DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1185-B
SHEET 1 OF 3

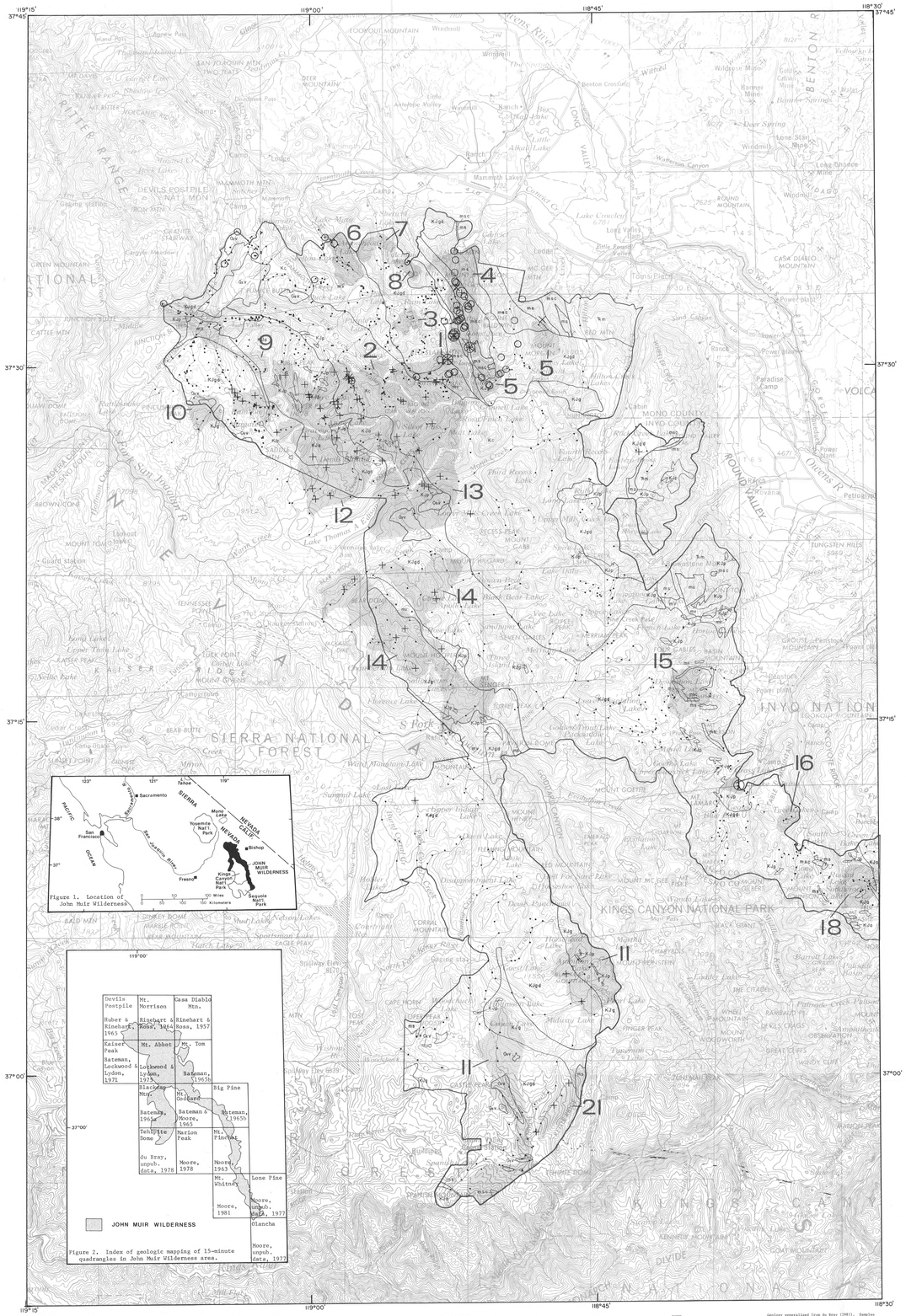

Figure 1. Location of John Muir Wilderness.

Figure 2. Index of geologic mapping of 15-minute quadrangles in John Muir Wilderness area.

Base from U.S. Geological Survey, 1:250,000
Fresno, 1962; Mariposa, 1957

APPROXIMATE MEAN DECLINATION, 1980

SCALE 1:125 000

0 1 2 3 4 5 6 7 8 9 10 MILES
0 1 2 3 4 5 6 7 8 9 10 KILOMETERS

CONTOUR INTERVAL 200 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Geology generalized from du Bray (1981). Samples collected by J.F. Lockwood, P.C. Bateman, and J.G. Sullivan, 1969; R.K. Hilbert, B. Brosh, and W.E. Teeval, 1975; R.K. Hoeger, 1975-76; J.G. Moore, 1976-77; E.A. du Bray, 1976-78; E.N. McKee, D.A. Dellinger, and F. Valverton, 1978.

AREA OF MAP

LEAD AND ZINC

NORTH HALF

MAPS AND INTERPRETATION OF GEOCHEMICAL ANOMALIES IN THE JOHN MUIR WILDERNESS, FRESNO, INYO, MADERA, AND MONO COUNTIES, CALIFORNIA

By
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EXPLANATION

Element	Analytical method	Class interval (ppm)	Symbol
LEAD AND ZINC			
Lead	Semiquant. spec.	38 – 83	+
	do.	83 – 830	+
Zinc	Semiquant spec.	260 – 360	×
	do.	360 – 830	×
	Atomic absorption	92 – 200	○
	do.	200 – 430	○
GOLD, SILVER, AND ARSENIC			
Gold	Atomic absorption	0.018 – 0.026	×
	do.	0.038 – 0.083	×
	do.	0.18 – 0.26	×
	Combined fire assay and atomic absorption	0.038 – 0.083	○
	do.	0.12 – 0.18	○
	do.	13 – 18	○
Silver	Semiquant. spec.	0.58 – 0.83	★
	do.	0.83 – 1.8	★
	do.	1.8 – 3.8	★
Arsenic	Colorimetric	8.3 – 18	+
	do.	18 – 26	+

Sample collection site showing no anomalies

Anomalous area and area number – See text on sheet 1 for discussion

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CORRELATION OF MAP UNITS

Qv		CENOZOIC
Ks	CRETACEOUS	MESOZOIC
Kgd	CRETACEOUS OR JURASSIC	MESOZOIC
Kdp	CRETACEOUS OR JURASSIC	MESOZOIC
Tm	TRIASSIC	MESOZOIC
mv		MESOZOIC OR PALEOZOIC
msc		MESOZOIC OR PALEOZOIC
ms		MESOZOIC OR PALEOZOIC

DESCRIPTION OF MAP UNITS

Qv	VOLCANIC ROCKS (CENOZOIC)
Ks	GRANODIORITE OF THE CATHEDRAL PEAK TYPE (CRETACEOUS)
Kgn	ALASKITE (CRETACEOUS OR JURASSIC)
Krg	GRANITE (CRETACEOUS OR JURASSIC)
Kgd	GRANODIORITE (CRETACEOUS OR JURASSIC)
Kdp	MAFIC PLUTONIC ROCK (CRETACEOUS OR JURASSIC)
Tm	QUARTZ MONZONITE (TRIASSIC)
mv	MAFIC AND FELSIC METAVOLCANIC ROCKS (MESOZOIC OR PALEOZOIC)
msc	CALCAREOUS METASEDIMENTARY ROCKS (MESOZOIC OR PALEOZOIC)
ms	METACEOUS AND OTHER METASEDIMENTARY ROCKS (MESOZOIC OR PALEOZOIC)

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 John Muir Wilderness in the Inyo and Sierra National Forests, Fresno, Inyo, Madera, and Mono Counties, California. The John Muir Wilderness was established by Public Law 88-577, September 3, 1964.

INTRODUCTION

A geochemical survey of the John Muir Wilderness was conducted by the U.S. Geological Survey between 1969 and 1978. The 755-mi² (1,956-km²) wilderness is located in the central Sierra Nevada, Calif. (fig. 1). Rock samples were collected at 1,633 sites (fig. 2) in the wilderness and immediately adjacent areas. Analytical data for these samples and a map of sampling sites are presented by du Bray and Dellinger (1980) and Diggles and others (1981). A geologic map of the area was compiled by du Bray (1981). These reports discuss anomalous areas of lead, zinc, gold, silver, arsenic, tungsten, tin, copper, and nickel. These are elements of economic interest which have historically been found in mineral deposits of the Sierra Nevada or other geologically similar areas.

PREVIOUS STUDIES

Detailed geologic mapping of the John Muir Wilderness was nearly complete when this study began in 1975 (fig. 3). Mapping by Rinehart and Ross (1957, 1963, 1964) and Bateman and others (1963, 1965) established the structural geology between Mount Emil and Mount Whitney. Tungsten mineralization in the Hilton district, adjacent to the wilderness, was described by Bateman (1965b); gold, silver, and tungsten mineralization in the Mount Morrison quadrangle by Bateman and Moore (1965); and tungsten mineralization in Madera, Fresno, and Tulare Counties by Kesselmayr (1953). Lockwood and others (1972) conducted a mineral resource evaluation of the Kaiser Peak and Casa Diablo Hot Springs Geothermal Project area, which coincides with part of the northeastern lobe of the wilderness.

SAMPLING

Stream-sediment sampling in the John Muir Wilderness was carried out between 1969 and 1976. In 1969, Lockwood and others (1972) conducted a geochemical survey of the Casa Diablo Hot Springs Geothermal Project area, described above. Further sampling was done by P. C. Bateman, R. Brosh, W.E. Teeval, R. K. Hoeger, J. G. Moore, R. A. du Bray, T. R. Wallace, and F. Valverton between 1975 and 1978.

Stream-sediment samples were collected using standard procedures as follows: About 750 g of sediment was taken from the most recently active channel. At sites where no sediment earlier than 1969 was present, a sample