

Summary of South River Floodplain Soil Survey

The Virginia Department of Environmental Quality (DEQ) and others have been monitoring mercury in fish, water, sediment, and soil in and along Virginia's South River and South Fork Shenandoah River since its discovery in the 1970s. Mercury was released to the South River as a result of past practices at the former DuPont plant in Waynesboro, where mercury was used from 1929 to 1950. Periodic flooding has deposited river sediment containing mercury in South River floodplain (i.e., land adjacent to the river that experiences flooding) soil from Waynesboro to Port Republic. The South River Science Team has been sampling and studying floodplain soil extensively over the last several years. This Fact Sheet describes a comprehensive soil sampling survey that was conducted in 2008. In general, the Science Team has found that the majority of samples have levels of mercury that are similar to results from previous soil sampling events.

As part of its survey of the floodplain soil, the South River Science Team collected over 1,200 samples in 2008 to achieve the following objectives:

- » Examine the spatial distribution of mercury in the floodplain soil in locations with varying land use, potential to flood, and depth.
- » Evaluate the role of floodplain soil as a long-term, ongoing source of mercury to the South River.
- » Provide valuable information for other projects examining mercury in the South River ecosystem (e.g., plants, animals).

This Fact Sheet summarizes the results of efforts to determine the spatial distribution of mercury in the floodplain. The other objectives listed above are addressed as part of other ongoing Science Team projects.

The Plan

The Science Team selected sampling locations by dividing the river into six segments from Main Street in Waynesboro to Port Republic, Virginia, using bridge crossings as boundaries. Within each segment, the team collected samples at three levels of flooding potential (2-year, 5-year, and 62-year floods) and four types of land use (open space, pasture, forested, and cultivated crops). At each sampling location, samples were collected in 6-inch vertical sections down to 30 inches below the ground surface. The first 6-inch section represented the surface soil, and the remaining samples

were combined into a sample that represented the subsurface soil. All samples were analyzed for total mercury, organic carbon, grain size, and moisture content.

The team also collected samples in wetland areas and these samples were analyzed for the same constituents as the soil samples, plus methylmercury. Methylmercury is important to measure because it is the form of mercury that is most easily accumulated in the bodies of animals, fish, and humans, and inorganic mercury tends to convert to methylmercury in wetland areas. More information about mercury in the environment is available from the U.S. Environmental Protection Agency (USEPA) web site on mercury at <http://www.epa.gov/mercury/about.htm>.



The Science Team collected over 1,200 soil samples from the South River floodplain.

The Results

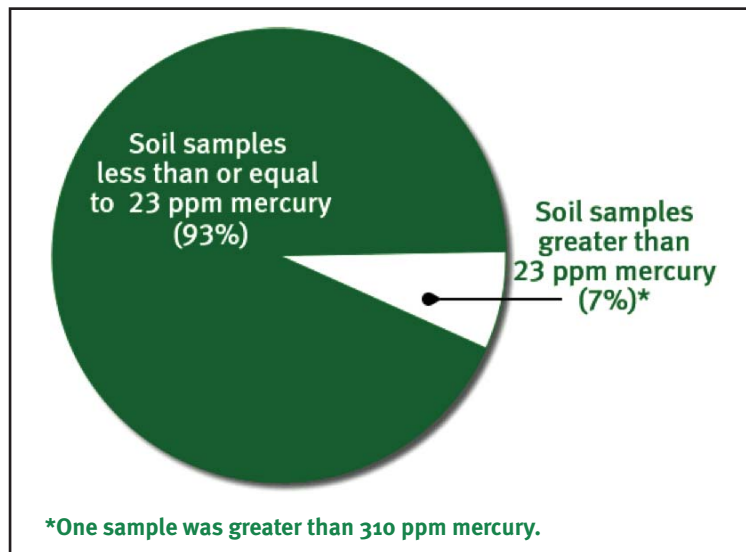
Mercury occurs naturally in soil, with background levels of mercury in soil in the state of Virginia typically well below one part per million (ppm). Most of the soil and sediment in the South River floodplain sampled as part of this survey revealed mercury levels that are above background levels. This means that the amount of mercury in floodplain soil is somewhat higher than what is normally found in Virginia in places that do not have a local mercury pollution problem. The survey revealed that mercury levels generally decreased with distance from the river and with elevation above the river. The Science Team did not observe any consistent patterns of mercury levels among the various land use categories.

The majority of samples collected had low levels of mercury when compared to health-based screening values developed by the USEPA. These screening values are 23 ppm for residential properties and 310 ppm for commercial or industrial properties (see pie chart). Higher levels of mercury were measured at a small number of sample locations. Most of these sample locations were in forested, agricultural, commercial, or industrial areas. The Science Team has evaluated these sample locations and the apparent property uses. Based on the residential or commercial/industrial screening values, the USEPA expects potential risks to humans from soil to be limited to nonexistent at the majority of these locations.

The DEQ is sending letters to property owners who participated in the floodplain soil survey. The letters detail the sampling results for each landowner's property. In addition, the DEQ and the USEPA are contacting every owner who has sampling results greater than 23 ppm by phone to review their individual property results and assess the need for additional sampling.



The Science Team used a hand auger (see photo inset) to collect floodplain soil samples.



This pie chart is a summary of the overall floodplain soil survey results.

Summary

In 2008, the South River Science Team collected over 1,200 samples in the floodplain soil along 25 miles of the South River. Although survey results showed that most of the samples were above the Virginia background level for mercury, the majority of samples were below the USEPA residential screening value of 23 ppm. All property owners are being contacted regarding the results from samples collected on their property. More detailed technical information on the South River floodplain soil survey is available from the contacts listed below.

Contacts

For more information contact:

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