



National Atmospheric Deposition Program/ Mercury Deposition Network

Background

In response to an emerging need to know more about the detrimental effects of mercury on the environment and human health, the Mercury Deposition Network (MDN) was formed under the NADP in 1995. Data collected from MDN is used to evaluate the role of precipitation as a potential source of mercury contamination to water bodies across the U.S. Mercury is in a class of chemicals called persistent bioaccumulative toxins, meaning that it persists in the environment by cycling back and forth between the air and soil surface, constantly changing chemical forms. It is known that mercury accumulates up the food chain in biological tissue, via a process called bioaccumulation.

Mercury Deposition

The EPA states that coal-burning power plants are the largest anthropogenic source of mercury emissions to the air in the U.S., while natural sources include gassing from volcanoes and evaporation from naturally enriched soils, wetlands, and oceans. Mercury in the air eventually settles into water or onto land where it can then be washed into water; wet deposition rates are highly variable, but tend to be highest in the summer months. Once deposited, certain microorganisms convert it into methylmercury (Me-Hg), a highly toxic form that builds up in fish and shellfish. This cycle continues up the food chain, with each higher predator consuming more and more Me-Hg, eventually reaching humans.

In May of 2006 and in collaboration with the MA DEP and MDPH, fish were collected from five freshwater kettle ponds within CACO to test for tissue mercury content. Mercury levels from three of these ponds were found to be at or above the EPA's Action Level of 1.0 mg/kg.

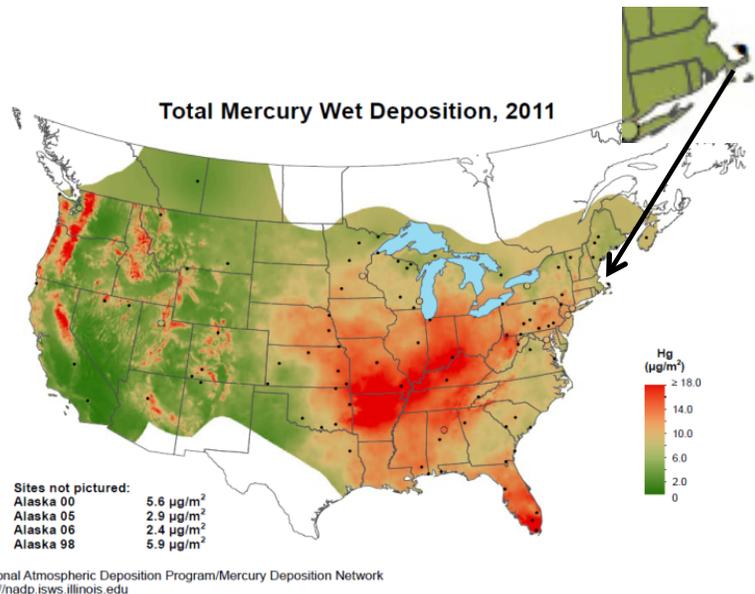


Figure 1. CACO received approximately 6.3 µg/m² Total Mercury in Wet Deposition in 2011.

One year later, fish were collected from five more CACO ponds. Fish tissue mercury levels from all five ponds were again found to be at or above the EPA Action Level. A consumption advisory in December 2007 for all 20 CACO kettle ponds was issued in response.

Management Applications

There is no known direct source of mercury at CACO, suggesting that elevated mercury levels are likely attributable to atmospheric deposition. Knowledge of where mercury is being added to the environment, at what rates, in what concentrations, and by what routes, is essential in order to understand and interpret changes in the ecological community.

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