DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-563

SILVER

● 10 or greater • 5 – 9 ○ 1.5 – 4

Silver content in parts per million

DISCUSSION

Detailed geologic mapping and geochemical rock sampling of the Brooks Spring quadrangle, during the 1973 summer field season, completed fieldwork on the four 7 1/2-minute quadrangles that make up the Edna Mountain 15-minute quadrangle. The objectives of the project are to map the geology of this structurally complex area and to determine the regional distribution and abundance of metals in rocks and the factors that control distribution and abundance of those metals. The ultimate objective is the identification of broad target areas or guidelines for mineral exploration in this area may be identified. The Brooks Spring quadrangle comprises the alluvium- and gravel-covered Pumpernickel Valley and the northern one-half of Buffalo Mountain. All of the sedimentary rocks in Buffalo Mountain are in the upper plate of the Golconda thrust and are assigned to the Pumpernickel and Havallah Formations. Felsic dikes and sills and small quartz monzonite plutons intrude the sedimentary section.

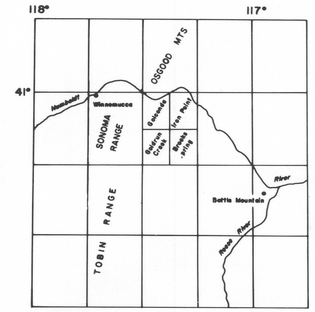
This series of maps shows the distribution and abundance of copper, lead, bismuth, molybdenum, silver, gold, mercury, arsenic, antimony, and tungsten in rocks of the Brooks Spring quadrangle as related to geologic and aeromagnetic data. Similar maps have been published for the Iron Point, Golconda, and Goldrun Creek quadrangles to the north, northwest, and west (Erickson and Marsh, 1971 and, 1972, 1973a–c). Most samples are from shear or fault zones, fractures, jasperoid, breccia reefs, veins, and altered zones. Such selective rock sampling enhances the probability of detection of zoning patterns and leakage halos that help outline concealed target areas.

Most of the geochemically anomalous areas are on the northeast flank of Buffalo Mountain and are spatially related to an aeromagnetic "high." Highest metal contents occur in narrow silicified shear zones and veins that strike N. 10°-20° W. across the regional northeast strike of bedding; wallrocks commonly are barren.

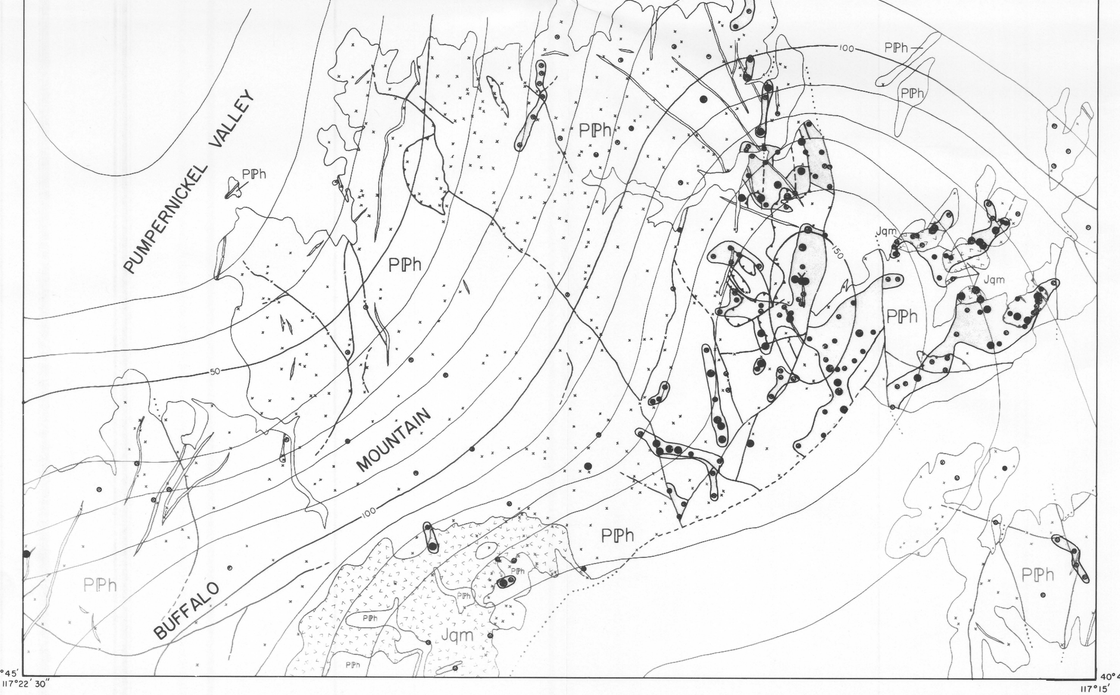
The distribution and abundance of the metals are crudely zoned and structurally controlled. The highest copper values are found in shears and veins within quartz monzonite and in limy quartzite adjacent to quartz monzonite on the east flank of the magnetic "high." The quartz monzonite itself rarely contains as much as 1,000 p/m (parts per million) copper. Anomalous amounts of molybdenum, tungsten, and bismuth are associated with the copper anomaly and with the narrow belt of lead and silver mineralization that extends from the center of the magnetic high to the north. Gold contents in excess of 1 p/m are clustered south of the magnetic high, but the gold apparently occurs only in narrow, northwest-striking silicified shear zones and quartz veins.

Anomalous amounts of mercury and arsenic are widespread; however, they are most abundant in association with the principal gold anomalies and lead-silver anomalies. The distribution of anomalous amounts of antimony, though more restricted than mercury and arsenic, is also associated with the principal gold and lead-silver anomalies.

All samples were prepared and analyzed in truck-mounted laboratories at Winnemucca, Nev. Copper, lead, zinc, silver, gold, and mercury were determined by atomic absorption methods by R. M. O'Leary and M. S. Erickson. Arsenic, antimony, molybdenum, tungsten, and bismuth were determined by semiquantitative spectrographic methods by D. J. Grimes and W. D. Crim and are reported in the series 1, 0.7, 0.5, 0.3, 0.2, 0.15, 0.1, etc.



Map showing location of Brooks Spring Quadrangle



40°45′ 117°22′30″ — 40°45′ 117°15′

GOLD

● 1 or greater • 0.25 – 0.9 ○ 0.1 – 0.2

Gold content in parts per million

EXPLANATION

- Jqm — Jurassic quartz monzonite
- Jurassic dike rocks
- PPh — Permian and Pennsylvanian Havallah sequence. Includes Havallah Formation, chiefly interbedded quartzite and limestone and interbedded chert and limestone, and Pumpernickel Formation, chiefly chert, shale, and greenstone
- Depositional contact
- Fault
- Thrust fault
- Sample locality
- Clusters of sample localities that contain anomalous amounts of metal
- 50 — Magnetic contours showing total intensity magnetic field of the earth in gammas relative to arbitrary datum. Magnetic map prepared by D. R. Mabey from aeromagnetic map of Winnemucca area, northwestern Nevada (U.S. Geological Survey, 1970). Main magnetic field of the earth from Fabiano and Peddie (1969) has been removed

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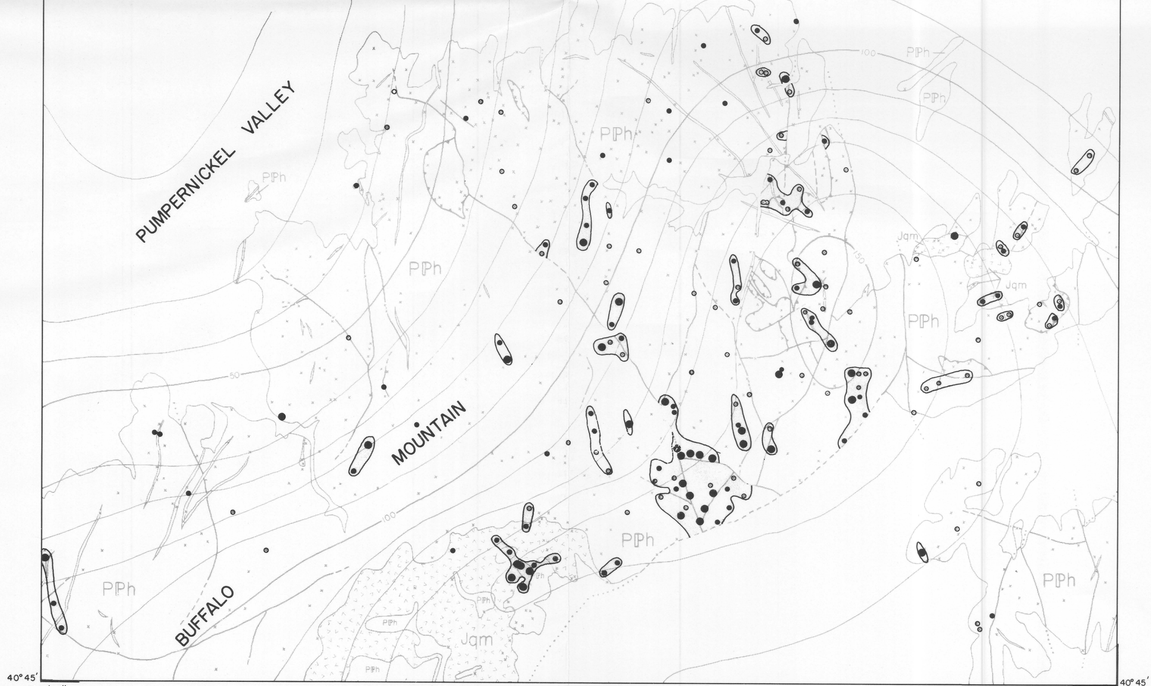

40°45′ 117°22′30″ — 40°45′ 117°15′

GEOCHEMICAL, AEROMAGNETIC, AND GENERALIZED GEOLOGIC MAPS SHOWING DISTRIBUTION AND ABUNDANCE OF GOLD AND SILVER, BROOKS SPRING QUADRANGLE, HUMBOLDT COUNTY, NEVADA

BY R. L. ERICKSON AND S. P. MARSH, 1974

For sale by U.S. Geological Survey, price 50 cents

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