



# Focus On

## Measuring Mercury Trends in Freshwater Fish and Lake Sediments in Washington State: 2005-2006 Sampling Results

Washington State Department of Ecology, Environmental Assessment Program

### Background

Mercury is a naturally occurring toxic chemical that can accumulate up the food chain and in the human body. In young children, exposure to mercury can lead to learning disabilities and damage to the nervous system. In adults, exposure may cause problems with the cardiovascular and central nervous systems. Mercury pollution is both a state and global problem, with many rivers and lakes being impacted.

Under guidance provided by the Washington State Legislature in 2003, the state Departments of Ecology and Health developed the *Mercury Chemical Action Plan* to address concerns about mercury pollution. An advisory committee made up of business, health, environmental, and local government representatives helped write the plan and identified the need for better understanding of how mercury behaves in the environment.

Between 2001 and 2006, statewide mercury reduction efforts through the action plan have resulted in approximately 2,300 pounds per year of mercury no longer being released into the environment. The plan addresses the elimination, phase out, collection, and recycling of certain mercury-containing products such as thermometers, fluorescent light bulbs, and thermostats.

In 2005, the Legislature provided funding to the Washington State Department of Ecology (Ecology) to develop a long-term monitoring program for mercury in freshwater systems. The mercury monitoring program was designed to track mercury trends over time by evaluating concentrations in fish tissues and lake sediments. Mercury in the environment comes from a variety of sources, including disposal of products containing mercury (thermometers, thermostats and fluorescent lamps), combustion of fossil fuels such as coal, atmospheric transport from other locations, and from natural sources.

### Report Overview: “Measuring Mercury Trends in Freshwater Fish in Washington State, 2005 Sampling Results”

This report presents results of the first year of a long-term monitoring effort for mercury in fish tissue. The primary goal of the project is to monitor mercury levels in edible tissue from freshwater fish at six sites per year for five years (30 sites total) to characterize trends in fish tissue mercury levels.

During 2005, largemouth and smallmouth bass were collected from six waterbodies across Washington: Liberty Lake, Long Lake (Spokane River), Loon Lake, Potholes Reservoir, Silver Lake, and the Yakima River.

Mercury concentrations in edible tissue ranged from 17 to 372 parts per billion (ppb). Fish ages and total lengths ranged from 1-12 years and 247-508 millimeters, respectively. Higher concentrations of mercury were found in the older and larger fish.

Five of the 60 fish collected contained mercury levels higher than the U.S. Environmental Protection Agency's (EPA's) Recommended Fish Tissue Criterion of 300 ppb. No fish had mercury levels higher than the National Toxics Rule criterion of 825 ppb.

Water and sediment samples from the waterbodies will be evaluated in subsequent years to help understand patterns of mercury levels in fish tissue over space and time.

### **Report Overview: "History of Mercury in Selected Washington Lakes Determined from Age-Dated Sediment Cores, 2006 Sampling Results"**

This report presents results of the first year of evaluating mercury deposition through the use of age-dated sediment cores.

During the fall of 2006, Ecology collected sediment cores and surface sediments from the following lakes: (1) Lake Ozette, located in the northwest corner of the Olympic Peninsula, (2) Lake Sammamish in east King County, and (3) Lake St. Clair in Thurston County. The selected lakes reflect potential impacts from different sources: trans-Pacific, large urban area, and the only coal-fired power plant in Washington, respectively.

Sediment cores were dated, using the constant rate of supply model, by examining stable lead, lead<sup>210</sup>, and percent solids. Sediments were also analyzed for total mercury, total organic carbon, selenium, and grain size.

Lake Ozette sediments did not show mercury above background (natural) levels until the mid 1900s, and peaked in the mid 1990s. Sediment cores for Lake Sammamish and Lake St. Clair displayed increased mercury levels beginning in the early 1900s. Lake Sammamish mercury levels peaked during World War II industrialization in the regions.

Mercury concentrations in recently deposited sediments at Lake Ozette have remained steady with possible slight declines. Mercury levels in sediments at Lake Sammamish have steadily declined since reaching maximum levels in the 1940s. Recent trends at Lake St. Clair suggest steadily increasing levels of mercury over the last 20 years.

### **Other Key Points**

- Concerns about mercury in our environment have increased due to mercury's toxic nature and its ability to remain in the environment for a long time and build up in the food chain. In response, Ecology and the state Department of Health developed a chemical action plan for mercury.
- The purpose of the mercury monitoring is to track whether mercury concentrations in freshwater fish and lake sediments are increasing or decreasing over time in Washington.

- The state Department of Health recommends eating fish as part of a healthy diet and offers information on their website about choosing fish that are low in contaminants: [www.doh.wa.gov/fish/](http://www.doh.wa.gov/fish/)
- Based on the mercury monitoring conducted to date, Ecology expects monitoring of freshwater fish in the near future to show similar levels of mercury, especially in older fish. It will take several years to evaluate whether mercury levels in Washington State fish are declining.

### **For More Information**

The full reports are available on Ecology's website at:

*Measuring Mercury Trends in Freshwater Fish in Washington State, 2005 Sampling Results*

[www.ecy.wa.gov/biblio/0703007.html](http://www.ecy.wa.gov/biblio/0703007.html)

*History of Mercury in Selected Washington Lakes Determined from Age-Dated Sediment Cores, 2006 Sampling Results*

[www.ecy.wa.gov/biblio/0703019.html](http://www.ecy.wa.gov/biblio/0703019.html)

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