Mercury concentrations in fish respond quickly to increased deposition

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A joint Canadian-American research team have, for the first time, demonstrated that mercury concentrations in fish respond directly to changes in atmospheric deposition of the chemical. The international team's research began in 2001 at the Experimental Lakes in Northern Ontario and is featured in this week's *Proceedings of the National Academy of Sciences*.

"Up to now a direct link has been difficult to establish because of all the other factors that affect mercury levels in fish and large pools of mercury already in the environment," said lead author Reed Harris of Tetra Tech. "By adding stable mercury isotopes to an entire ecosystem for several years, our team was able to zero in on the effects of changing atmospheric mercury deposition."

"The results were very dramatic," said co-author Dr. Andrew Heyes of the University of Maryland Center for Environmental Science Chesapeake Biological Laboratory. "Using the stable isotope approach has revealed a great deal about the cycling of mercury in watersheds. We look forward to continuing our study to provide guidance in mitigating the legacy left by the years of high mercury deposition."

To directly test the response of fish contamination to changing mercury deposition, researchers conducted a whole-ecosystem experiment, increasing the mercury load to a lake and its watershed by the addition of enriched stable mercury isotopes. The isotopes allowed the team to distinguish between experimentally applied mercury and mercury

already present in the ecosystem and to examine bioaccumulation of mercury deposited to different parts of the watershed. Fish methylmercury concentrations responded rapidly to changes in mercury deposition over the first three years of study.

“This is good news. It means that a reduction in new mercury loads to many lakes should result in lower mercury in fish within a few years,” added Cynthia Gilmour of the Smithsonian Environmental Research Center and University of Maryland MEES participating faculty. Harris went on to say “The study shows the clear benefits of regulating mercury emissions, and the near-term effectiveness of emission reductions.”

Mercury levels in the environment have increased several-fold on a global scale since pre-industrial times due to emissions from coal-fired power plants, metal smelting, and other sources. Mercury is persistent in the environment, and toxic to humans and wildlife. There are currently thousands of advisories against eating fish from lakes in both Canada and the United States.

Source: University of Maryland