# LAKE SEDIMENT GEOCHEMISTRY, NEWFOUNDLAND*

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## Geochemical lake sediment survey, Avalon Peninsula

This survey was carried out between July 15 and August 8, 1975 over two areas on the Avalon Peninsula (see Fig. 1). One area of 2650 $km^2$ covered the Harbour Main Group and the second area of 2150 $km^2$ included the area underlain by the Bull Arm Formation.

Samples of sediment were collected from lake centres at an average density of 1 sample per 4 $km^2$ in each of the two areas. Duplicate samples were collected at every twentieth sample site. The predominantly organic-rich sediment was oven-dried and sieved to <177μ (minus 80 mesh). The samples have been analysed for Cu, Pb, Zn, Co, Ni, Ag, Mo, Mn and Fe by atomic absorption spectrophotometry, and an estimate of their relative organic carbon contents have been obtained from the weight loss on ignition of the samples. In addition, the samples are being analysed for As (colorimetrically) and F (by ion-selective electrode). When the analytical data are complete they will be statistically analysed to aid in their interpretation with respect to mineral potential.

The effectiveness of lake-centre sediment as a sample medium in regional geochemical surveys is becoming increasingly accepted as the results of more studies are published. On the Avalon Peninsula lake sediment is a particurlarly attractive sample medium, for, in addition to the abundance of lakes, and the ease and rapidity of sample collection, stream systems are very immature and poorly developed, so stream sediment offers a poor choice of sample medium for regional surveys in this area.

The Cu, Pb, Zn, Mo, Co, Ag, Ni, Mn, Fe and L.O.I. data have been released on open file (Davenport *et al.*, 1975a). This release did not include the results of any data processing, however, and a second release of data including the results of a statistical analysis and, where appropriate, data processing will be made.

## Distributions of Cu, Co, Ni, Ag, Mo and U in Lake Sediments on The Great Northern Peninsula

In 1973, a regional lake sediment sampling programme was carried out over the Ordovician carbonate rocks of western Newfoundland from Cooks Harbour to the Port au Port Peninsula (Davenport *et al.*, 1974, 1975b). The survey was carried out to assess the zinc and lead potential of the

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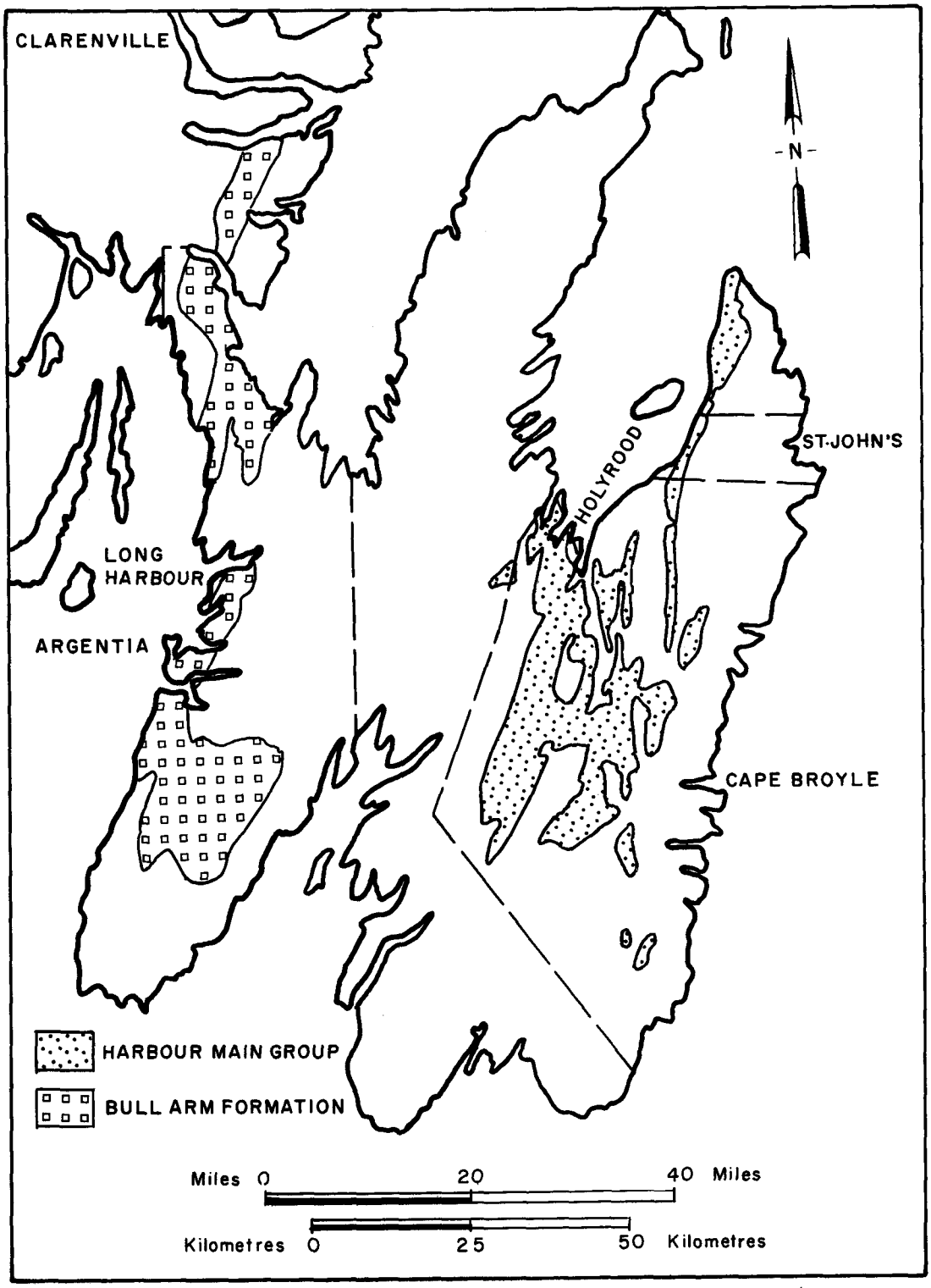


Fig. 1 - Areas covered by lake sediment sampling, Avalon Peninsula

belt, and for this reason Zn and Pb were the only ore metals determined on the samples. On the Great Northern Peninsula rocks of Cambrian and Precambrian (Grenvillian) age underlie part of the catchment areas of the lakes sampled close to the Grenvillian "core" of the peninsula. The airborne gamma-ray traverse flown across the peninsula from Daniel's Harbour to Sops Arm showed anomalous uranium values in an intrusive granite of Grenville age north of Portland Creek Inner Pond (Geological Survey of Canada, 1975). In addition a Pb-Zn-Cu-F showing is present in upper Table Head Formation rocks on an island near Quirpon, at the extreme northeastern tip of the peninsula (R.K. Stevens, pers. comm.). The showing is a vein in a window of the Table Head Formation beneath the Hare Bay Klippe. This showing suggests the possiblity of other similar mineralization occurring elsewhere in the Table Head Formation, especially close to its contact with the Klippe rocks in the Hare Bay-Canada Bay area.

To evaluate the mineral potential of the Great Northern Peninsula more fully, about 500 samples were selected from the Hare Bay-Canada Bay area and around the margin of the Grenville inlier for Cu, Ag, Co, Ni and Mo analysis by atomic absorption spectophotometry. It is further planned to determine fluorine on these samples. In addition about 400 samples from around the margin of the Grenville inlier have been analysed for uranium by delayed neutron activation. The location of the areas from which the samples were collected is shown in Figure 2.

The Cu, Co, Ni, Ag, Mo and U data have been placed on open file (Davenport and Butler, 1976). Of particular interest is the confirmation of the uranium anomaly from the airborne gamma-ray traverse (Geological Survey of Canada, 1975) by the three sample sites where the lake sediment is highly anomalous in U. Another interesting feature is the correspondence between anomalous Cu values and anomalous Zn and Pb values in the west and south sides of Canada Bay. If these samples are found to be anomalous in F, then this will strongly suggest that the Zn-Pb-Cu-F type of mineralization exemplified by the showing near Quirpon is widespread around the base of the Hare Bay Klippe.

## Distributions of As, Mo and F in Lake Sediments, Burlington Peninsula

The lake sediment samples collected over the Burlington Peninsula (Fig. 3) in 1974 were analysed for the ore metals Cu, Pb, Zn, Co, Ni, and Ag (Davenport and Butler, 1975). To evaluate the mineral potential of the area more fully, the samples have now been analysed for Mo, As and F. Although no occurrences of these elements have been reported, the geological setting of the area suggests that mineralization containing these elements may occur.

The Mo, As and F data require statistical analysis, and will be released on open file.

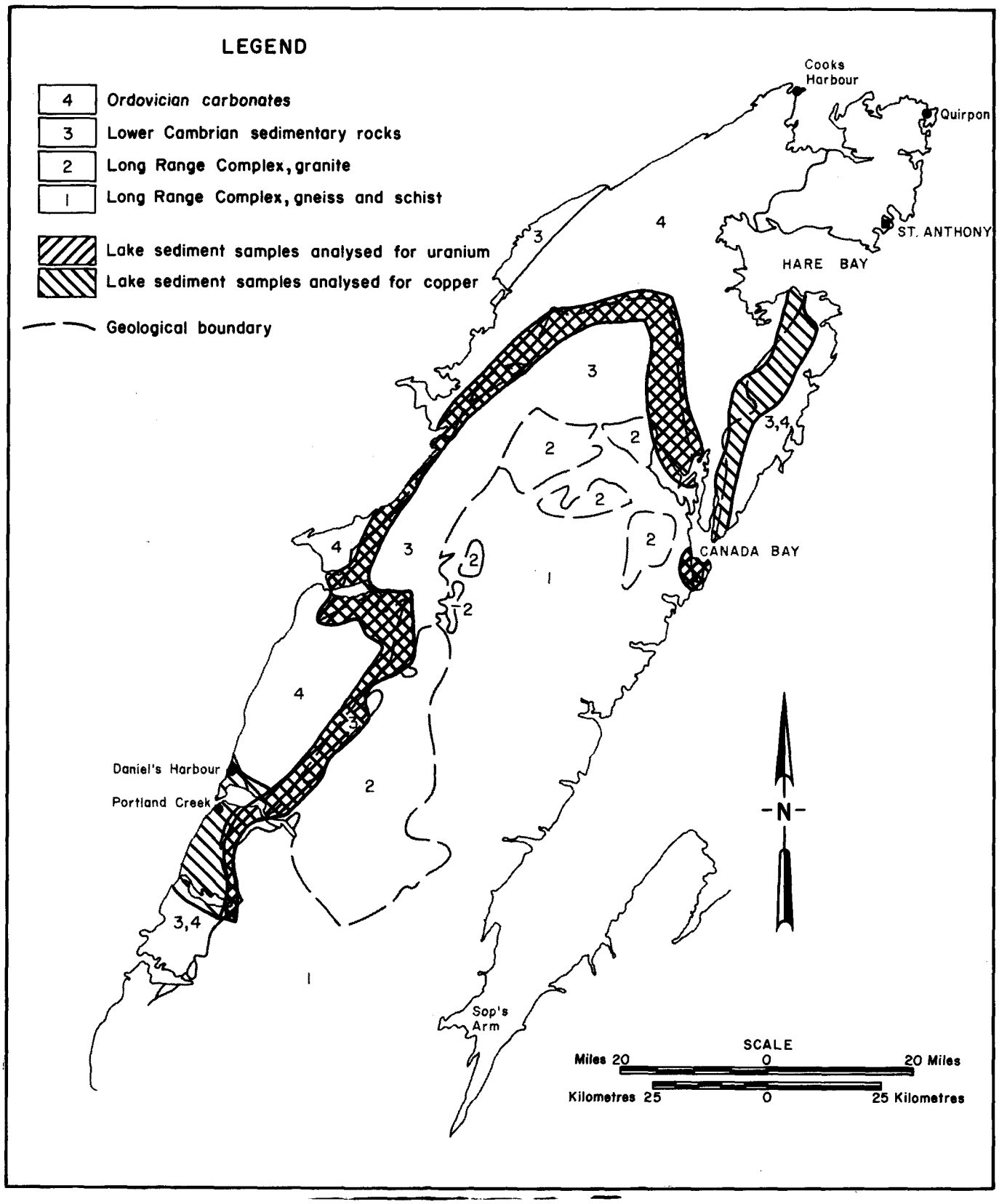


Fig. 2 - Location map showing the areas from which lake sediment samples were analysed for (a) Cu, Co, Ni, Ag and Mo and (b) U, Great Northern Peninsula, Newfoundland

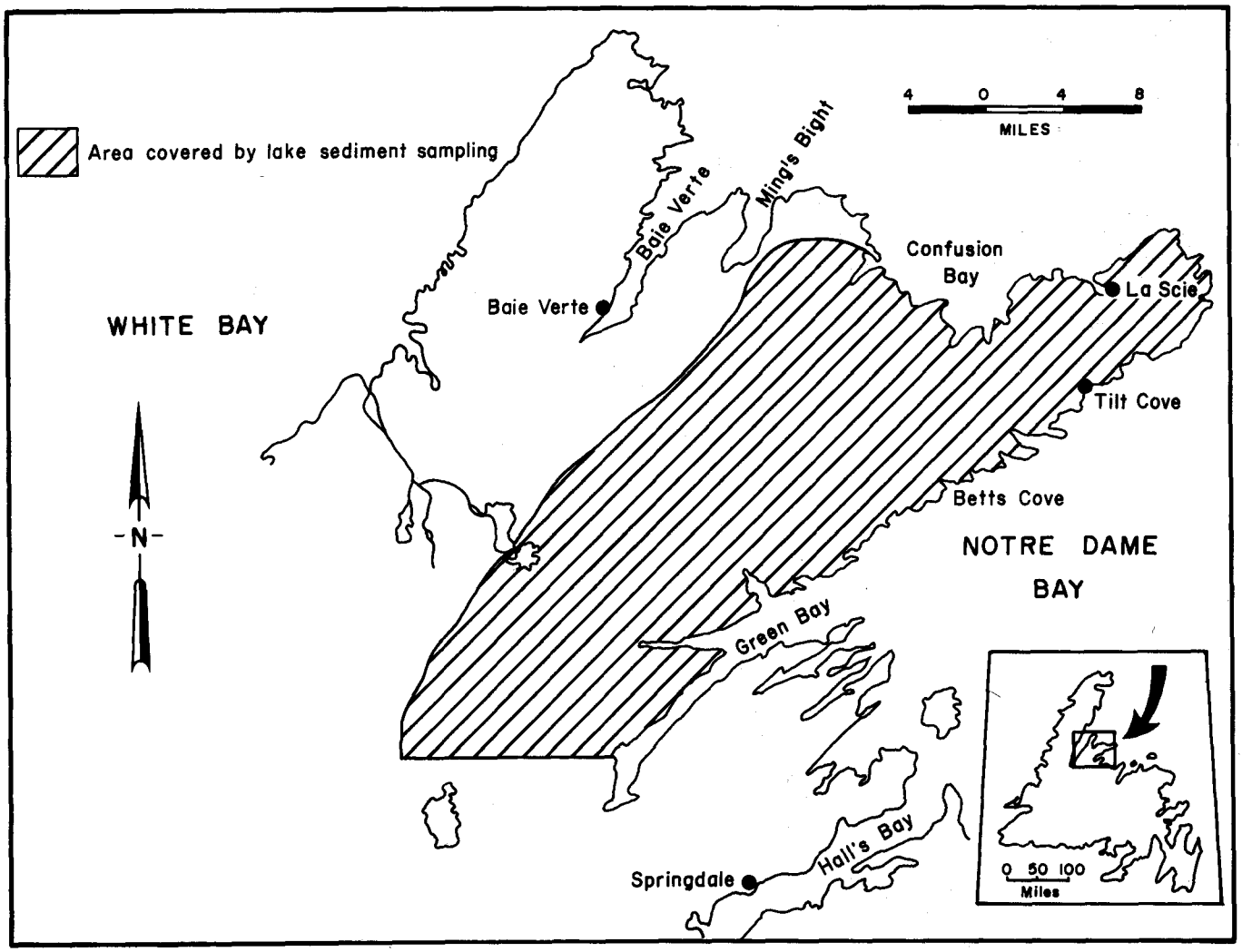


Fig. 3 - Area covered by lake sediment sampling, Burlington Peninsula

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