DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

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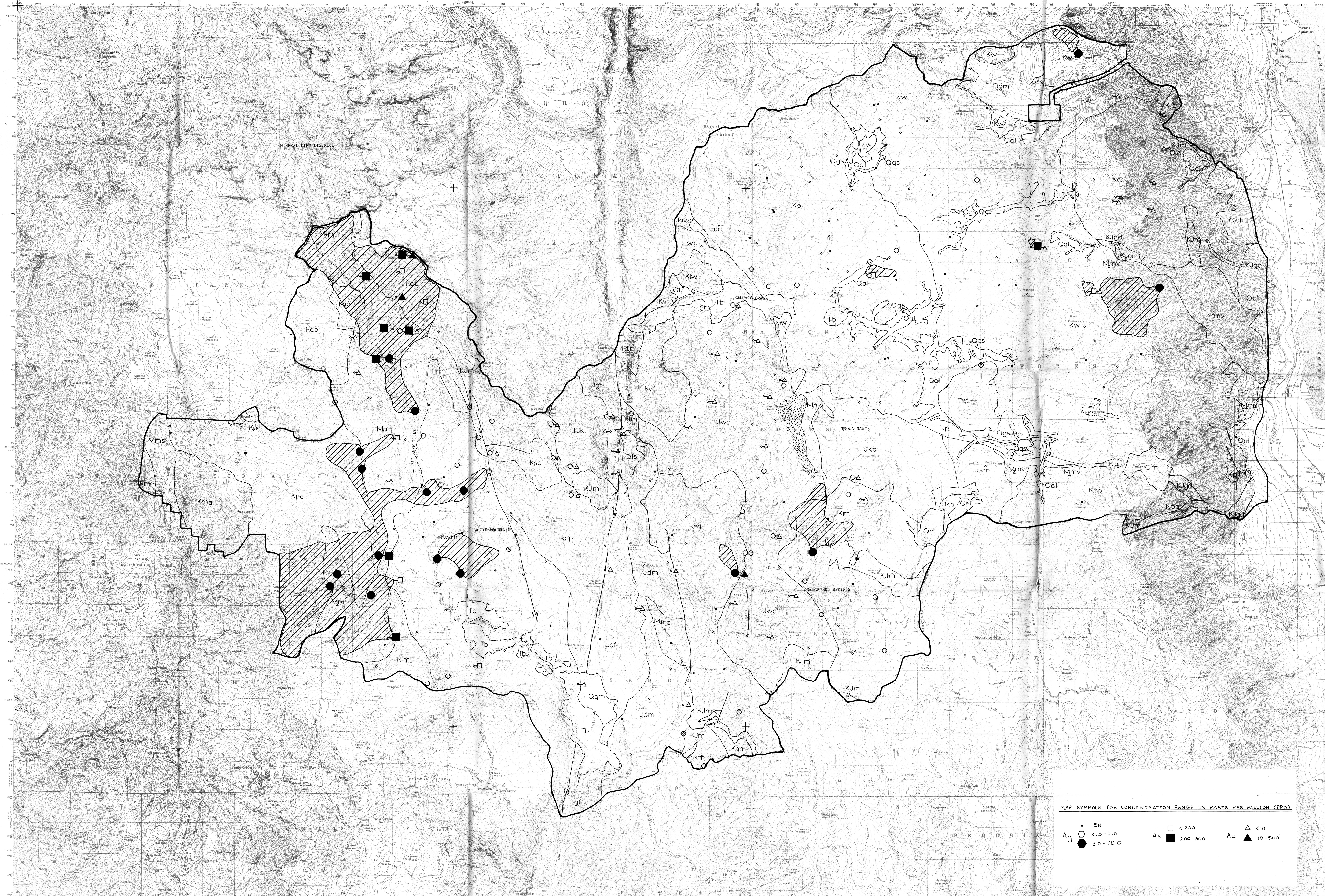


INTRODUCTION

This map shows the distribution of Ag, Au, and As in the nonmagnetic heavy-mineral concentrates of stream sediments collected from the Golden Trout Wilderness, Calif., in the summers of 1979 and 1980. Sites were selected on first- or second-order drainages as defined by 1:62,500 topographic maps. All sites on second-order drainages were chosen at least 100 m below any first-order-stream junction. The sample sites were selected at a density of one site per cell, each cell having an area of approximately one square mile (2.6 km^2). Some cells do not contain a sample because of various factors such as lack of small-order-stream drainages, extreme relief, or insufficient sample of the heavy-mineral separate. At each site, five grab samples of stream sediment were collected along 10 m of active stream channel and composited into a single sample. From the composited stream sediment, a heavy-mineral concentrate was collected using a standard gold pan. Commonly, 3 to 4 kg of composited sediment were necessary to yield the desired amount of concentrate. At the laboratory, the sample was air dried, and the highly magnetic material was removed by a magnet. Any light-weight material remaining in the concentrate was then separated by allowing the heavier fraction to settle through bromoform (specific gravity 2.82). The resulting heavy-mineral fraction was then separated into a nonmagnetic and magnetic fraction using a Frantz Isodynamic Separator[1] at a setting of 0.6 ampere, with 15° forward and 15° side setting.

The nonmagnetic fraction was then analyzed semiquantitatively 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, analytical methods, and includes statistical summaries of the data.

In the nonmagnetic heavy-mineral concentrates, the concentration of Ag may reflect the distribution of Ag-sulfides, Ag-sulfosalts, and native metal; the Au may reflect the distribution of native metal and Au-tellurides; and As may reflect the distribution of As-sulfosalts and As-sulfides.

RESULTS

Many of the heavy-mineral concentrates were at or below the detection limit for Ag (0.5 ppm) and Au (10 ppm) and most were below detection for As (200 ppm). To avoid overlap of the concentration symbols, the Au and As symbols were offset from the Ag symbol which overlies the correct location of the sample. Because the data consists of a number of populations derived from a variety of rock types, we arbitrarily chose the anomalous samples to approximate as close as possible the top 5 percentile of the data. Therefore, the anomalous concentrations for Ag include 3.0 to 70 ppm (95-100 percentile) and As includes <200 to 3,000 ppm (95-100 percentile). Fourteen percent of the samples contained detectable Au (<10 ppm); however, we consider only 3 samples to be significantly anomalous (two at 10 ppm and one at 500 ppm).

The Little Kern River drainage contains three anomalous areas. The large anomalous area south of the Mineral King District is characterized by anomalous As--two sites within this area have anomalous Ag and two sites have anomalous Au. The large anomalous area to the south in the Little Kern River drainage is characterized by anomalous Ag--four sites also contain anomalous As. The anomalous samples within these two large areas were collected over the outcrops of the Mineral King roof pendant or within a few kilometers of the contact with the granitic intrusive rocks. The third anomalous area in the Little Kern River drainage, located southwest of White Mountain, contains two samples with anomalous Ag and is underlain by the granite of White Mountain.

In the eastern part of the wilderness, there are five stream catchment areas in the Cretaceous Whitney Granodiorite that contain anomalous Ag or As. In the southern part of the wilderness near Jordan Hot Springs, two additional stream catchment areas contain anomalous Ag--one also contains the highest observed concentration of Au (500 ppm) and Ag (70 ppm) in the wilderness. Detectable Au concentrations (<10 ppm) appear to be localized in a northwest-trending zone, located from the Little Kern River drainage eastward to Golden Trout Creek and the Toowa Range.

[1]The use of trade names in this report is for descriptive purposes only and does not constitute endorsement by the U.S. Geological Survey.

REFERENCES CITED

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.

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

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards. Any use of trade names is for descriptive purposes only and does not imply endorsement by the USGS.

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 Granodiorite 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)

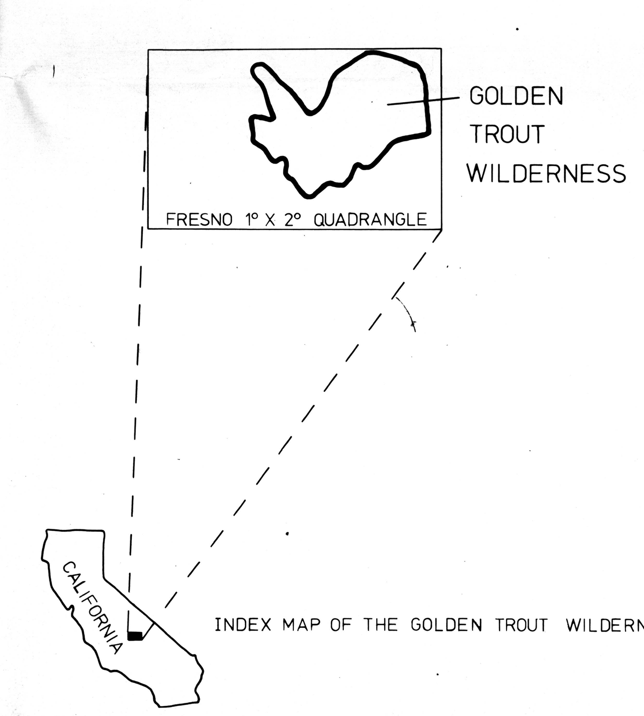
- Kap Aplite
- KJm Mafic Plutonic Rock
- KJgd Granodiorite

METAMORPHIC ROCKS

- Mms Metasedimentary Rocks
- Mm Metamorphic Rocks, Undifferentiated
- Mmv Metavolcanic Rocks

(Geology from duBray and Dellinger, 1981)

- Boundary of Golden Trout Wilderness
- Geologic Contact
- Fault



INDEX MAP OF THE GOLDEN TROUT WILDERNESS

MAP SHOWING DISTRIBUTION OF Ag, Au, AND As IN HEAVY-MINERAL CONCENTRATES FROM THE GOLDEN TROUT WILDERNESS, CALIFORNIA

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

1981

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.