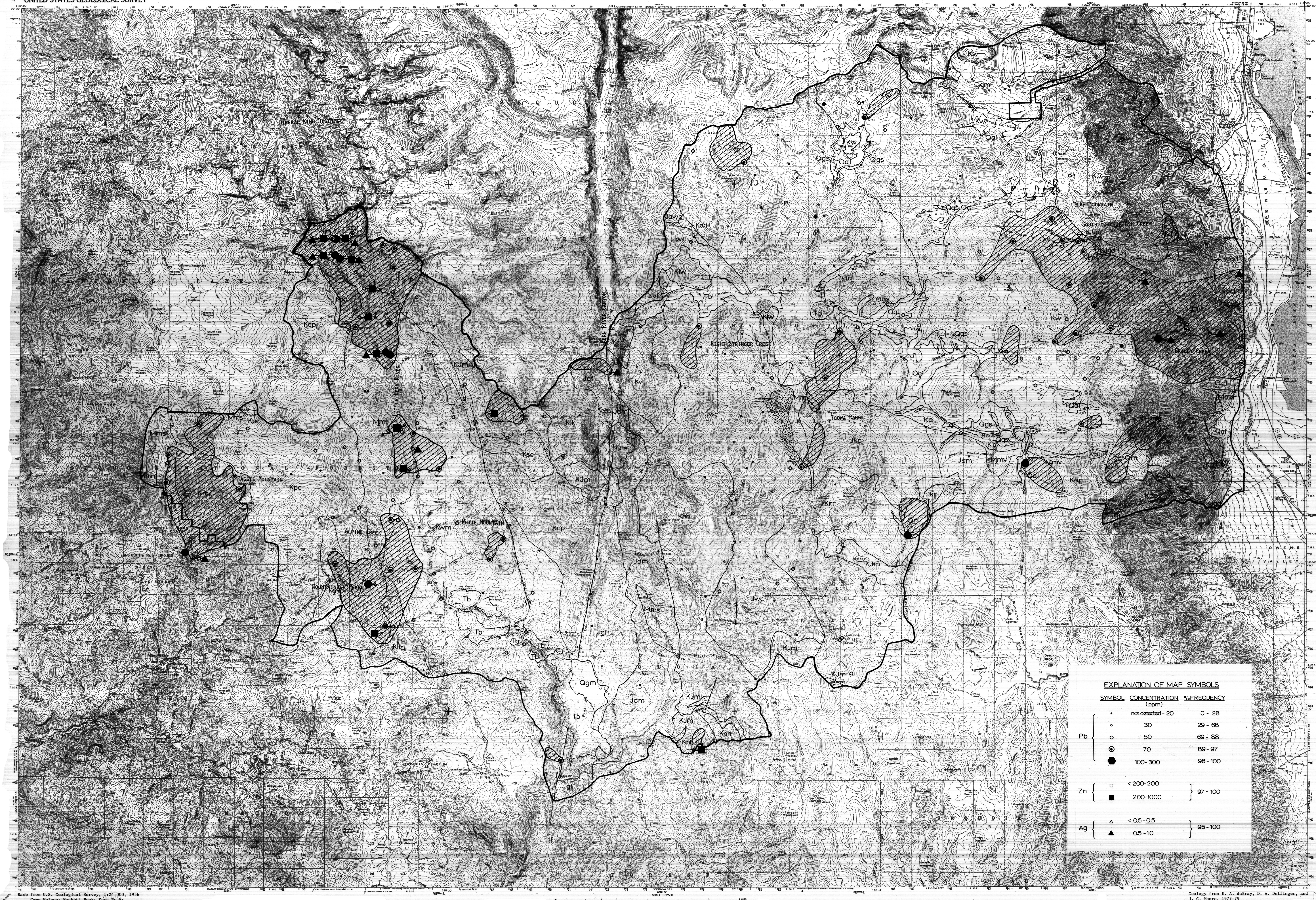
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

OPEN-FILE REPORT
81-755



Base from U.S. Geological Survey, 1:24,000, 1956
Camp Nelson; Hockett Peak; Kern Peak;
Mineral King; Monache Mtn; Olancha

Geology from E. A. duBray, D. A. Dellinger, and J. G. Moore, 1977-79

SCALE 1:62500

CONTOUR INTERVAL 80 FEET
DATUM IS MEAN SEA LEVEL

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards.

MAP SHOWING DISTRIBUTION OF Pb, Zn, AND Ag IN STREAM SEDIMENTS FROM THE GOLDEN TROUT WILDERNESS, CALIFORNIA

By
D. L. Leach, R. J. Goldfarb, and J. A. Domenico
1981

INTRODUCTION

This map show the distribution of Pb, Zn, and Ag in the 80-mesh (<180 μm) fraction of stream sediments collected in the Golden Trout Wilderness during the summers of 1979 and 1980. Five grab samples of stream sediment were collected along 10 m of active stream channel and composited into a single sample. Sites were chosen on first- or second-order drainages, as defined by 1:62,500 topographic maps. All sites on second-order drainages were chosen 100 m below any first-order stream junction. Sample sites were selected at a density of one site per cell with the cell having an area of approximately one square mile (2.6 km^2). A few cells may not contain a sample site because of various factors such as, lack of small-order stream drainages or extreme relief.

The 80-mesh (<180 μm) sediment fraction was pulverized at the laboratory and analyzed for 31 elements using an optical emission spectrograph, according to the method outlined by Grimes and Marranzino (1968). A complete tabulation of the data for each sample collected in the Golden Trout Wilderness is given in Leach and others (1981). This report also presents a more detailed discussion of the sampling and analytical methods as well as statistical summaries of the data.

RESULTS

A histogram of the Pb concentrations in the stream-sediment samples is shown in Figure 1. The concentration ranges used to plot the Pb data were arbitrarily selected to approximate the top 5 percentile, 95-75 percentile, 75-50 percentile, 50-25 percentile, and the lower 25 percentile. Because the spectrographic concentrations are reported as geometric midpoints of ranges in concentrations, it is not possible to precisely divide the data into the desired percentiles. Therefore, the 5 symbols represent slightly different percentile ranges. Most of the samples contained concentrations of Zn and Ag below the detection limits; therefore, only those samples that contained detectable concentrations (including less-than-qualified concentrations) are plotted. To avoid overlap of the symbols, the Zn and Ag concentrations symbols were offset from the symbol for Pb which overlies the correct location of the sample.

We define the anomalous concentrations of Pb to include the 89-97 percentile (70 ppm) and the 98-100 percentile (100-300 ppm). All of the Zn and Ag concentrations plotted are considered anomalous. These concentration ranges for Zn and Ag would include the top 3 and 5 percentile, respectively.

On the map, we have outline the stream catchment area that may have contributed material for the anomalous metal concentrations. Four areas contain a significant number of samples with anomalous metal concentrations, and all have significant exposures of metamorphic roof pendant. The first area, south of the Mineral King District, and within the Little Kern River watershed, is characterized by anomalous concentrations of Pb, Zn, and Ag. This area is largely underlain by metamorphic rocks of the Mineral King roof pendant. The anomaly in the vicinity of Mountaineer and Alpine Creeks is underlain by the Mineral King roof pendant, granite of White Mountain, and granodiorite of Loggy Meadow, and is characterized by anomalous concentrations of Pb and Zn. The third anomalous area is located at the western edge of the study area, 2 km northwest of Maggie Mountain. Stream sediments in this area are characterized by anomalous Pb concentrations; one sample contains anomalous Ag and Zn. The streams in this area drain an unnamed mountain underlain by the alaskite of Maggie Mountain. The sites on the western edge of this area lie within the exposures of the metasedimentary roof pendant.

The fourth area of anomalous metal concentrations is located on the eastern edge of the study area, between Braley Creek and upper South Fork of Ash Creek. The eastern third of this area contains anomalous concentrations of Ag in the stream sediments. This part of the anomalous area contains roof pendants of metavolcanic rocks. In contrast, the western part of this anomalous zone is characterized by anomalous Pb concentrations and is underlain by the Cretaceous Whitney Granodiorite.

It is apparent that the highest concentration of Pb, Zn, and Ag in the stream sediments of the Golden Trout Wilderness correlate with metamorphic roof pendants and contact zones with the granitic intrusives. It is possible that the several isolated anomalous samples in various granitic rocks may be related to areas of abundant xenoliths.

REFERENCES CITED

Cohen, A. C., 1959, Simplified estimators for the normal distribution when samples are singly censored or truncated: Technometrics, v. 1, no. 3, p. 217-237

duBray, E. A., and Dellinger, D. A., 1981, Geologic map of the Golden Trout Wilderness, southern Sierra Nevada, California: U.S. Geological Survey Miscellaneous Field Studies Map 1231-A.

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

Leach, D. L., Goldfarb, R. J., and Domenico, J. A., 1981, 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.

LIST OF MAP UNITS

SURFICIAL DEPOSITS

- Qal — Alluvium
- Qcl — Colluvium
- Qgm — Glacial Moraine
- Qt — Talus
- Qg — Gravel
- Qls — Landslide Deposit
- Qgs — Grus and Sand

VOLCANIC ROCKS

- Qrl — Rhyolite of Long Canyon
- Tb — Basalt
- Trt — Rhyolite of Templeton Mountain

GRANITOID ROCKS
WESTERN REGION

- Kmm — Alaskite of Moses Mountain
- Kma — Alaskite of Maggie Mountain
- Kqp — Granodiorite of Quinn Peak
- Kpc — Granodiorite of Peck's Canyon

GRANITOID ROCKS
CENTRAL REGION

- Kwm — Granite of White Mountain
- Ksc — Granodiorite of Sheep Creek
- Kvf — Granodiorite of Volcano Falls
- Ktr — Granodiorite of Tower Rock
- Klm — Granodiorite of Loggy Meadow
- Kcp — Alaskite of Coyote Pass
- Klk — Granite of Little Kern Lake Creek
- Khh — Alaskite of Hell's Hole
- Jgf — Granite of Grasshopper Flat
- Jdm — Granodiorite of Doe Meadow
- Jwc — Granite of Window Cliffs

GRANITOID ROCKS
EASTERN REGION

- Klw — Granite of Little Whitney Meadow
- Kw — Whitney Granodiorite
- Kib — Intrusion Breccia of Timosea Peak
- Kp — Paradise Granodiorite

GRANITOID ROCKS
EASTERN REGION (CONT'D)

- Kcc — Granite of Carroll Creek
- Krr — Granodiorite of Redrock Meadow
- Kop — Alaskite of Olancha Peak
- Jawc — Alaskite of Window Cliffs
- Jwc — Granite of Window Cliffs (patterned area is a mafic phase)
- Jkp — Alaskite of Kern Peak
- Jsm — Granodiorite of Schaeffer Meadow

IGNEOUS ROCKS
(OF UNCERTAIN TEMPORAL & GENETIC AFFINITIES)

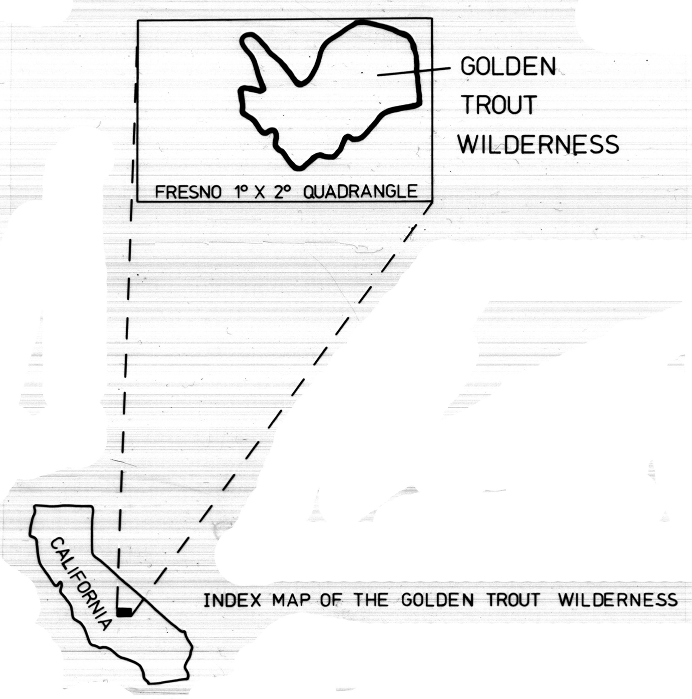
- Kap — Aplite
- KJm — Mafic Plutonic Rock
- KJgd — Granodiorite

METAMORPHIC ROCKS

- Mzms — Metasedimentary Rocks
- Mzm — Metamorphic Rocks, Undifferentiated
- Mzmv — Metavolcanic Rocks

(Geology from duBray and Dellinger, 1981)

- Boundary of Golden Trout Wilderness
- Geologic Contact
- Fault



INDEX MAP OF THE GOLDEN TROUT WILDERNESS

Studies Related to Wilderness

The Wilderness Act (Public Law 88-577, Sept. 3, 1964) and related Acts require the U.S. Geological Survey 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, California.

Table 1. Statistical Summary of Pb Concentrations [Calculations were made using qualified data by Cohen's method (1959). Details of the calculations are given in Leach and others, 1981.]

Detection Ratio*	0.99
Geometric Mean (ppm)	31
Geometric Deviation (ppm)	1.7
Expected Range for 95 percent of Data (ppm)	11-88
Arithmetic Mean (ppm)	36

*Number of uncensored values divided by total number of samples.

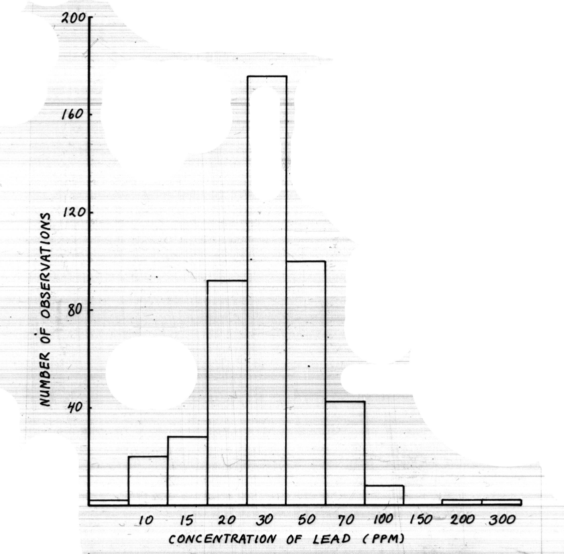


FIGURE 1: HISTOGRAM OF LEAD IN STREAM SEDIMENTS