Eco Alert
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# Mercury Rising

**by Lia Daborn**

Mercury accumulation in the environment is putting wildlife at serious risk, especially in the Maritimes. The study recently completed by CCNB and the Union of New Brunswick Indians (UNBI) has further determined that levels in fish and otters taken from the Saint John River are high. In addition, these high levels may have serious impacts on the wildlife and people who rely on these fish as a significant part of their diet. Other research has found high levels of mercury in Saint John and Charlotte County loons; Maritime loons have higher mercury levels than anywhere else in Canada.

The US EPA has established a Tissue Residue Guideline for wildlife that consume fish and shellfish. This Guideline recommends that aquatic biota (including fish) should contain no more than 18 ug/kg (0.018 mg/kg) if they are consumed by mammals (including river otter). All of the results from smallmouth bass caught for the CCNB and UNBI study were higher. Each group of smallmouth bass measured for mercury exceeded the US EPA Tissue Residue Guideline by a factor of 10.

Mercury emitted into the air and water remains in the ecosystem. It builds up in lake and river sediments and in soil and fish. Mercury is released into the environment from natural sources, but also as a by-product of human activities such as the burning of fossil fuels, hospital and municipal waste incineration and some industrial processes. Chronic exposure can cause death, reduced reproductive success, impaired growth and development, and behavioural abnormalities (US EPA 1997) in plants, birds, fish and mammals. Reproductive effects are the main concern as these can occur at low dietary concentrations.

Mercury has been identified as a persistent toxic substance and targeted for reduction by the federal government under the Priority Substances List of the Canadian Environmental Protection Act. Mercury is one substance which is being addressed under the development of Canada-Wide Standards. In addition, a mercury action plan was signed at the June 1998 meeting of the New England Governors/Eastern Canadian Premiers (NEG/ECP) in Fredericton. However, all of these accords and discussions are doing little to effectively reduce the levels of mercury in the New Brunswick environment.

## In this issue . . .



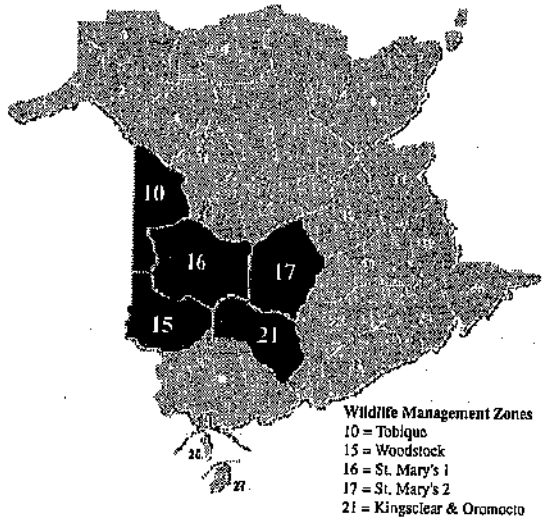
***Public Forest, Public Vision, April 3 & 4, Fredericton Inn, must be a CCNB member in good standing to participate. See page 4 for details.***

# Mercury Study Completed

## *An examination of mercury levels in otter and smallmouth bass in the St. John River food chain*

**by Lia Daborn**

This project is an examination of smallmouth bass and river otter from the St. John River to determine if environmental mercury levels in New Brunswick are affecting wildlife in the region which may feed on fish as part of their diet. The New Brunswick First Nations are defined by the natural resources upon which they depend. Due to their unique connection to fisheries and natural resources, the project centred on five First Nation communities along the St. John River.

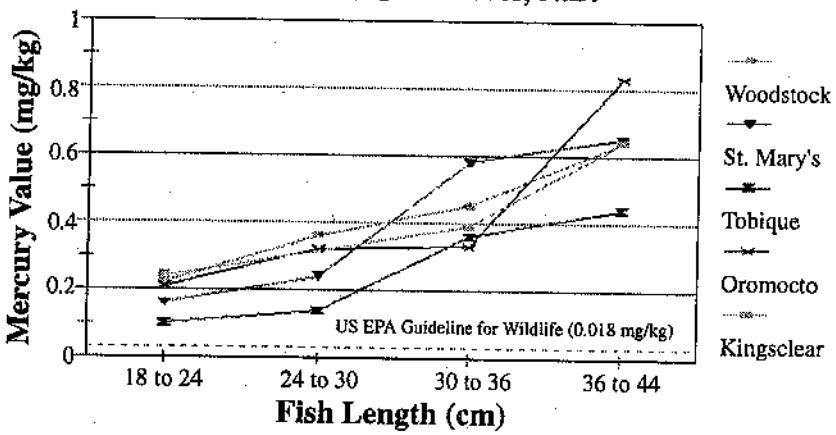



### Fish

Smallmouth bass were caught and blended together in groups according to length. Whole fish were used since otters eat the entire fish rather than simply a fillet, as a human would. As a result, the measurements show lower levels of mercury in the whole fish: the mercury is distributed throughout the entire sample and not just concentrated in the muscle or organs. If tests had been run on tissue samples only, the results would have been higher.

The fish were caught by angling from the headponds of each site (except for Oromocto and St. Mary's). The mercury concentrations were sampled from the blend. In general, the larger the fish, the higher the level of mercury found. All of the fish tested exceeded the guideline of 18µg/kg (0.018 mg/kg) set by the US Environmental Protection Agency (EPA). Additionally, larger fish had levels over 0.5 mg/kg. The highest levels were found in the fish from Oromocto, and the lowest were in Tobique fish (see Graph).

**Mercury Levels in Smallmouth Bass in the St. John River, N.B.**




### New Brunswick Fish Advisory:

Pregnant women, nursing mothers, women who may become pregnant and children less than eight years old should, as a rule, not eat fish from lakes and ponds in New Brunswick.

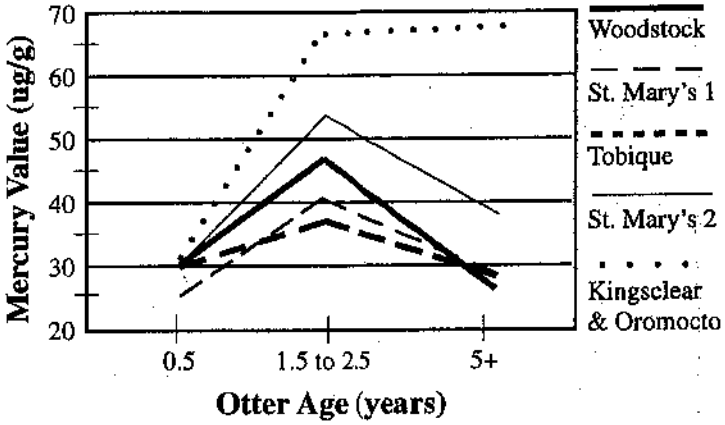
## Otter

A total of 15 river otters were tested through hair analysis to determine the level of mercury. These otters were provided by the provincial Department of Natural Resources and Energy and were selected based on age (under one year; 1.5-2.5 years; older than 5 years). Otters had been collected through trapping; the extent of their range is not known. The available data is limited to sex, age and weight. The otters are identified simply by the Wildlife Management Zone (WMZ) in which they were caught, which can mean that they did not feed along the shore of the Saint John River. However, each WMZ selected was bordered by the river (see Map).

Methylmercury readily accumulates in fur of mammals. Approximately 95% of ingested methylmercury is absorbed. The otters ranged in weight from 3 kg to 9 kg. The measurements of total mercury in hair ranged from 24.1 ug/g to 67.1 ug/g, with levels being highest in the Kingsclear and Oromocto Site (see Graph). The mercury concentrations measured in the otters are higher than those recorded elsewhere. In Ontario, otter liver and kidney, as well as muscle, ranged from 17.4 ug/g to 4.26 ug/g respectively (Wren et al., 1986).

A larger sample size is required to provide a more complete picture of mercury in NB otter populations. The otters which were tested demonstrated a peak in mercury levels when they were 1.5-2.5 years of age. It is not clear why this peak occurred in four sites, but could possibly be because of the high level of fish consumed at that period in their life. In general, fish represent 90% of river otter diets (O'Connor and Nielson, 1980).

**Mercury Levels in River Otter Hair in the St. John River, N.B.**




## Conclusion

Ingestion of contaminated fish is the most significant source of methylmercury exposure to humans. Total exposure to mercury depends on the quanitity of fish and shellfish consumed. The levels of mercury identified in smallmouth bass and river otter in this study warrant further action. This project is only the first step of work which should be considered for the future, including the following:

- Develop a comprehensive contaminants monitoring strategy including analysis of mercury in mammals, birds and fish (as well as human diet).
- Establish a database for chemical contaminants research for fish.
- Initiate child health studies, especially for populations which have high fish consumption throughout the province.
- Determine the level of public awareness of the provincial fish advisory.
- Carry out extensive fish monitoring for fish using both fillets and whole fish.
- Expand the river otter study to examine mercury levels in liver, brain and fur.

Health Canada recommends a total daily intake of no more than 0.2 µg/kg (or 0.0002mg/kg) for women of childbearing age and young children.

The NB Fish Advisory further states that children older than eight years of age, male adults and women past child-bearing age, should limit consumption of all wild New Brunswick fish (except Brook trout) caught in New Brunswick lakes and rivers to one meal every two weeks.