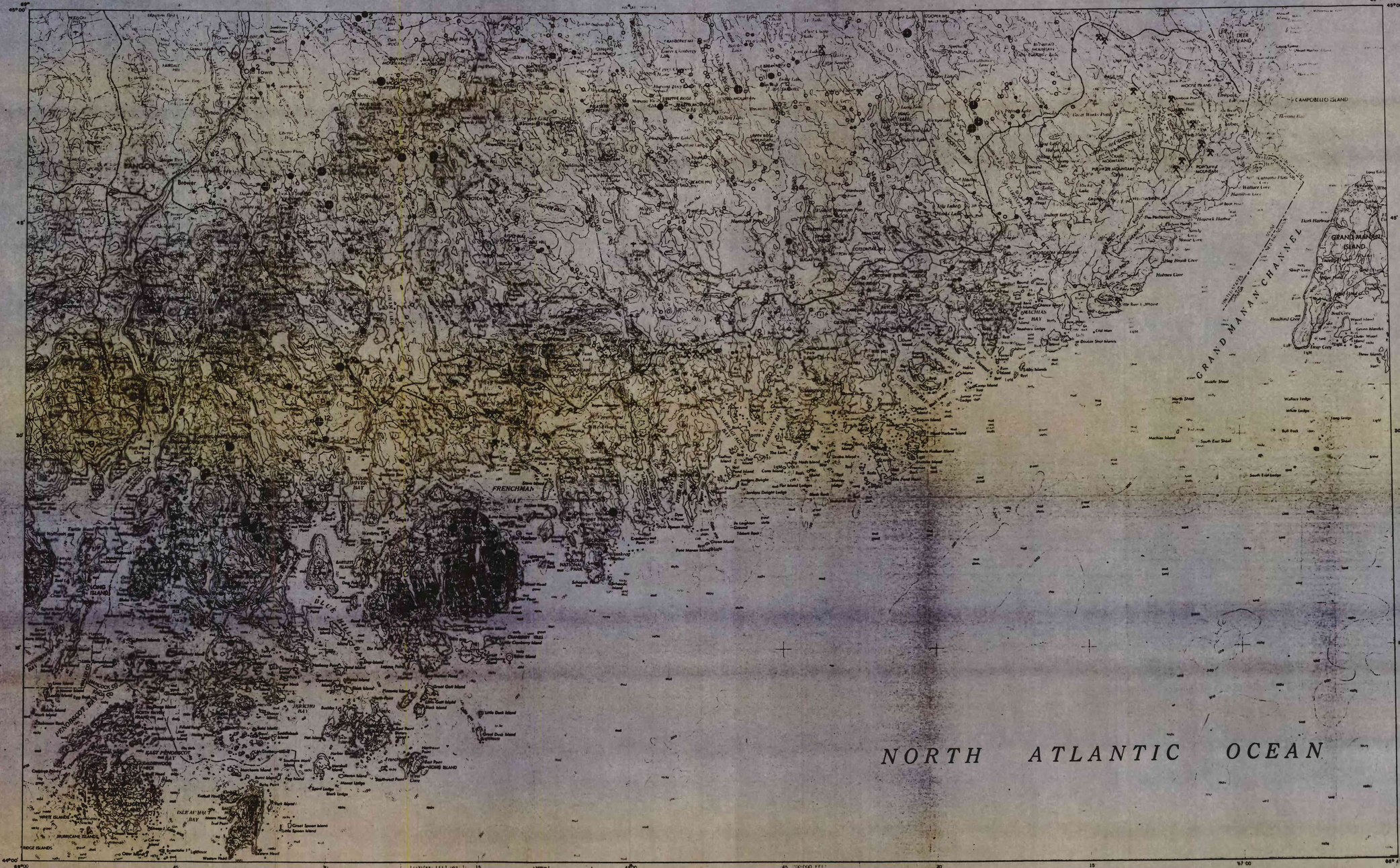
64-152

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

OPEN-FILE REPORT



Base from parts of U.S. Geological Survey
1:250,000 series quadrangles: Bangor and Eastport, 1956

SCALE 1:250 000

5 0 5 10 15 20 25 MILES

5 0 5 10 15 20 25 KILOMETERS

CONTOUR INTERVAL 50 FEET
DATUM IS MEAN SEA LEVEL

Fieldwork by G. H. Van Sickle, W. H. Dennen, J. B. Hite, N. P. Cuppels, G. A. Newton, and W. R. McKay, 1963
Analyses by G. A. Newton and G. H. Van Sickle

APPROXIMATE MEAN DECLINATION, 1964

HEAVY METALS IN STREAM SEDIMENT, SOUTHEASTERN MAINE

By

Gordon H. Van Sickle, William H. Dennen, and Edwin V. Post

1964

EXPLANATION

Location and heavy-metal content of samples of active stream sediment

○ • • • • •

2.5 2.5-5 6-10 11-20 >20

Type and size of dot shows content of citrate-soluble heavy metals, expressed as parts per million as compared with standard samples containing known amounts of zinc.

⊕

Crossed dot indicates sample that contains more than 20 parts per million heavy metals and in which the ratio of heavy metals to manganese is greater than average

•2

Number by dot shows content of cold acid-extractable copper in parts per million where more than 1 part per million

⚒

Metal mine or prospect
True position shown by leader where symbol displaced by geochemical data

DISCUSSION

This map presents the initial results of a geochemical reconnaissance of stream sediment in southeastern Maine. This part of Maine is noted for the number of base-metal prospects it contains, many of which are shown in publications by Rand (1957), Hussey (1958), and Young (1962 and 1963). The data presented on this map are comparable to those presented for west-central Maine by Post and Hite (1963).

Map data are based on the analyses of 1,073 samples of fine-grained sediment collected from the active channels of streams readily accessible by roads, trails, or waterways. All samples were collected during the 1963 field season. An attempt was made to achieve a sample density of one sample per two square miles, but this was frequently not achieved because of variations in the drainage network and poor accessibility in some areas.

The samples were dried, screened through a 250-micron sieve, and the minus-250-micron portions were analyzed for cold citrate-soluble heavy metals (principally undifferentiated copper, lead, zinc, and cobalt) and for cold acid-extractable copper by rapid semiquantitative field methods described by Ward, Lakin, Canney, and others (1963, p. 25-29).

In general, this map shows only raw data; no systematic effort was made to field check the possible significance of apparently anomalous values. However, the locations of deposits of copper, lead, or zinc minerals noted by Rand, Hussey, or Young have been indicated by an appropriate symbol. Few of these deposits are situated where their metal would be introduced into the stream courses sampled during this investigation. Thus, it is difficult to correlate the distribution of known mineral deposits with geochemical anomalies. A few highly anomalous values undoubtedly reflect contamination from mineral exploration activities.

Of more value, perhaps, than the correlation of specific geochemical anomalies with known mineral deposits is the recognition of a concentration of heavy metals and copper anomalies in a belt about 18 miles wide east of the Penobscot River. This belt of anomalies seems to be related to a large mass of porphyritic granite that underlies the hilly country from Bucksport northeast 40 miles to Eagle Mountain.

Many of the heavy-metal anomalies are associated with appreciable concentrations of manganese-iron oxides in the stream sediment. Such material is known to be an efficient scavenger of many metals, especially zinc. The effect of this phenomenon on the interpretation of the data of geochemical drainage surveys is still imperfectly understood. However, an attempt has been made to evaluate the relative significance of heavy-metal anomalies of 20 parts per million or more by determining the manganese content of the sample and indicating by a special symbol on this map those samples with a higher than average ratio of heavy metals to manganese. Although the samples so indicated seem to have greater significance than others, any apparent heavy-metal anomaly should be interpreted cautiously and with full recognition that it may not be related to a mineral deposit, but may only represent a natural enrichment of metal from unmineralized source rocks.

REFERENCES

Hussey, A. M., compiler, and others, 1958, Maine metal mines and prospects: Maine Geol. Survey Minerals Resources Index, No. 3, 53 p.

Post, E. V., and Hite, J. B., 1963, Heavy metals in stream sediment, west-central Maine: U.S. Geol. Survey Mineral Inv. Field Studies Map MF-278.

Rand, J. R., 1957, Mineral resources of Maine, Bangor sheet: Maine Geol. Survey, Mineral Resources Reference Map Ser., Map MRRM-1.

Ward, F. N., Lakin, H. W., Canney, F. C., and others, 1963, Analytical methods used in geochemical exploration by the U.S. Geological Survey: U.S. Geol. Survey Bull. 1152, 100 p.

Young, R. S., 1962, Prospect evaluations, Hancock County, Maine: Maine Geol. Survey Spec. Econ. Studies Ser., No. 2, 113 p.

_____ 1963, Prospect evaluations, Washington County, Maine: Maine Geol. Survey Spec. Econ. Studies Ser., No. 3, 86 p.