

National Geochemical Reconnaissance Mercury in Lake and Stream Sediments

Just as maps are prepared to show the height of the land surface, or percentage of wetlands, maps can be prepared to describe the geochemistry of Canada's surface. This regional geochemical map is based on data for freshwater lake and stream sediments. Lake and stream sediments have been used to map large parts of Canada because they are inferred to represent a 'geochemical average' of catchment areas.

The map of mercury in lake and stream sediments, covering 2.6 million square kilometres and representing data for almost 135,000 sites, shows major variations in the distribution of mercury across Canada. A number of factors influence these patterns. The two most important are the geochemistry of the bedrock, glacial materials and soils in the drainage basins, and, on a broader Canada-wide scale, the amount of decomposed organic matter in the sediments. Although not visible at this scale, mercury levels may be significantly enhanced due to emissions within one hundred kilometres of major industrial sites, e.g., smelters such as at Flin Flon, Manitoba. The vast majority of the sites which provided data for the map are distant from sources of pollution and thus reflect the natural patterns of mercury across Canada.

Influence of bedrock

High mercury levels in the Selwyn Basin of southeastern Yukon, the Labrador Trough in western Labrador, and the Rove Basin southwest of Thunder Bay, Ontario (represented in red on the map) reflect areas where shale occurs. Shale can be formed from organic and sulphur rich muds that accumulated in an oxygen-poor depositional environment. Shales are a natural sink or repository for mercury. Other areas of higher mercury levels evident on the map (Central B.C. and parts of Vancouver Island) reflect volcanic rock, which commonly hosts mineral deposits containing ores of copper, lead, and zinc; mercury was a natural component of the geological ore-forming processes.

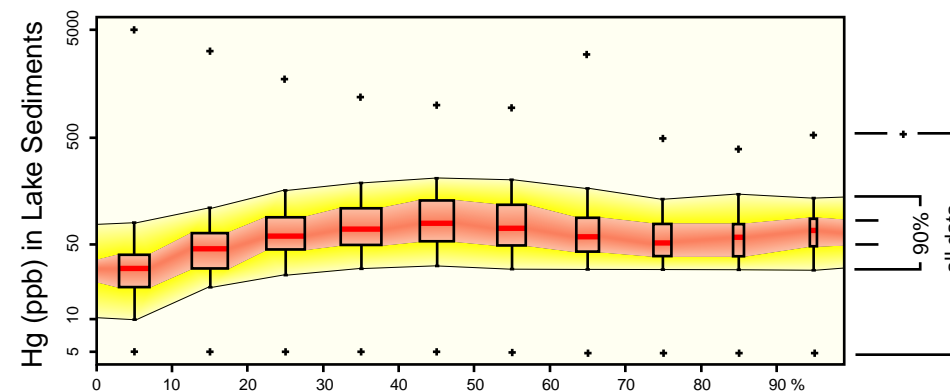
Influence of organic matter

Mercury has a great affinity for organic matter. In Canada where ecozones range from prairie grasslands, southern hardwood and eastern boreal forests, to western temperate rain forests, and arctic tundra desert, there are related changes in the organic content of lake sediments. Along the Labrador coast, the northward decrease in mercury in part, represents a northward decrease in the organic matter content of the lake sediments.

Contour Intervals

- Median x4
- Median x3
- Median x2
- Median
- Median /2
- Median /3
- No Data

Mercury (ppb) vs. Loss-on-ignition (%) for 70,610 centre-lake bottom sediments prescribed in 10% increments.



The amount of mercury absorbed by lake sediments is, in part, dependant on organic matter content. Organic content is estimated by determining the weight 'loss-on-ignition' through burning. The LOI plot displays an increase of mercury concentration by a factor of two to three in most samples (90%), with an increase in organic matter content.

Distribution in Lake and Stream Sediment

