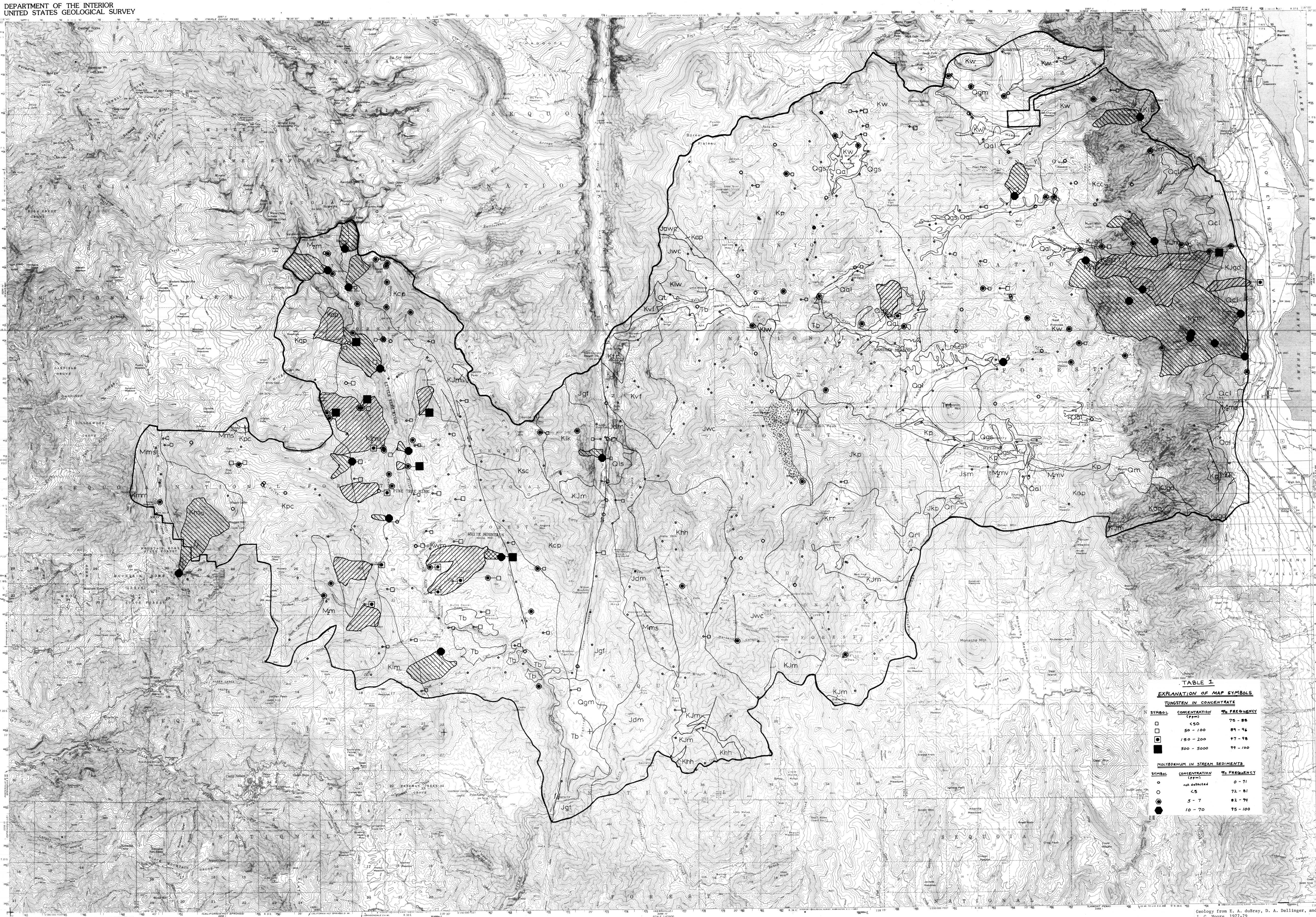
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

OPEN-FILE REPORT
81-990



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

SCALE 1:62500

CONTOUR INTERVAL 80 FEET
DATUM IS MEAN SEA LEVEL

UTM GRID AND 1956 MAGNETIC NORTH

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

TABLE 1

EXPLANATION OF MAP SYMBOLS

TUNGSTEN IN CONCENTRATE

SYMBOL	CONCENTRATION (ppm)	% FREQUENCY
□ (small)	<50	75 - 88
□	50 - 100	89 - 96
▣	150 - 200	97 - 98
■	500 - 5000	99 - 100

MOLYBDENUM IN STREAM SEDIMENTS

SYMBOL	CONCENTRATION (ppm)	% FREQUENCY
○ (small)	not detected	0 - 71
⬡	<5	72 - 81
◉	5 - 7	82 - 94
⬢	10 - 70	95 - 100

INTRODUCTION

This map shows the distribution of Mo in the minus-80-mesh (<180 μm) fraction of composited stream sediments and the distribution of W in heavy-mineral concentrates collected in the Golden Trout Wilderness, Calif., during the summers of 1979 and 1980. 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 at least 100 m 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 2.6 km^2. Some cells may not contain a sample site because of various factors such as lack of small-order-stream drainage or extreme relief.

At each site, five grab samples of stream sediment were collected along 10 m of active stream channel and composited into a single sample. These samples were air dried, and sieved with 80-mesh (<180 μm) sieves. The material passing through the 80-mesh sieve was pulverized prior to analysis. A heavy-mineral concentrate was collected at the same location 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 prepared samples of stream-sediment and nonmagnetic heavy-mineral concentrate were 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 also presents a more detailed discussion of the sampling, analytical methods, and includes statistical summaries of the data.

RESULTS

The concentration ranges used to plot the data are given in table 1 and histograms of the data are shown in fig. 1. Because the data consists of a number of populations derived from a variety of rock types, we arbitarily chose the anomalous samples to approximate as close as possible the top 5 percent of the data. Therefore, anomalous concentrations of Mo are defined as the top 5 percent of the data (10-70 ppm). The top 4 percent of the W data (150-5000 ppm) are defined as anomalous concentrations; however, two concentration symbols were used to represent the 150-200 ppm and 500-5,000 ppm ranges. On the map, we have outlined the stream catchment areas that may have contributed material for the high-metal concentrations. A significant number of heavy-mineral concentrates with anomalous concentrations of W are located along the Little Kern River drainage in the metamorphic rocks of the Mineral King roof pendant. A small active mine in this area (Pine Tree mine) is producing small amounts of W. Another stream catchment area with an anomalous concentration of W is located near White Mountain underlain by the granite of White Mountain. One sample in this area contains high concentrations of Ag (3 ppm), Mo (10 ppm), and Bi (1,000 ppm). Two additional stream catchment areas, each having one heavy-mineral concentrate with anomalous concentration of W, drain the metavolcanic roof pendant along the eastern Sierra Nevada range front. These samples also contain high Bi (70 and 500 ppm). One additional anomalous W concentration is located in Ramshaw Meadows, underlain by the Paradise Granodiorite.

Stream sediments with anomalous concentrations of Mo generally occur in drainages containing exposures of roof pendant rocks. Many samples from the headwaters of the Little Kern River watershed contain anomalous concentrations of Mo. The anomalous Mo is detected in streams underlain by the Mineral King roof pendant and the surrounding granitic rocks of the Sierra Nevada batholith. Scattered anomalous Mo are found near the Pine Tree mine and to the south along the contact between the Mineral King roof pendant and the granitic rocks of the Sierra Nevada batholith. One small drainage in the White Mountain region also contains anomalous Mo.

An area of approximately 65 km^2 along the Sierra Nevada range front, within the Ash Creek and Braley Creek drainage systems, contains stream sediments with anomalous concentrations of Mo. The streams with anomalous concentration of Mo are underlain by metavolcanic rocks, granite of Carrol Creek, and the Whitney Granodiorite. Stream sediments in this area also contain as much as 5 ppm Ag, 200 ppm Cu, and 1500 ppm Ba.

[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

du Bray, 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 semiquantitative analysis of geologic materials: U.S. Geological Survey Circular 591, 6 p.

Leach, D. L., Goldfarb, R., 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)

Stream catchment areas with anomalous W

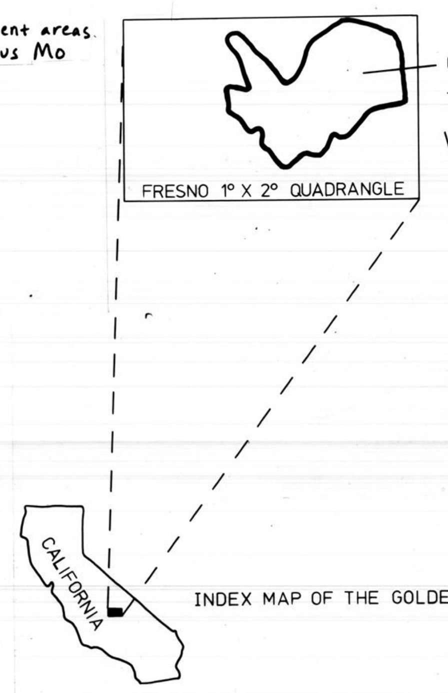
Stream catchment areas with anomalous Mo

Boundary of Golden Trout Wilderness

Geologic Contact

Fault

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.



INDEX MAP OF THE GOLDEN TROUT WILDERNESS

MAP SHOWING DISTRIBUTION OF MO IN STREAM SEDIMENTS AND W IN NONMAGNETIC, HEAVY-MINERAL CONCENTRATES FROM THE GOLDEN TROUT WILDERNESS, CALIFORNIA

By

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

1981

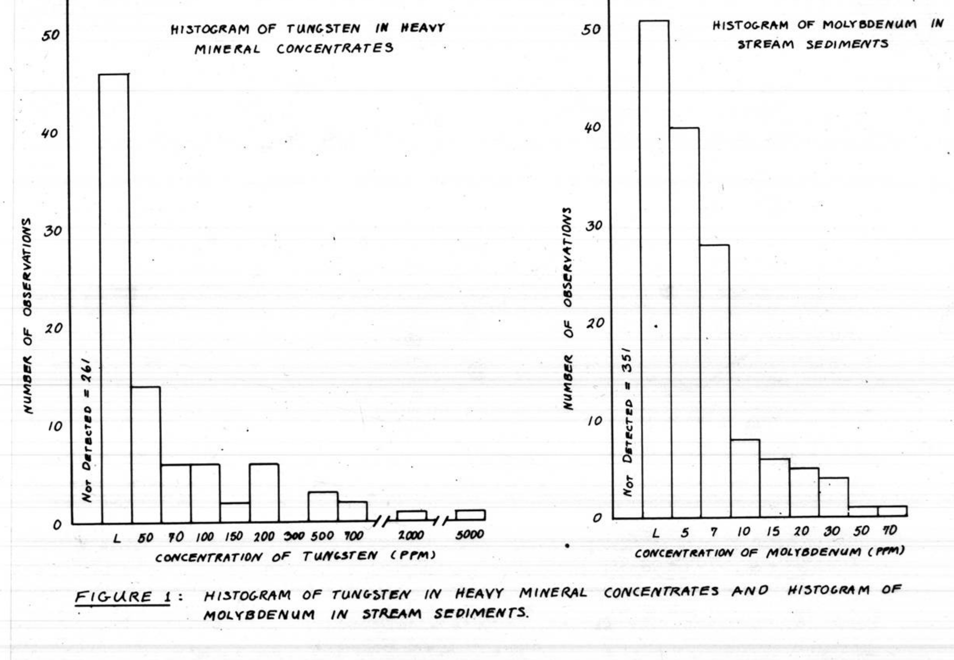


FIGURE 1: HISTOGRAM OF TUNGSTEN IN HEAVY MINERAL CONCENTRATES AND HISTOGRAM OF MOLYBDENUM IN STREAM SEDIMENTS.

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.