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# ENVIRONMENTAL Fact Sheet

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WD-BB-21

2019

## Mercury in The Environment

### What is Mercury and how is it used?

Mercury (Hg) is a naturally occurring element found in rocks, soils, sediments and the atmosphere. It is a relatively stable metal that does not readily react chemically. Mercury will vaporize at relatively low temperatures and can enter the atmosphere through the combustion of mercury containing materials (e.g., coal) and through natural processes such as the eruption of volcanoes.

Historically, mercury was used in many ways including the manufacturing of mirrors and hats, as a fungicide for agricultural applications, as an ingredient in paints, as a processing chemical for production of chlorine and as a component of electrical products such as batteries and fluorescent lamps. During wartime mercury was used as a component of detonators for ordinance. Over the years as the toxic potential of mercury has become better understood, many of these applications have been discontinued and the quantity in use today is significantly less than in the past.

Mercury occurs naturally in coal and, when burned, the combusted coal releases mercury into the atmosphere. Coal fired power plants are significant source atmospheric mercury globally, in the United States, and New England.

### How is Mercury Emitted into the Environment?

Mercury is emitted into the environment through three main processes. The first is a natural process: mercury emitted from soils, volcanoes, the weathering of rocks and forest fires. The second is the anthropogenic (man-made) process: mercury emitted as a result of human activities such as the burning of municipal waste and fossil fuels. The third process is when previously deposited mercury is re-emitted or recycled to the environment through various natural processes such as the cycling of mercury between the oceans and atmosphere. The original source of this recycled mercury can be both natural and anthropogenic.

### How is Mercury Transported to New Hampshire's Freshwater Fish?

The major pathway of mercury to fish is atmospheric deposition. Mercury is emitted to the atmosphere in one of three forms: gaseous elemental, gaseous divalent and particulate. Gaseous elemental mercury is relatively insoluble and can remain in the atmosphere for up to a year and

can travel long distances. Gaseous divalent and particulate mercury tend to drop out of the atmosphere in relatively quickly limiting the distance it travels from its original source. Elemental mercury emitted to the atmosphere is deposited statewide and explains why even fish that reside in remote lakes and ponds contain some amount of mercury from manmade sources. Divalent and particulate mercury forms that are deposited on the landscape are likely to have originated from more local sources.

Regardless of the form, the deposited mercury can accumulate over time in organic matter of lake sediments where bacteria can convert the mercury to methylmercury, a highly toxic organic form that can enter the food chain. Once incorporated into the food chain it progressively bioaccumulates at higher levels in predatory fish and wildlife. All species of fish can contain mercury but large, old, predatory fish tend to have the highest having amount.

There are potential health risks in consuming fish with elevated levels of mercury. These include impacts to the neurological system of unborn and young children, and an increased risk of kidney failure, heart attack, and compromised immune system in adults. As a result, the state of New Hampshire has a statewide fish consumption advisory that specifies the recommended amounts that are safe to eat as well as certain species and waterbodies that are known to have higher mercury levels.

### **What has Been Done to Reduce to Control Mercury Pollution?**

In the last 25 years, significant progress has been made to reduce non-natural sources of mercury in the environment in an effort to reduce risks to human health and wildlife. Since 1990, atmospheric emissions of mercury in the United States have decreased by about 80%. In New Hampshire, specifically, estimated atmospheric emissions of mercury have been reduced from 1,109 lbs/yr in 1997 to 11.3 lbs/yr in 2016. In addition, non-atmospheric controls of mercury sources in New Hampshire have included banning the sale of most consumer products containing mercury (e.g., novelty items, thermostats and switches), restricting the disposal of products known to contain mercury, and requiring dental facilities to install amalgam separators.

### **Does the State Test Fish for Mercury?**

The simple answer is, "yes." Since 1992, the NHDES has completed mercury analysis on the muscle tissue of 4,100 freshwater fish representing 26 species collected from 227 waterbodies. A report summarizing these data was completed in 2018 and is available on the NHDES website (NHDES report #R-WD-17-22). The report concludes that large, top predatory fish species tend to have highest concentrations of mercury, but that the current statewide advisory is still protective of human health. The report also recommends the addition of new species to the statewide advisory list and notes that there is evidence to suggest that mercury levels in fish tissue are slowly decreasing.

NHDES will continue to test fish for mercury and the public is welcome to submit fish for analysis. If you are interested, the agency requests you contact them for more information at (603) 271-3503.