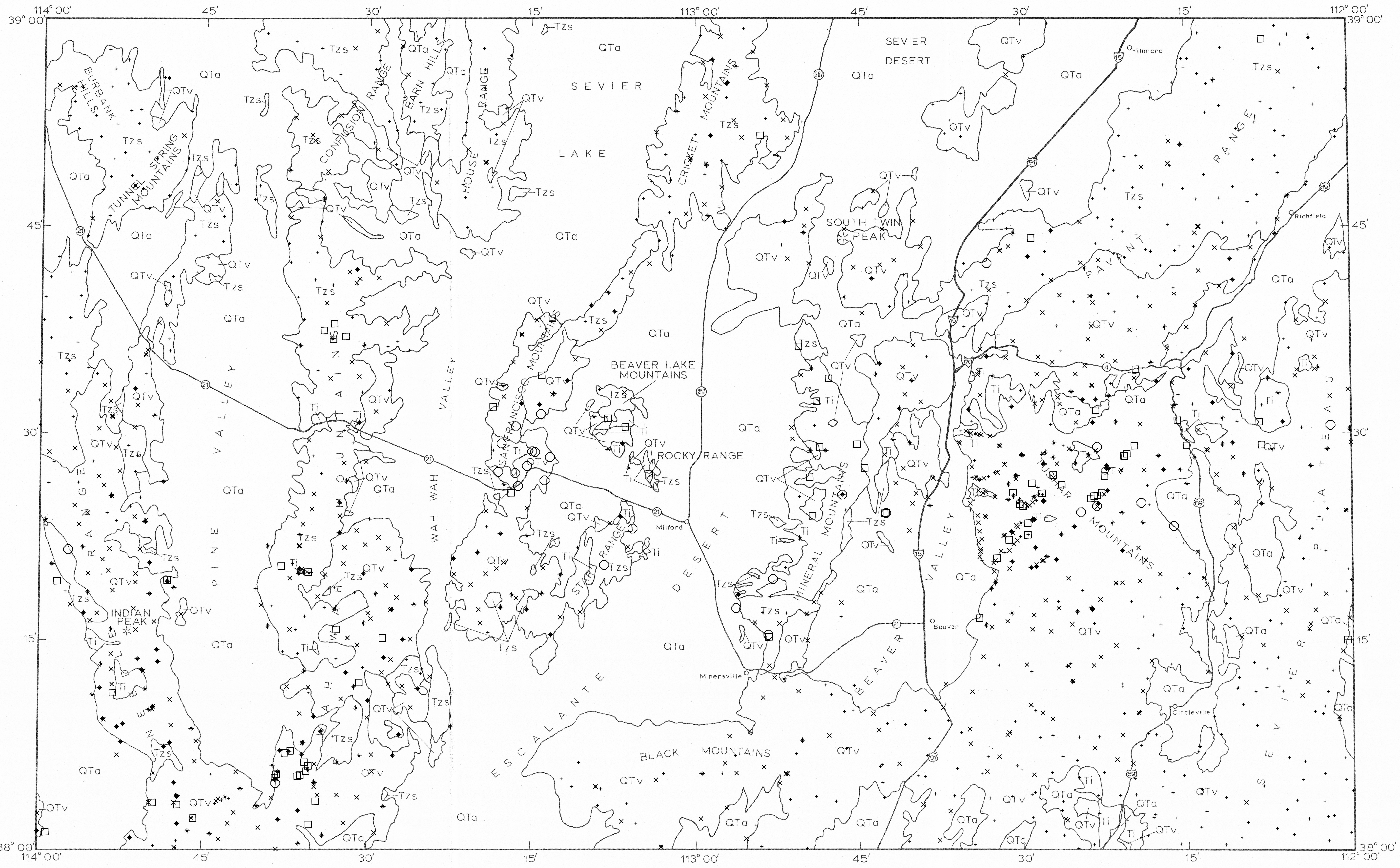

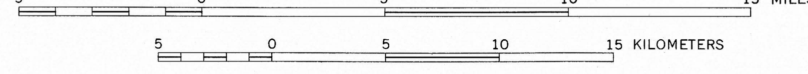

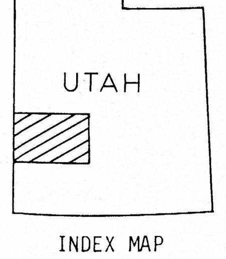

INDEX MAP

Geology generalized from Steven and others (1978)

Manuscript approved for publication, August 6, 1990

MAP SHOWING DISTRIBUTION OF LEAD IN STREAM-SEDIMENT SAMPLES, RICHFIELD 1° X 2° QUADRANGLE, UTAH

By
William R. Miller, Jerry M. Motooka, and John B. McHugh
1990

INTRODUCTION

This map of the Richfield 1° x 2° quadrangle shows the regional distribution of lead in the less-than-0.180-mm (minus-80-mesh) fraction of stream-sediment samples. It is part of a folio of maps of the Richfield 1° x 2° quadrangle, Utah, prepared under the Conterminous United States Mineral Assessment Program. Other published geochemical maps in this folio are listed in the references (this publication).

The Richfield quadrangle is located in west-central Utah and includes the eastern part of the Pioche-Marysvale igneous and mineral belt, which extends from the vicinity of Pioche in southeastern Nevada, east-northeastward for 155 miles into central Utah. The western two-thirds of the Richfield quadrangle is in part of Basin and Range province, whereas the eastern third is part of the High Plateaus of Utah, a subprovince of the Colorado Plateau.

Bedrock in the northern part of the Richfield quadrangle consists predominantly of Late Proterozoic and Paleozoic sedimentary strata that were thrust eastward during the Sevier orogeny in Cretaceous time onto an autochthon of Mesozoic sedimentary rocks located in the eastern part of the quadrangle. The southern part of the quadrangle is largely underlain by Oligocene and younger volcanic rocks and related intrusions. Extensional tectonism in late Cenozoic time broke the bedrock terrain into a series of north-trending fault blocks; the uplifted mountain areas were eroded to various degrees and the resulting debris was deposited in adjacent basins. Most mineral deposits in the Pioche-Marysvale mineral belt were formed as a result of igneous activity in middle and late Cenozoic time. A more complete description of the geology and a mineral-resource appraisal for the Richfield quadrangle appears in Steven and Morris (1984 and 1987).

The regional sampling program was designed to define broad geochemical patterns and trends that can be utilized along with geological and geophysical data to assess the mineral-resource potential for this quadrangle. Reconnaissance geochemical surveys are valuable tools in mineral exploration, especially when used in conjunction with data obtained from other earth science disciplines. Identifying specific exploration targets, however, generally involves additional, more detailed investigations.

SAMPLE COLLECTION AND PREPARATION

Stream-sediment samples were collected at 1,445 sites throughout the Richfield quadrangle. The sample sites are located along small, normally unbranched or first-order stream drainages, which range from 1 to 2 miles in length and whose water courses are 2 to 12 feet wide. Sample density within the bedrock areas is one sample per 3 square miles. Intermountain basins containing sediments were not sampled. Each sample is a composite of material collected at four or five sites (usually within 30 feet of each other) across and along the active stream channel. About 1 to 2 pounds of bulk sediments were collected at each site. Geochemical sampling was conducted by G.K. Lee, W.R. Miller, J.B. McHugh, R.E. Tucker, J.D. Tucker, and J.F. Guadagnoli.

The less-than-0.180-mm fraction of stream sediments was prepared by drying the bulk sediment and sieving it to less than 0.180 mm. This fraction was then pulverized in a vertical ceramic-plate mill to a powder (less than 0.105 mm) and analyzed.

ANALYTICAL PROCEDURES

For this study, lead concentration was determined by using a 6-step dc-arc optical-emission spectrographic method. The results of the analyses appear in Motooka and Miller (1983). All values are reported within a framework made up of six steps per order of magnitude (1, 0.7, 0.5, 0.3, 0.2, 0.15, or multiples of 10 of these numbers) and represent approximate geometric midpoints of the concentration ranges. The precision is within one adjoining reporting interval on either side of the reported value 83 percent of the time, and within two adjoining intervals 96 percent of the time (Motooka and Grimes, 1976).

GENERATION OF MAPS

A computer-generated point-plot map for lead in the less-than-0.180-mm fraction of stream sediments was prepared using the computerized mapping programs within the U.S. Geological Survey's STATPAC system (VanTrump and Miesch, 1977). Lead concentrations ranged from less than 10 to 7,000 ppm. Approximately 40 percent of the samples were within the range of background values; the remaining 60 percent are divided into four classifications that classes that range from highly anomalous to weakly anomalous. Each classification is represented by a symbol or size of symbol on the histogram (fig. 1). The least anomalous classification only indicates elevated values above background and does not indicate mineralization. The most anomalous classification represents one percent of the total population followed by less anomalous classifications representing larger percentages of the total population.

REFERENCES

Miller, W.R., and McHugh, J.B., 1990, Map showing the distribution of uranium in stream-sediment samples, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-2138-J, scale 1:250,000.

Miller, W.R., and McHugh, J.B., 1990, Map showing the distribution of thorium in stream-sediment samples, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-2138-H, scale 1:250,000.

Miller, W.R., Motooka, J.M., and McHugh, J.B., 1980, Distribution of molybdenum in heavy-mineral concentrates, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-1246-A, scale 1:500,000.

_______1985, Maps showing distribution of arsenic in heavy-mineral concentrates, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-1246-B, scale 1:500,000.

_______1985, Maps showing distribution of barium in heavy-mineral concentrates, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-1246-C, scale 1:500,000.

_______1985, Maps showing distribution of beryllium in heavy-mineral concentrates and stream sediments, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-1246-D, scale 1:500,000.

_______1985, Maps showing distribution of bismuth in heavy-mineral concentrates, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-1246-E, scale 1:500,000.

_______1985, Maps showing distribution of copper in heavy-mineral concentrates, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-1246-F, scale 1:500,000.

_______1985, Maps showing distribution of lead in heavy-mineral concentrates, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-1246-G, scale 1:500,000.

_______1985, Maps showing distribution of thorium in heavy-mineral concentrates, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-1246-H, scale 1:500,000.

_______1985, Maps showing distribution of tin in heavy-mineral concentrates, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-1246-I, scale 1:500,000.

_______1985, Maps showing distribution of tungsten in heavy-mineral concentrates, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-1246-J, scale 1:500,000.

_______1985, Maps showing distribution of zinc in heavy-mineral concentrates, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-1246-K, scale 1:500,000.

_______1990, Map showing the distributions of cadmium and antimony in the nonmagnetic fraction of heavy-mineral concentrates, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-2137-A, scale 1:250,000.

_______1990, Map showing the distribution of silver in the nonmagnetic fraction of heavy-mineral concentrates, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-2137-B, scale 1:250,000.

______1990, Map showing the distributions of bismuth and cadmium in stream-sediment samples, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-2138-B, scale 1:250,000.

______1990, Map showing the distribution of barium in stream-sediment samples, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-2138-A, scale 1:250,000.

______1990, Map showing the distribution of copper in stream-sediment samples, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-2138-C, scale 1:250,000.

______1990, Map showing the distribution of molybdenum in stream-sediment samples, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-2138-F, scale 1:250,000.

______1990, Map showing the distribution of silver in stream-sediment samples, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-2138-G, scale 1:250,000.

______1990, Map showing the distribution of tin in stream-sediment samples, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-2138-I, scale 1:250,000.

______1990, Map showing the distribution of zinc in stream-sediment samples, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-2138-K, scale 1:250,000.

Motooka, J.M., and Grimes, D.J., 1976, Analytical precision of one-sixth order semiquantitative spectrographic analyses: U.S. Geological Survey Circular 738, 25 p.

Motooka, J.M., and Miller, W.R., 1983, Analyses of the less than 0.180-mm fraction of darainage sediments, Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Open-File Report 83-74, 101 p.

Steven, T.A. and Morris, H.T., 1984, Mineral resource potential of the Richfield 1° x 2° quadrangle, west-central Utah: U.S. Geological Survey Open-File Report 84-521, 5 p.

_______1987, Mineral resource potential of the Richfield 1° x 2° quadrangle, west-central Utah: U.S. Geological Survey Circular 916, 24 p.

Steven, T.A., Rowley, P.D., Hintze, L.F., Best, M.G., Nelson, M.G., and Cunningham, C.G., compilers, 1978, Preliminary geologic map of the Richfield 1° x 2° quadrangle, Utah: U.S. Geological Survey Open-File Report 83-602, 1 sheet, scale 1:250,000.

VanTrump, G., and Miesch, A.T., 1977, The U.S. Geological Survey RASS-STATPAC system for management and statistical reduction of geochemical data: Computers and Geosciences, v. 3, p. 475-488.

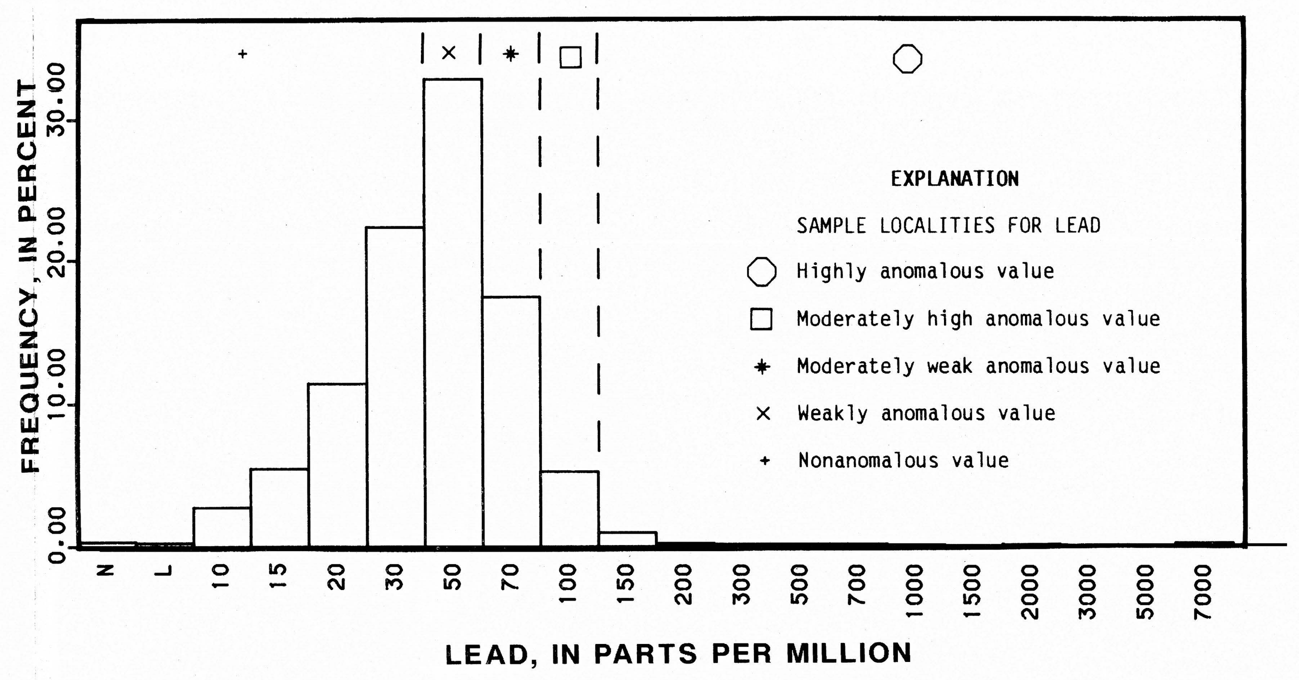

Figure 1.--Histogram showing lead concentrations in stream-sediment samples collected from the Richfield 1° x 2° quadrangle, Utah. Number of samples, 1,445; N, not detected at 10 ppm; L, detected but less than 10 ppm.

LIST OF MAP UNITS

QTa	Surficial deposits, undivided (Quaternary and Tertiary)
QTv	Volcanic rocks, undivided (Quaternary and Tertiary)
Ti	Intrusive igneous rocks, undivided (Tertiary)
Tzs	Sedimentary rocks, undivided (Tertiary to Late Proterozoic)
———	Contact

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1990

For sale by U.S. Geological Survey Map Distribution, Box 25286, Federal Center, Denver, CO 80225