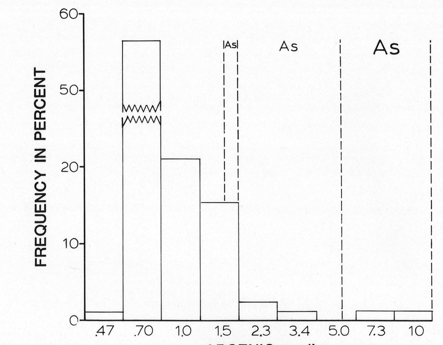
SAMPLE SITE SHOWING OUTLINE OF DRAINAGE BASIN ABOVE SAMPLE SITE--Single dot indicates stream sample site; circled dot indicates spring sample site. Number beside element symbol indicates concentration in parts per million. Size of element symbol corresponds to class of the anomalous value shown on histograms

Base from U.S. Geological Survey, 1:62,500, Hockett Peak, Kernville, Lamont Peak, Monache Mtn., 1956; 1:24,000, Onyx, Weldon, 1972

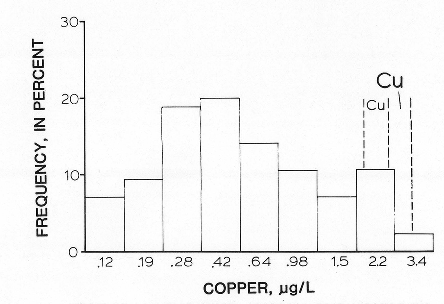
Geology from Bergquist and Nitkiewicz (1982)



HISTOGRAM SHOWING ANOMALOUS AMOUNTS OF ARSENIC IN NATURAL WATERS

EXPLANATION

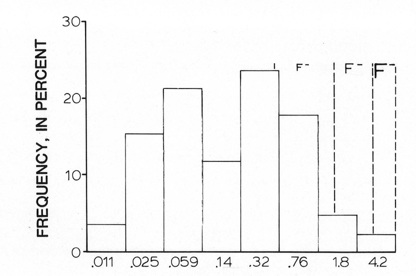
As--5.2 to 9.7 µg/L, HIGHLY ANOMALOUS VALUES
As--1.9 to 5.2 µg/L, MODERATELY ANOMALOUS VALUES
As--1.6 to 1.9 µg/L, WEAKLY ANOMALOUS VALUES



HISTOGRAM SHOWING ANOMALOUS AMOUNTS OF COPPER IN NATURAL WATERS

EXPLANATION

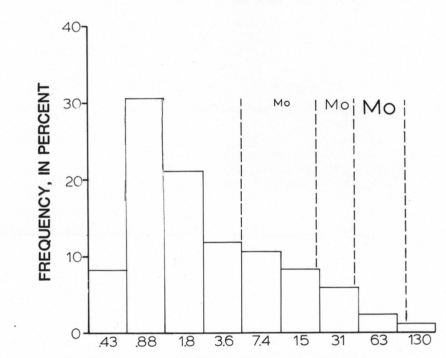
Cu--2.6 to 2.9 µg/L, HIGHLY ANOMALOUS VALUES
Cu--2.0 to 2.6 µg/L, MODERATELY ANOMALOUS VALUES



HISTOGRAM SHOWING ANOMALOUS AMOUNTS OF FLUORIDE IN NATURAL WATERS

EXPLANATION

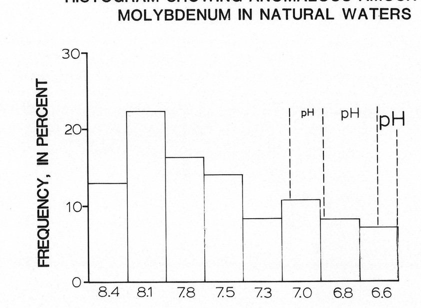
F^---4.0 to 5.7 mg/L, HIGHLY ANOMALOUS VALUES
F^---1.7 to 4.0 mg/L, MODERATELY ANOMALOUS VALUES
F^---.49 to 1.7 mg/L, WEAKLY ANOMALOUS VALUES



HISTOGRAM SHOWING ANOMALOUS AMOUNTS OF MOLYBDENUM IN NATURAL WATERS

EXPLANATION

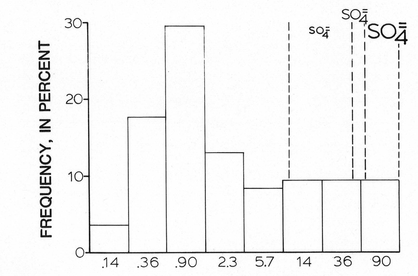
Mo--40 to 93 µg/L, HIGHLY ANOMALOUS VALUES
Mo--21 to 40 µg/L, MODERATELY ANOMALOUS VALUES
Mo--5.4 to 21 µg/L, WEAKLY ANOMALOUS VALUES



HISTOGRAM SHOWING ANOMALOUS pH VALUES IN NATURAL WATERS

EXPLANATION

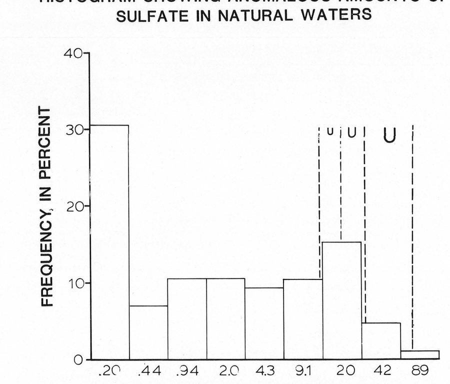
pH--6.6 to 6.4, HIGHLY ANOMALOUS VALUES
pH--6.9 to 6.6, MODERATELY ANOMALOUS VALUES
pH--7.1 to 6.9, WEAKLY ANOMALOUS VALUES



HISTOGRAM SHOWING ANOMALOUS AMOUNTS OF SULFATE IN NATURAL WATERS

EXPLANATION

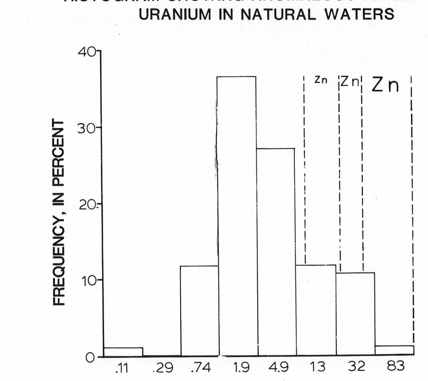
$SO_4^=$--74 to 140 mg/L, HIGHLY ANOMALOUS VALUES
$SO_4^=$--51 to 74 mg/L MODERATELY ANOMALOUS VALUES
$SO_4^=$--12 to 51 mg/L, WEAKLY ANOMALOUS VALUES



HISTOGRAM SHOWING ANOMALOUS AMOUNTS OF URANIUM IN NATURAL WATERS

EXPLANATION

U--32 to 64 µg/L, HIGHLY ANOMALOUS VALUES
U--19 to 32 µg/L, MODERATELY ANOMALOUS VALUES
U--12 to 19 µg/L, WEAKLY ANOMALOUS VALUES



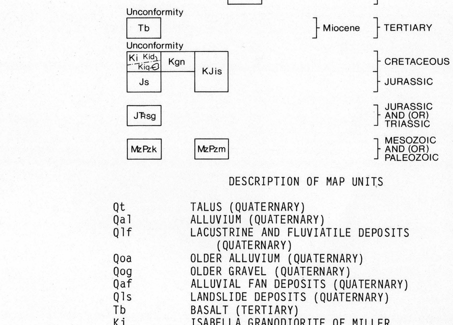
HISTOGRAM SHOWING ANOMALOUS AMOUNTS OF ZINC IN NATURAL WATERS

EXPLANATION

Zn--40 to 130 µg/L, HIGHLY ANOMALOUS VALUES
Zn--24 to 40 µg/L, MODERATELY ANOMALOUS VALUES
Zn--10 to 24 µg/L, WEAKLY ANOMALOUS VALUES

(Note: The following correlation and description are for the geologic base map shown in gray)

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

Qt	TALUS (QUATERNARY)
Qal	ALLUVIUM (QUATERNARY)
Qlf	LACUSTRINE AND FLUVIATILE DEPOSITS (QUATERNARY)
Qoa	OLDER ALLUVIUM (QUATERNARY)
Qog	OLDER GRAVEL (QUATERNARY)
Qaf	ALLUVIAL FAN DEPOSITS (QUATERNARY)
Qls	LANDSLIDE DEPOSITS (QUATERNARY)
Tb	BASALT (TERTIARY)
Ki	ISABELLA GRANODIORITE OF MILLER (1931) (CRETACEOUS)--Locally includes:
Kid	Dikes
Kiq	Quartz
Kgn	GNEISS (CRETACEOUS)
KJis	ISABELLA GRANODIORITE OF MILLER (1931) AND SACATAR QUARTZ DIORITE OF MILLER AND WEBB (1940), UNDIVIDED (CRETACEOUS AND JURASSIC)
Js	SACATAR QUARTZ DIORITE (JURASSIC)
JTRsg	SUMMIT GABBRO OF MILLER AND WEBB (1940) (JURASSIC AND (OR) PALEOZOIC)
MzPzk	KERNVILLE SERIES OF MILLER (1931) (MESOZOIC AND (OR) PALEOZOIC)
MzPzm	MIXED ROCKS (MESOZOIC AND (OR) PALEOZOIC)

CONTACT--Dotted where concealed, hachured where gradational

FAULT--Arrows indicate relative horizontal movement

STRIKE AND DIP OF INCLINED BEDDING

STRIKE AND DIP OF FOLIATION

Inclined

Vertical

STRIKE AND DIP OF JOINTS

Inclined--Measured in field

Steeply dipping to vertical--Mapped from aerial photographs

Vertical--Measured in field

Horizontal--Measured in field

DRAG FOLDS--Arrow in direction of axial plunge

SCHLIEREN--Arrows in direction of elongation, dip indeterminate

DIKE--Arrow in direction of dip

SAMPLE LOCATION--Modal analysis

SAMPLE LOCATION--K-Ar dating

BOUNDARY--Domeland Wilderness and contiguous roadless areas

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 values, if any, that may be present. 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 Domeland Wilderness and Woodpecker and Domeland Addition Roadless Areas in the Sequoia National Forest, Kern and Tulare Counties, Calif. Woodpecker (05206) and Domeland Addition (05207) Roadless Areas were classified as further planning areas by the U.S. Forest Service, January 1979.

INTRODUCTION

The purpose of this map is to provide a geochemical framework for the mineral resource assessment of the Domeland Wilderness and contiguous roadless areas. The map shows the distribution of anomalous elements in spring and surface waters.

The Domeland Wilderness is in the southern block of the Sierra Nevada batholith, California. The South Fork of the Kern River flows through the area. Relief is moderate and averages 3600 ft (1100 m) along the canyon of the Kern River. The highest peak in the area is Sirretta Peak, at 9977 ft (3041 m), and the lowest point is 3000 ft (914 m) along the Kern River in the southeastern part of the study area. Rainfall over the study area averages 17.4 in/yr (44 cm/yr). Chaparral and mixed conifer forest are the main types of vegetation.

GEOLOGY

According to Bergquist and Nitkiewicz (1982), the Cretaceous Isabella Granodiorite of Miller (1931) is a batholith that underlies most of the area and consists of quartz monzonite, granodiorite, and granite. Other important rock types include: Tertiary basalt, andesite, and tuff which overlie the older units; Jurassic Sacatar Quartz Diorite of Miller and Webb (1940) and mixed Isabella Granodiorite and Sacatar Quartz Diorite; and Paleozoic Kernville Series of Miller (1931). The mixed Isabella Granodiorite and Sacatar Quartz Diorite is probably an earlier phase of the batholith, which has engulfed Sacatar Quartz Diorite. The Kernville Series consists of biotite schist, quartzite, calc-silicate, marble, and hornfels and occurs as roof pendants to the batholith.

COLLECTION AND ANALYTICAL METHODS

Water samples were collected from 8 springs and 70 small streams in the study area. Samples were collected using acid-rinsed polyethylene bottles. At each sample site, a 2-oz (60-mL) sample was collected and filtered through a 0.45-µm membrane filter and acidified with reagent-grade concentrated nitric acid to pH <2. An untreated 16-oz (500-mL) sample was also collected. Temperature and pH were measured at each sample site. Sulfate and fluoride were determined using the untreated sample. Zinc, copper, molybdenum, arsenic, and uranium were determined using the 0.45-µm filtered and acidified sample. The analytical results and techniques used for the analysis of each species are shown in McHugh and others (1981).

MAP PREPARATION

Water samples represent the chemistry of the basin above the sample site. Therefore, on the map, each basin is outlined above the sample site. Stream samples are represented by a dot and spring samples are represented by a dot within a circle. As, Cu, Mo, Zn, U, SO_4, and pH were selected for analyses and geochemical mapping because they are often associated with mineralization. The data were plotted on histograms, and thresholds were subjectively determined for each element, depending on the range of concentrations. If the element was above the threshold, it was considered anomalous. The anomalous values were divided into two or three classes, depending on the total number of anomalous values. The symbol of the element above its threshold and the anomalous value are shown for the sample site either within the represented basin for a stream sample or near the site for a spring sample. The size of the symbol for the element corresponds to the class of the anomalous value and is shown on the histograms.

DISCUSSION OF THE ANOMALIES

The most significant anomalies occur in the southern part of the study area and along the South Fork of the Kern River. Both areas are underlain by Isabella Granodiorite, which is mainly quartz monzonite. Other anomalies occur throughout the study area and are probably related to small contact-type and(or) hydrothermal vein-type mineralization often found near roof pendants.

Southern anomaly

The anomaly occurs along the southern boundary of the study area and consists of several spring sites. Several of the springs are south of the study area but drain areas north, which are within the study area. The anomaly includes sample sites 29, 30, 208, 215, and 216 and consists mainly of anomalous concentrations of As, F, Mo, SO_4, and Zn. The area is underlain by Cretaceous Isabella Granodiorite, which is mostly quartz monzonite. The anomalous values of Ag, Mo, Pb, and Sn in the nonmagnetic fraction (Miller and others, 1985a) and of Ag, Ba, Mo, Pb, Sn, and Th in the magnetic fraction of heavy-mineral concentrates (Miller and others, 1985b) also support the existence of the anomaly. These geochemical suites of elements are probably associated with highly differentiated silica-rich rocks with possible porphyry-molybdenum mineralization.

South Fork of the Kern River anomaly

The anomaly occurs along the South Fork of the Kern River in the southeastern part of the study area and includes sample sites 52, 63, 64, 131, 248, and 249, which have anomalous concentrations of F, Mo, SO_4, and U. The area is underlain by Cretaceous Isabella Granodiorite. Anomalous concentrations of U in stream sediments (Miller and others, 1985a) also support the existence of the anomaly. These geochemical suites of elements are probably associated with highly differentiated silica-rich rocks containing uraninite-bearing veins.

Eastern Margin anomaly

The anomaly occurs along the eastern margin of the study area and may merge with the South Fork of the Kern River anomaly. The anomaly includes sample sites 61, 90, 92, 97, and 245, and consists of anomalous concentrations of As, Cu, F, Mo, SO_4, U, and Zn. The area is underlain by Cretaceous Isabella Granodiorite, Jurassic Sacatar Quartz Diorite, mixed Isabella Granodiorite and Sacatar Quartz Diorite, and Paleozoic Kernville Series. Anomalous concentrations of Ba, Cu, Mo, Pb, and W in the magnetic fraction of heavy-mineral concentrates (Miller and others, 1985b) also support the existence of the anomaly. These geochemical suites of elements are probably associated with contact-type and(or) vein-type mineralization.

Northern anomaly

The anomaly occurs in the northeastern part of the study area and includes sample sites 100, 101, 103, and 244, which have anomalous concentrations of Cu, F, Mo, and SO_4. The area is underlain by Jurassic Sacatar Quartz Diorite and mixed Isabella Granodiorite and Sacatar Quartz Diorite. Anomalous concentrations of Mo, Pb, Sn, and W in the nonmagnetic fraction of heavy-mineral concentrates (Miller and others, 1985a) also support the existence of the anomaly. These geochemical suites of elements are probably associated with contact-type and possibly hydrothermal vein-type mineralization.

Lunch Meadow anomaly

The anomaly occurs around Lunch Meadow in the northern part of the study area and includes sample sites 111, 115, and 117, which have anomalous concentrations of Mo, Cu, and SO_4. The area is underlain by Cretaceous Isabella Granodiorite and Paleozoic Kernville Series. Anomalous concentrations of Pb and Zn in the nonmagnetic fraction of heavy-mineral concentrates (Miller and others, 1985a) also support the existence of the anomaly. These geochemical suites of elements are probably associated with contact-type and possibly vein-type mineralization.

Northeastern anomaly

The anomaly occurs in the northeastern part of the study area and includes sample site 94, which has anomalous concentrations of Cu, Mo, Zn, and SO_4. The area is underlain by mixed Isabella Granodiorite and Sacatar Quartz Diorite and Paleozoic Kernville Series. Anomalous concentrations of Mo, Pb, Sn, and W in the nonmagnetic fraction of heavy-mineral concentrates (Miller and others, 1985a) of an adjacent drainage also support the existence of the anomaly. These geochemical suites of elements are probably associated with contact-type mineralization.

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Bergquist, J. R., and Nitkiewicz, A. M., 1982, Geologic map of the Domeland Wilderness and contiguous roadless areas, Kern and Tulare Counties, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1395-A, scale 1:48,000.

McHugh, J. B., Ficklin, W. H., and Miller, W. R., 1981, Analytical results of 78 water samples from Domeland Wilderness and adjacent RARE II study area, California: U.S. Geological Survey Open-File Report 81-730.

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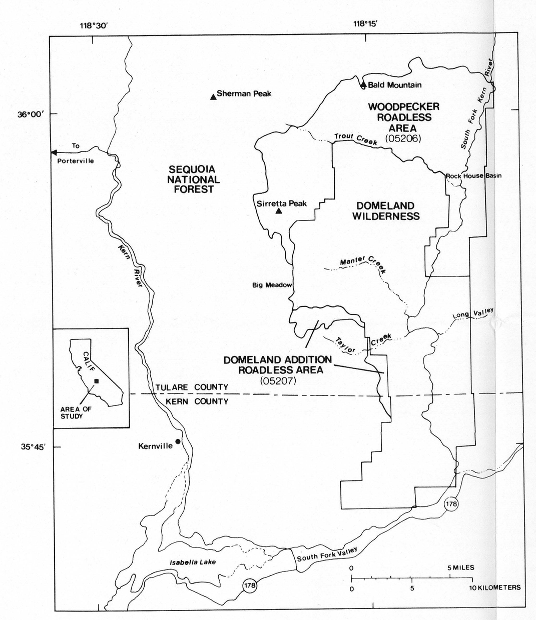
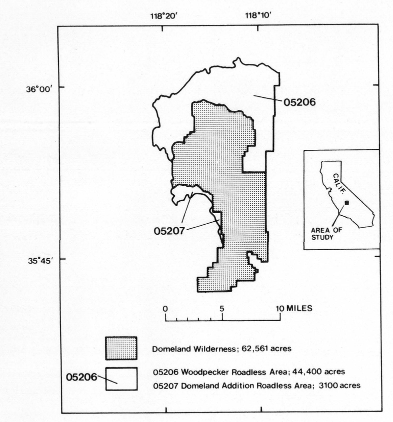
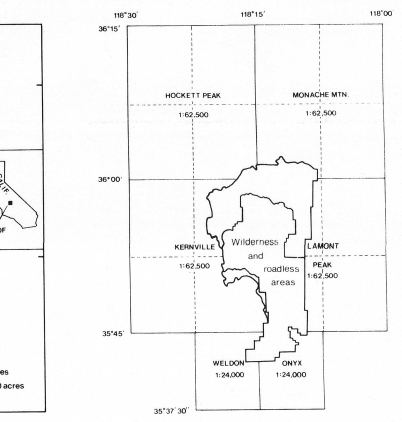
1985b, Distribution of anomalous trace elements in the magnetic fraction of heavy-mineral concentrates, Domeland Wilderness and contiguous roadless areas, Kern and Tulare Counties, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1395-D, scale 1:48,000.



INDEX MAP SHOWING LOCATION OF THE DOMELAND WILDERNESS AND THE WOODPECKER AND DOMELAND ROADLESS AREAS



INDEX MAP SHOWING WILDERNESS AND ROADLESS AREAS



INDEX MAP SHOWING 7.5' AND 15' QUADRANGLES

SCALE 1:48 000

1 ½ 0 1 2 3 MILES

1 .5 0 1 2 3 KILOMETERS

MAP SHOWING DISTRIBUTION OF ANOMALOUS CONCENTRATIONS OF ELEMENTS IN WATER, DOMELAND WILDERNESS AND CONTIGUOUS ROADLESS AREAS, KERN AND TULARE COUNTIES, CALIFORNIA

By

William R. Miller and John B. McHugh

1985

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