

**A role for exploration geology in environmental monitoring  
In urban developments and wetlands in Newfoundland and Labrador**

Elliott T. Burden<sup>1</sup> and Eleanora I. Robbins<sup>2</sup>

<sup>1</sup>*Department of Earth Sciences, Memorial University of Newfoundland, St. John's, Newfoundland A1B 3X5, Canada*

<sup>2</sup>*United States Geological Survey, Reston, Virginia 22092, U.S.A.*

Three projects utilizing techniques for Pb, As and U exploration are summarized to show how geologists can help with urban development strategies and to help preserve wetlands. (1) In Newfoundland, exploration geochemistry has played a significant role in the search for ore deposits. There now exists a data set of 33 element analyses examined from 16,300 sites. In rural areas, Pb anomalies in sediment and water are thought to reflect the natural environment; nevertheless, some ponds have significantly more than 20 ppm Pb in the sediment. As towns and cities in the province develop new water and sewer systems, planners must take into account the role of bedrock geology in modifying lake sediment chemistry and the flux of naturally occurring Pb into city reservoirs and water systems. (2) Pb and As can also be incorporated into sediments from anthropogenic sources. In places such as northern Ontario, where "smokestack industry" has been active for nearly a century, exploration geologists look for chemical anomalies that are not only high but

are also persistent at depth in lake sediments. Viewed from another perspective, anomalies present in shallow sediments might be very useful indicators of the areal extent and intensity of pollutants from point sources. (3) Naturally occurring U has the potential for creating environmental problems. U is a very mobile element having a strong affinity for organic material. Commonly, it occurs as a dispersed trace metal in granitic rocks such as those in Newfoundland and Labrador. Weathering releases U that can next become concentrated in reduced sediments of wetlands and lakes. For example, in places along the Rocky Mountains of Nevada and Colorado, any proposal to drain wetlands containing stable, reduced U may cause extensive pollution to municipal water systems as U is oxidized and released. Given that the igneous terranes of Newfoundland and Labrador contain radioactive granite bodies, there is no doubt that data provided by exploration geologists will be useful for protecting the urban environment.