

# MercNet

## Tracking mercury in air, water, land, fish and wildlife

### Why Do We Need Environmental Mercury Monitoring?

Although mercury is a naturally occurring element, human activities, such as power generation from coal-fired power plants, have increased human and wildlife exposure, primarily through eating mercury-contaminated fish. After mercury is emitted to the atmosphere, it deposits to the Earth's surface as ionic mercury. Within watersheds and lakes, natural processes convert ionic mercury to methyl mercury – a toxic form that is readily magnified to high concentrations in the food web. Mercury concentrations in fish and wildlife in the U.S. now routinely exceed human and wildlife health thresholds. Fish consumption advisories blanket the entire nation, including significant coastal advisories. For more information, visit the EPA fish advisories web page - <http://www.epa.gov/waterscience/fish/>.



Mercury is now implicated in the population decline of some bird species.

The most at-risk and sensitive Americans include women of childbearing age who may become pregnant, nursing mothers, and children less than 12 years old. The most highly exposed people, due to fish consumption habits, include: recreational fishers and their families, some Native American populations, Asians and Pacific Islanders, and subsistence fishers who fish to meet their families' nutritional needs.

At present, scientists must rely on limited information to understand and quantify the critical linkages between mercury emissions and environmental response. Successful design, implementation, and assessment of solutions to the mercury pollution problem requires standardized and comprehensive long-term information – information that is currently not available.

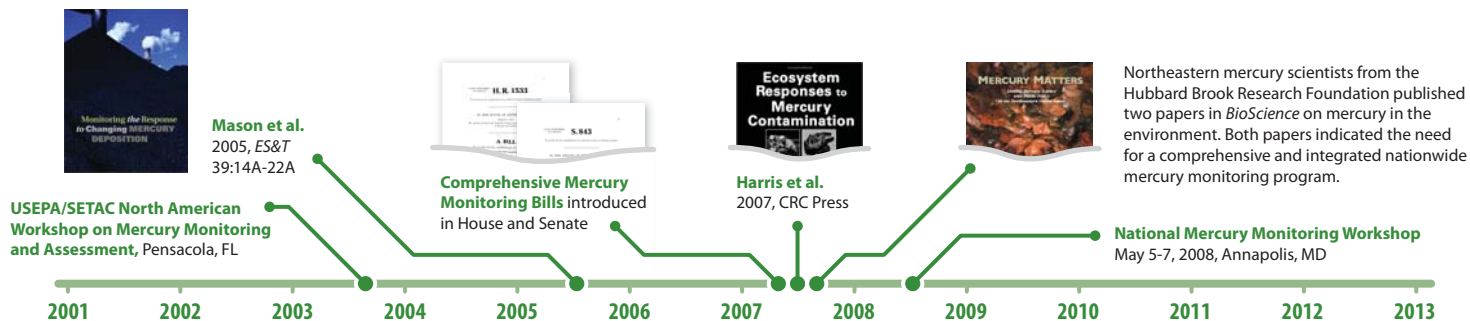
### What Will Mercury Monitoring Tell Us?

Mercury policy development, implementation, and assessment requires substantially improved mercury monitoring. A comprehensive long-term mercury monitoring program focused on ambient concentration, mercury deposition, watershed cycling, and biological effects would allow scientists and managers to assess mercury in the environment, linking changes in emissions and deposition with ecosystem effects and response. The monitoring network described here would provide answers to critical environmental policy questions, such as:

- Are mercury emissions and deposition to the environment changing as a result of current policies and programs?
- Are further emissions reductions necessary?
- Are ecosystems responding to changes in mercury pollution?
- Have fish tissue concentrations changed sufficiently to revise fish consumption advisories?
- What human and wildlife populations continue to be at risk due to high concentrations of mercury in fish?
- How much are threatened and endangered species impacted by mercury pollution?



Researchers have revealed mercury is a ubiquitous contaminant and exhibits maximum impact on wetlands.



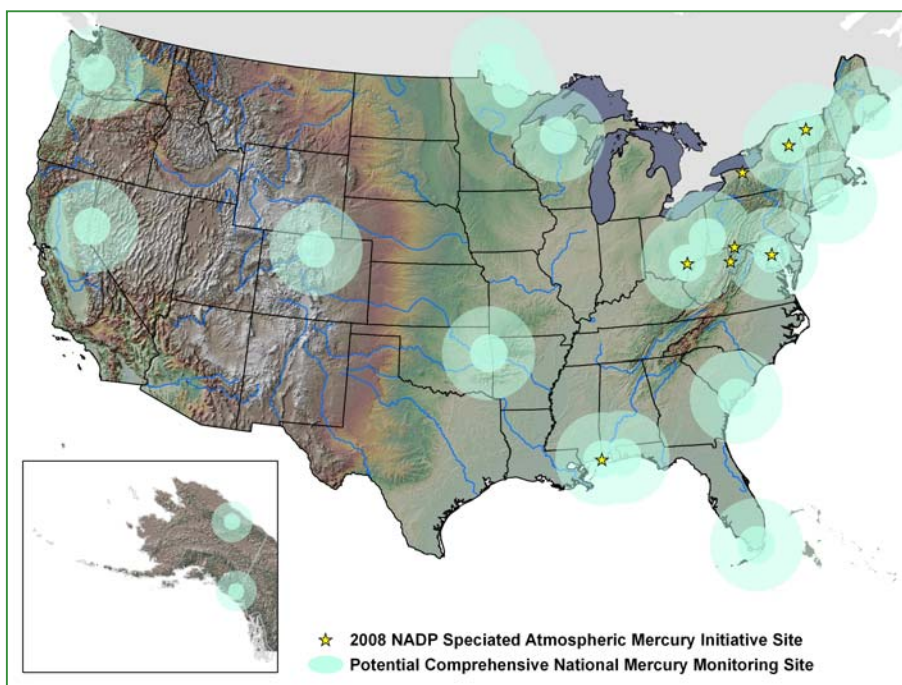
## What Kind of Mercury Monitoring Do We Need?

There is a vision for mercury monitoring. In 2003, an EPA-sponsored workshop convened by the Society for Environmental Toxicology and Chemistry gathered scientists from across the United States and several other countries to devise a national mercury monitoring program. A roadmap for a comprehensive national mercury monitoring program emerged from this workshop, detailed in a peer-reviewed journal article published in 2005 and a 2007 book.

**At the May 2008 National Mercury Monitoring Workshop, U.S. and Canadian scientists from state, federal, academic, and private institutions agreed upon the overall goal of a network: "Establish a policy-relevant network to systematically monitor, assess, and report on indicators of nationwide changes in atmospheric mercury deposition and concentrations of mercury in land, water, and biota in coastal and freshwater ecosystems in response to changing mercury emissions over time."**

Workshop scientists considered the conceptual framework for a mercury monitoring network, such as depicted in the map at right. They agreed on several monitoring design elements:

- A national distribution of sites to understand the sources, consequences, and changes in U.S. mercury pollution;
- A network of 10-20 intensive sites, accompanied by about 20 cluster sites for each intensive site;
- Intensive monitoring sites would establish cause and effect relationships between mercury pollution and environmental change, and data would be used to test and evaluate models;
- Cluster sites would be near an intensive site and provide a general understanding of environmental responses for a region or ecosystem type;
- Monitoring sites would be multi-media (air, water, sediments, fish, and wildlife);
- The network must run for an extended period (10-40 years) to quantify the range of responses expected for many ecosystem types;
- The network should build on existing monitoring efforts, where possible, to maximize information, benefits and coordination with existing resources.



Conceptual network design - center of circle is an intensive site, with associated cluster sites included within first or second rings.

## Who Is Collaborating In MercNet Now?

Collaboration and partnerships among existing mercury science and monitoring is integral to MercNet. A broad cross-section of agencies and institutions are working to coordinate mercury monitoring activities.

To monitor mercury in the atmosphere, the National Atmospheric Deposition Program (NADP) membership of federal agencies, states, tribes, academic institutions, industry, and other organizations are collaborating to establish a new network for monitoring atmospheric mercury species. The network leverages existing atmospheric mercury sites, where possible. At present, eight atmospheric mercury monitoring stations are participating in NADP to provide high resolution, high quality data. For more information, visit the NADP mercury initiative webpage - <http://nadpweb.sws.uiuc.edu/amn/>.

MercNet seeks to utilize existing expertise through active coordination of the experts throughout states and tribes who for years have been monitoring mercury in air, water, land, fish and wildlife as part of ongoing programs.

The May 2008 National Mercury Monitoring Workshop was an important step in building broad community support for a comprehensive, integrated monitoring network. The workshop included participants from

federal agencies (U.S. Environmental Protection Agency, U.S. Geological Survey, National Oceanic and Atmospheric Administration, U.S. Fish and Wildlife Service, National Park Service), state and tribal agency representatives, the National Atmospheric Deposition Program, industry, and scientists from academic and private research institutions. The workshop was part of an ongoing effort to enhance mercury monitoring in the United States through coordination of existing monitoring, and, should new funding sources become available, implementation of new and coordinated monitoring efforts.

For more information:

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