

Rain Check Cleveland:

Environmental and Conservation Groups Monitor
Mercury Levels in Ohio's Precipitation



*A report by the National Wildlife Federation's Clean the Rain Campaign,
co-sponsored by the League of Ohio Sportsmen and the Northeast Ohio Mercury
Collaborative*



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FOREWORD

I grew up swimming and boating in the Great Lakes and exploring the scenic streams, rivers, and wild areas throughout the region. However, there's a problem looming over these waterways like a thundercloud. My family and yours cannot safely eat the fish we catch because the state's rivers, lakes and streams are contaminated with mercury, and so are the fish they support.

High mercury levels in inland waters have forced health officials to issue advisories warning people to restrict or entirely avoid eating certain species of fish caught from thousands of inland lakes and streams in Minnesota, Illinois, Wisconsin, Michigan, Ohio, and Indiana. Mercury is a powerful neurotoxin that can cause irreversible harm to the brain and nervous system of children when they are developing in the womb. It is particularly dangerous for sport fishermen, subsistence anglers, Native Americans and others who eat fish as a dietary mainstay. Wildlife such as otters, eagles, herons and loons are also susceptible to mercury. Fish-eating animals exhibit reproductive and behavioral problems when their food supply is contaminated with the toxic metal.

Air pollution is the major cause of mercury in our lakes and streams. Coal-fired power plants, waste incinerators, and other industries spew mercury into the air, allowing it to fall back to earth in rain and snow. The very precipitation that should be a source of cleansing waters has been shown to increase toxic mercury in waterways across the Great Lakes region.

This report is part of the National Wildlife Federation's (NWF) Clean the Rain Campaign to educate Americans about the risk mercury poses and give concerned citizens the information and tools to protect themselves and their environment. NWF's Great Lakes office is working with local partners and communities to sample rain falling in many communities across the Midwest to highlight the threat and begin tackling the airborne sources of mercury pollution.

We hope this report will inspire Ohio citizens, businesses, and policy leaders to act on the solutions we know exist. By cleaning up the nation's coal-fired power plants, promoting clean, renewable energy sources, and eliminating the intentional use of mercury in products and manufacturing, we can protect ourselves and our wildlife from a host of environmental threats that include mercury pollution.



Andy Buchsbaum
Director, NWF Great Lakes Office



Introduction

We think of rain as clear and pure. We assume it is cleansing and life-supporting. But rather than purifying our water, Ohio rain is now itself a source of pollution.

In late fall 2003, the National Wildlife Federation organized the collection of samples of Ohio's rain and snow. The samples were taken from October through December 2003 on a rooftop site in the Ohio City neighborhood in Cleveland. Analyses of the precipitation samples for mercury were performed by the Physics Department at the University of Minnesota-Duluth. The results are startling.

The samples reveal that precipitation in the Cleveland area contains mercury in concentrations that are as high as 31 times the US EPA and state safe level for Lake Erie and streams and rivers in the basin. The average mercury concentration in precipitation was nearly eight times higher than the safe level for Lake Erie and streams and rivers in the basin, and all samples exceeded the standard.

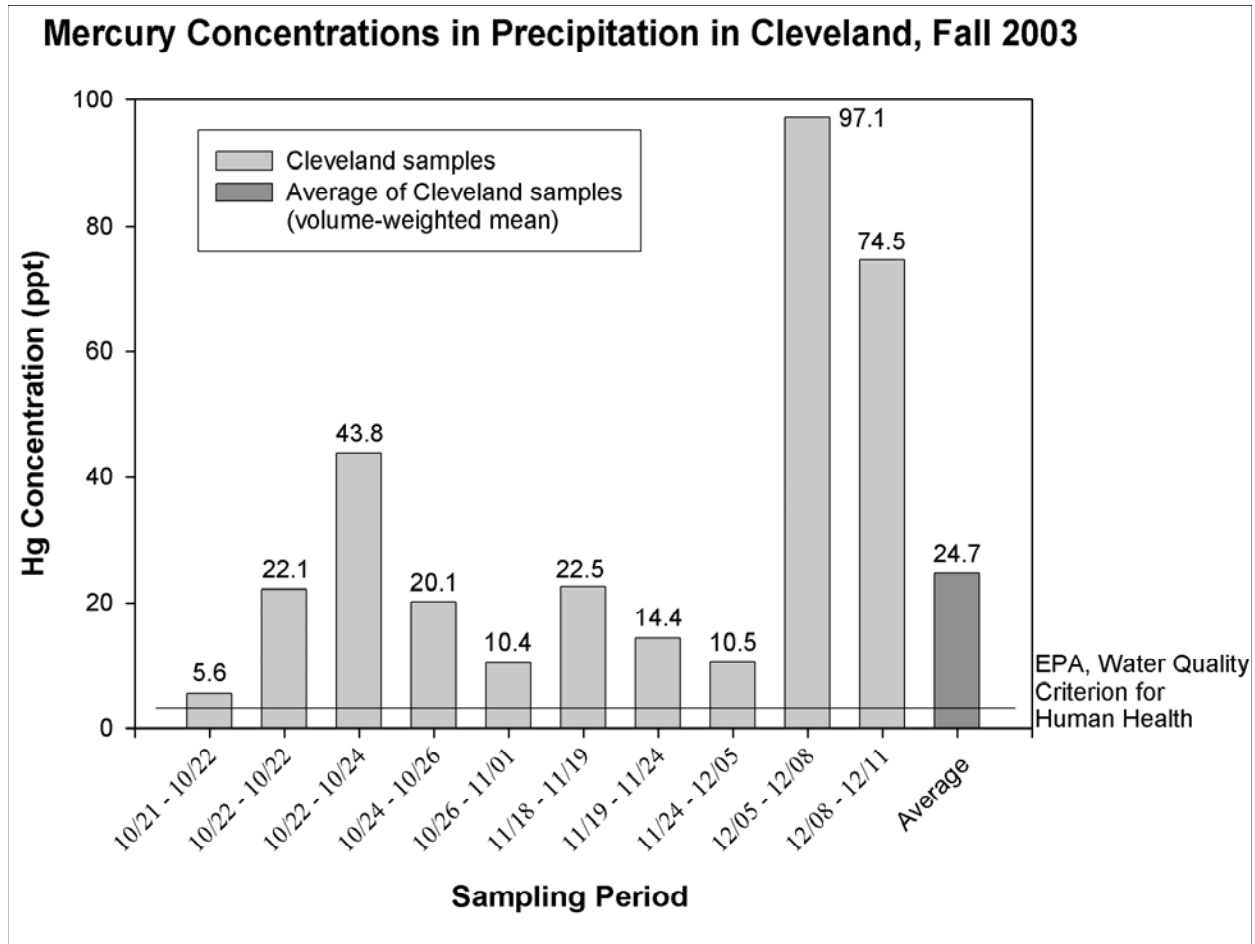
The contamination of our rain and snow has major consequences for the people and wildlife of Ohio. Rain is supposed to cleanse our waters, not add contamination to them, and ongoing mercury contamination of our lakes and streams means an ongoing threat to the health of fish, wildlife and the public. Because the rain itself is contaminated, Ohio, other states, and the nation must take rapid and comprehensive steps to address mercury sources. To clean our rain and our lakes and streams, a coalition of Ohio organizations have formed the Northeast Ohio Mercury Collaborative, to press the state and federal governments to phase out mercury releases in Ohio. Similar efforts are already underway in other Great Lakes states.

The study in Cleveland follows similar rain sampling that NWF has done in Michigan, Minnesota, Wisconsin and Illinois over the past several years. This study shows not only that average levels in Cleveland are among the highest seen both by NWF and other researchers in the Midwest, but it completes a picture that shows consistent elevated mercury levels across the region. At the same time, recent scientific studies increasingly show that mercury poses a real and present threat to public health, while other studies show that dramatic reductions in mercury pollution are technically and economically feasible.

Now is the time for the state of Ohio, organizations and individuals to act to begin restoring the Great Lakes for the people and wildlife that depend on them.

Mercury Levels in Ohio's Rain

Rain samples were collected from October to December 2003. Analyses of the precipitation samples for mercury were performed by the Physics Department at the University of Minnesota-Duluth. The following chart compares the levels of mercury in rain measured in two rounds of sampling in Cleveland to the safe levels for the state's surface waters:



As shown above, rain samples collected at Cleveland between October 21, and December 11, 2003, were found to have mercury levels ranging from 5.6 to 97.1 parts per trillion. US EPA and Ohio's safe level for mercury in the waters of the Lake Erie drainage basin is 3.1 parts per trillion for human health and 1.3 parts per trillion for wildlife, based on bioaccumulation of mercury in fish tissue. All of the ten samples exceeded the U.S. EPA's safe levels for human health in surface water. The rainfall collected between December 8 and 11, containing the highest mercury concentration, had a mercury level at 31 times the U.S. EPA's safe level for people. The volume-weighted mean level of mercury in these ten rain samples was 24.7 parts per trillion, or almost 8 times the U.S. EPA's safe level for human health.¹

Mercury: Serious Harm From Tiny Amounts

The impacts of mercury-contaminated rain are enormous. Mercury is a potent neurotoxicant. Even at low levels, it can cause subtle but permanent harm to the human brain and reproductive harm in wildlife; if ingested or inhaled at high levels, it can cripple or kill. A National Research Council report in 2000 estimated 60,000 newborns each year may suffer developmental harm due to fetal mercury exposure, primarily from their mothers' consumption of mercury-contaminated fish.² A more recent study released in January 2003 by the Centers for Disease Control and Prevention found that one in twelve women of childbearing age in the U.S. had mercury levels in their body that exceed the levels U.S. EPA considers to be safe for a developing fetus.³ This means that approximately 12,000 children are born in Ohio every year at risk of neuro-developmental problems due to mercury exposure. Mercury contamination of fish also threatens certain wildlife and costs the state money in lost commercial and recreational fishing revenues.

Mercury is so dangerous because it is harmful in such small amounts. As an element, it is never destroyed, but persists in the environment forever. The harmful effect of this persistence is magnified because mercury – particularly in an organic form, methylmercury – bioaccumulates: that is, it takes part in biochemical reactions and is stored for long periods of time in tissue. Bacteria in sediments transform mercury into methylmercury. Plankton then take up the organic mercury produced by bacteria. As larger aquatic organisms eat smaller organisms (e.g. forage fish eating plankton) the mercury concentrates in their tissue, becoming higher in concentration in each succeeding species in the food chain. The top predator fish, such as walleye, northern pike, lake trout, and salmon, can have mercury concentrations over one million times higher than the levels in the surrounding water.⁴

It takes a surprisingly small amount of mercury in the water to contaminate fish to unsafe human consumption levels. The annual addition of only .002 pounds of mercury – 1/70th of a teaspoon – is enough to contaminate a 25-acre lake to the point that the fish in that lake are unsafe to eat.⁵

Mercury contamination in Ohio is so widespread that the Ohio Environmental Protection Agency has to issue statewide fish advisories warning adults and children to limit consumption of sport fish caught from all water bodies in Ohio to one meal per week, unless there is a more restrictive advisory. Additionally, the current state advisory has one meal per month (or more restrictive) mercury advisories for 50 Ohio rivers and lakes, including two dozen new listings for 2004.

The Ohio EPA has also joined efforts with the Ohio Department of Health's WIC (Women, Infant and Children) program to improve education outreach and to provide Ohio's families with consumption advice, including one-on-one counseling on dietary warnings for women and children at risk.⁶

Ohio has established mercury water quality standards of 3.1 parts per trillion to protect human health and 1.3 parts per trillion to protect wildlife for the waters of the Lake Erie drainage basin, while the Ohio River drainage basin has less stringent standards: 12 parts per trillion to protect human health.

These standards are for surface water and not snow or rain (there are no standards for mercury in precipitation). The standards are not based on drinking water or contact with skin as scientists believe the levels of mercury in lake water and rain do not pose a risk through those exposure routes. The danger comes from eating fish contaminated with mercury from polluted waters.

The EPA safe-level for mercury in lakes and streams

The Environmental Protection Agency has set standards for mercury in the Great Lakes and all the waters in the Great Lakes basin. These standards were developed during the Great Lakes Water Quality Initiative (“GLI”) process and formalized into regulations. Each Great Lakes State is now required to implement these regulations.

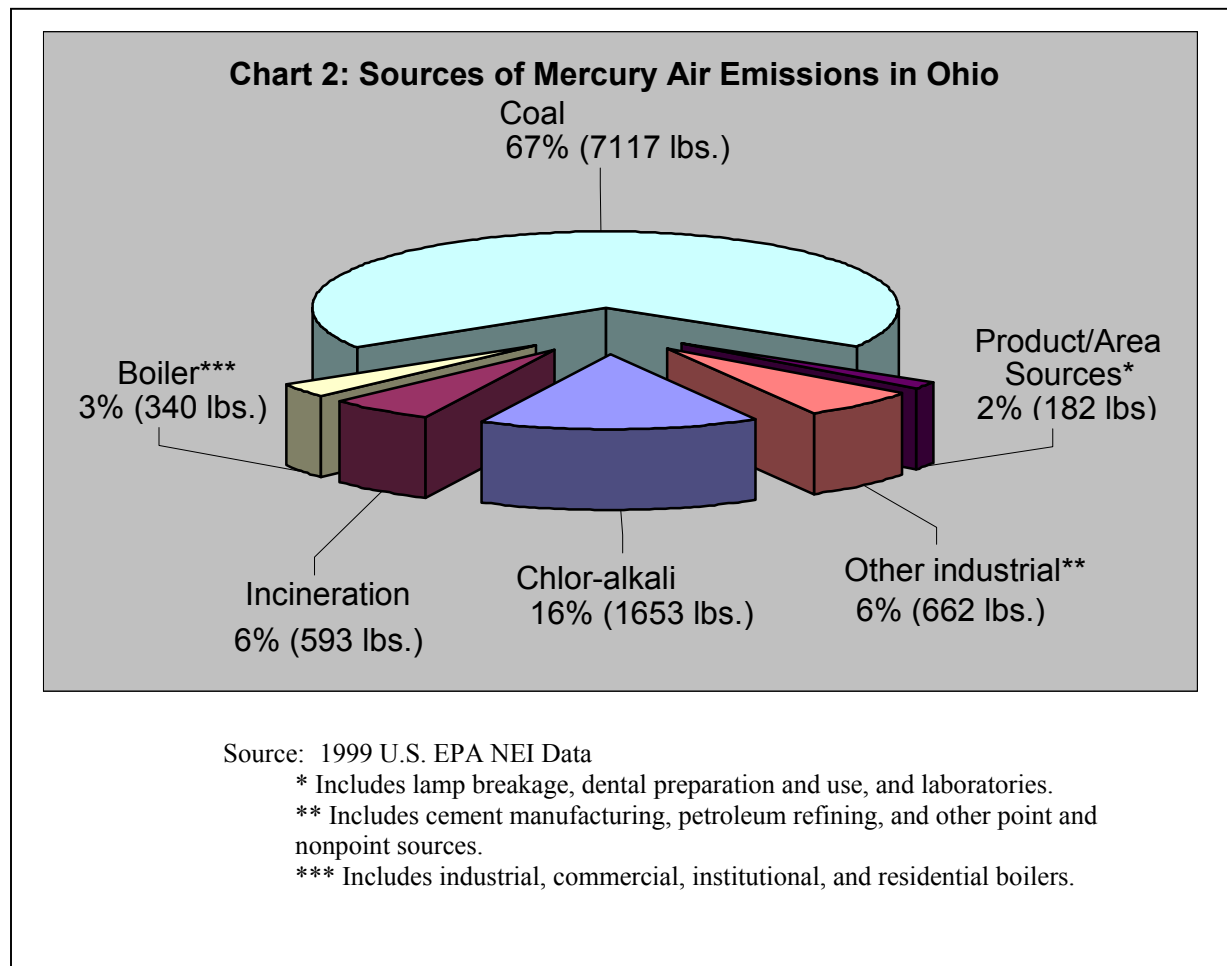
The GLI established two standards for mercury: one to protect people, and one to protect wildlife. The wildlife standard requires that lakes and streams contain no more than 1.3 parts per trillion (ppt or nanogram per liter, ng/L) of mercury in their water. The human health standard sets a limit of 3.1 parts per trillion mercury in water (see 40 CFR part 132). The EPA had originally set criterion of 1.8 ppt, but later issued a memo stating that a more relaxed criterion of 3.1 was acceptable based on a revised protocol. (EPA memorandum from Jim Hanlon to Richard L. Caspe, Alvin R. Morris, and Jo Lynn Traub, Oct. 28, 1996.) The EPA has not set any standards for mercury in rain.

These standards were set to protect people and wildlife that eat fish caught from Great Lakes basin waterways. Fish that live in waterways with mercury below these concentrations should be safe to eat without restriction (although in some cases, it is possible that high fish tissue levels can still develop in such water). Fish living in waterways with mercury above these water quality levels may be unsafe to eat. These standards are set so low because mercury bioaccumulates in fish tissue so readily. Ohio has adopted the GLI standards in their water quality standards program for the Lake Erie basin, but the state has weaker standards for the rest of the state (the Ohio River basin).

Sources of Mercury in Ohio

Although mercury is a naturally occurring element, human activities have significantly increased mercury contamination of the environment over the past several centuries. Some estimates indicate that as much as 70 to 80 percent of mercury released to the atmosphere on a global basis comes from human sources.⁷ For the majority of water bodies, most of the mercury entering them deposits out of the atmosphere with rain, snow, dust particles and gases.⁸

Mercury comes from local, regional, national and global sources. But while mercury is a global pollutant, local and regional sources have significant impacts on nearby areas. Computer modeling by a scientist at the National Oceanic and Atmospheric Association (NOAA) estimates that 43 percent of mercury deposition for Lake Michigan comes from sources within 60 miles of the lake; and 82 percent comes from sources within 420 miles – that is, from within the larger Great Lakes region. Other modeling estimates that mercury deposition in the industrial heartland of the U.S. is over ten times higher than deposition west of the Mississippi River. Local and regional sources are likely the reason for this difference. Computer models have made similar predictions in other regions. For example, it is estimated that nearly one-half of the mercury deposition in New England is actually from sources in that region.⁹



As with other states, Ohio’s mercury air emissions remain high. The most recent mercury emissions data from the U.S. EPA National Emissions Inventory indicates that in 1999, over 67 percent of Ohio’s mercury emissions came from coal-fired power plants, 16 percent from a chlor-alkali plant, six percent from incineration, three percent from boilers (that provide power or heat in industries and homes), and eight percent from other miscellaneous sources. It is likely that the overall percentage of Ohio’s mercury emissions from coal-fired utilities has increased over the past four years, because of dramatic reductions in mercury emissions being made by the incinerator industry. In the late 1990’s, federal air emissions standards (known as Maximum

Achievable Control Technology or “MACT” standards) were set under the Clean Air Act that required medical, municipal and hazardous waste incinerators to reduce their mercury emissions substantially (by up to 90%), with implementation over a several year period. Based on EPA data for 1996, incinerators were the second largest source of mercury emissions in the state. The 1999 inventory shown above reflects partial implementation of these standards, and it seems likely that current emissions from the incineration sector are lower still. Incinerator operators met these requirements and are now much smaller contributors to the overall mercury pollution problem in the state. It is up to us to take the steps to ensure similar progress is made across all the mercury emitting sectors in Ohio.

The Need for Action

We know that the amount of mercury in the rain and water, and in wildlife and people, is already at levels that are harming our children. We know that air pollution is the predominant source of mercury in our environment and ourselves. And we know that the largest sources nationally and in Ohio are industries like coal-burning power plants, a chlor-alkali plant, and certain steel, cement, and incinerator facilities. There is a general consensus that Ohio’s industries need to reduce their mercury emissions. The question is, by how much?

Because mercury is so harmful in such small amounts, the “safe” level for people and wildlife is extremely low; in fact, scientific data suggests that it is approximately the same level as the natural background (the amount of mercury from natural sources). Scientists estimate that mercury levels in the environment have increased by a factor of about 2 to 4.5 over natural background levels due to human sources of mercury.¹⁰ At the same time, commonly found levels of mercury in water and fish in the Great Lakes region range between 2 and 10 times higher than the levels the EPA considers to be safe.¹¹ To reduce the levels of mercury in water and fish to protective levels, we will need to reduce the mercury levels in the environment significantly: that is, to natural background levels.

Reducing mercury to natural background levels requires a complete phaseout of mercury by all major human sources. It is not possible to reduce natural releases of mercury, but we can and should phase out our mercury releases from human sources. Indeed, the governments of the United States and Canada agreed to do just that in the 1978 Great Lakes Water Quality Agreement, which calls for virtual elimination of mercury in the Great Lakes basin.

We know that completing this task will take time, but there are critical steps we can take today at a national, regional, state, and local level to phase out mercury pollution and begin restoring our lakes and streams.

- **Eliminate or greatly reduce industrial mercury emissions.** Some industrial sources, such as chlorine manufacturers or waste incinerators, can virtually eliminate their mercury emissions by either switching to mercury-free processes or removing mercury from the incinerator feedstock. For other sources, such as coal-fired power plants, stringent emission limits must be set using existing authority under the Clean Air Act.

- **End the manufacture and use of mercury-containing products.** Legislation should be passed at the federal, state, and local level to phase out the sale of mercury-containing products, institute mercury-free purchasing, and mandate manufacturer take-back for products that are still on the market and in use.
- **Promote safe disposal of mercury waste.** Mercury is found in dozens of household, business and industrial products. To prevent haphazard disposal of these products, resources need to be allocated to communities for comprehensive mercury collection and recycling facilities.
- **Enact water quality standards that are consistent and protective of people and wildlife.** Mercury monitoring and the process that results in fish consumption advisories need to be improved in order to more effectively reduce the public's exposure to mercury as well as to offer adequate protection to wildlife.

Actions on Mercury Underway in Ohio

The state of Ohio has taken some actions to educate the public on mercury dangers, and to reduce releases to the environment, but much more work remains to be done.

Notable state agency initiatives underway include the state's sport fish advisory, issued annually by the Ohio Department of Health, Ohio Department of Natural Resources, and Ohio Environmental Protection Agency. The advisory warns the public to limit consumption of all fish caught from every inland water body in Ohio and Lake Erie due to mercury, and lists specific consumption advisories for certain waterbodies and certain fish due to contamination by mercury and other pollutants.

The state's Coal Development Office also continues to be a leading supporter of research on technologies to reduce emissions from coal-burning. Working with the OCDO, a number of Ohio companies are developing and testing mercury control technologies for coal-fired power plants.

Apart from federal requirements, Ohio has not adopted rules or legislation limiting industrial emissions of mercury or restricting the manufacture, sale or disposal of mercury bearing products.

Working with state agencies and localities, however, a number of private, non-profit, or educational organizations have been engaged in mercury outreach and some mercury collection and recycling initiatives. Bowling Green University has instituted a mercury collection program for thermometers, blood pressure devices and thermostats, and an initiative known as the Cleveland Clean Air Century Campaign has implemented a mercury thermometer exchange. The healthcare industry in Ohio has also made strides in reducing mercury use and releases from medical and dental facilities. Thirty-one Ohio hospitals have adopted a Mercury Elimination Resolution as part of the Ohio Healthy Hospital Pollution Prevention Initiative.

Spotlight: Ohio firms lead the way on mercury control technology

Ohio is home to a number of companies developing, testing, and implementing advanced mercury emissions control technology for the utility industry. Strong federal standards would provide a vibrant market nationwide that Ohio firms such as these could supply, and would reward those Ohio power producers who have gone the extra mile to test and apply more stringent controls. Not only do these examples underscore the capability of Midwest industry to meet stringent standards, but they provide a local example of the potential economic and jobs benefits to the industrial Midwest of investments in cleaner energy technologies.

Babcock and Wilcox, a subsidiary of McDermott Technologies, designs and manufactures scrubber technology to clean mercury and other pollutants out of smokestacks. In 1995 Babcock and Wilcox opened a state-of-the-art combustion and emissions testing facility, in Alliance, Ohio. Additionally, the company is partnering with the Ohio Coal Development Office on clean coal technology pilot projects.

Sorbent Technologies of Twinsburg is a small business developing its niche in the mercury control technology sector. The company currently relies primarily on federal research and development dollars that fund innovative clean energy endeavors. Stringent air pollution requirements would give a needed boost to these and other companies that see the profit of emerging clean energy technologies.

Akron-based **First Energy**, the nation's fourth largest investor-owned electric system, is investing in Powerspan, a successful developer of cost-effective clean energy technology for coal-fired power plants. The company is also testing the multipollutant control Powerspan-ECO system at its Burger Station. Tests suggest this technology can achieve very high rates of mercury removal.

A number of environmental and conservation organizations in the state also work to educate the public on and reduce the threat of mercury pollution. Their actions have included outreach to the public to raise awareness of fish consumption advisories, promoting replacement and recycling of mercury-bearing products, and promoting improved air pollution control technology and clean up of mercury-contaminated waterbodies.

An Ohio Mercury Phaseout

The state of Ohio can do much more to address mercury pollution. To meaningfully reduce mercury pollution in the state's lakes, streams, and fish, the state will need to dramatically reduce and ultimately phase out mercury pollution from all manmade sources in the state. While eliminating mercury will take time, dramatic mercury reductions in major emitting sectors are feasible today. Many Ohio firms are already at the forefront in developing and implementing mercury control technologies.

Achieving major reductions will require implementation of stringent state and federal air emissions standards for coal fired power plants, as well as for other major industrial sources, mandating a shift to the use of mercury-free products and processes wherever possible, and more aggressive mercury recycling and monitoring programs. The state also needs to comply with Clean Water Act requirements to clean up mercury in its water-bodies.

What You Can Do

- ❖ Eliminate mercury from your home.
 - For information on mercury-containing products and their alternatives, see NWF's Mercury Products Guide, online at: www.nwf.org/ourprograms/, click on Mercury Deposition, Great Lakes
 - For information on recycling/disposal of mercury containing products, see www.nwf.org/ourprograms/, click on Mercury Deposition, Great Lakes

Spotlight: Northeast Ohio Regional Sewage District (NEORS)

The Northeast Ohio Regional Sewer District governs the operation of three major wastewater treatment plants and associated water pollution control facilities on Lake Erie, the Cuyahoga River and Rocky River. The District serves 53 suburban communities and the City of Cleveland and employs more than 580 people. Major treatment facilities include Southerly, Easterly and Westerly Wastewater Treatment Plants.

Most dental fillings are made of a silver and mercury amalgam. In many areas, one of the largest sources of mercury entering water treatment plants comes from dental offices which allow pieces of mercury-bearing amalgam to wash down drains as fillings are replaced. To address this problem, the NEORS has issued an Administrative Order requiring submittal and implementation of Best Management Practices (BMP) plans for dental sources within their system.

This Order requires that dental offices eliminate all use of bulk elemental mercury, change filters and chairside traps frequently without rinsing them over drains, and ensure all waste amalgam is recycled or disposed as a hazardous waste. NEORS recommends the use of mercury-free amalgams (gold, composites, glass ionomers, etc.), installation of amalgam separators (which capture mercury much more effectively), and improving traps and other equipment.

The city of Solon, in Cuyahoga County, has taken an additional step toward effectively controlling mercury and requires the use of amalgam separators by its dental offices.

Next steps for the District include addressing recycling of fluorescent bulbs, mercury in schools, medical clinics and analytical labs, and requiring industrial users to monitor their wastewater for mercury, and best management practices for hospitals.

<http://www.amsa-cleanwater.org/meetings/03summer/ppt/ppt/11%20-%20Linn,%20Keith/Linn%20AMSA%207-16-03.ppt>

- ❖ Encourage your business, school or local government to buy mercury free products
 - For information on how to develop mercury free procurement policies, see NWF's Mercury Products Guide, online at www.nwf.org/ourprograms/, click on Mercury Deposition, Great Lakes

- ❖ Talk to your health care clinic, hospital, and dentist about becoming mercury-free.
 - For more information on the Hospitals for a Healthy Environment Program, contact 603-643-6700.
 - For information about mercury-free dental and health care and methods to keep mercury out of dental and medical waste streams, see <http://www.h2e-online.org>

- ❖ Support efforts to enact emission standards for large sources of mercury pollution. Throughout the coming years, federal and state legislation and regulations will be proposed that will set new mercury limits for power plants, taconite processing, and other industrial sources. Please let your legislators and regulatory agencies know that you support these efforts.
 - For more information current federal rulemaking and
 - For information on developing state and local programs to reduce mercury see NWF's Getting Serious About Mercury report online at www.nwf.org/ourprograms/, click on Mercury Deposition, Great Lakes

- ❖ Join the Northeast Ohio Mercury Collaborative: To meet the mercury reduction challenge, a group of environmental, conservation and public health groups have come together to work for a phaseout of mercury pollution in the state.
 - For information on how you can help, contact the Northeast Ohio Mercury Collaborative c/o Environmental Health Watch at 216-961-4646 or call the National Wildlife Federation at 734-769-3351

Conclusion

The contamination of rain by mercury completely reverses what we used to believe to be true about the pollution of our lakes and streams. We believed that while lakes and rivers in Ohio might be polluted by runoff and industry, nature used rain to cleanse our waterways. Now we know the opposite is true: rain itself is so contaminated by mercury that it adds pollution to our lakes and streams.

To save Ohio's lakes and streams and the people and wildlife that depend on them, Ohio must do no less than clean the rain. The mercury phase-out plan proposed by the Northeast Ohio Mercury Collaborative is a major step toward doing just that.

Endnotes

¹ The volume-weighted mean is an average of all samples, where each sample concentration is weighted based on the amount of precipitation that fell during the sampling period.

² National Research Council, *Toxicological Effects of Methylmercury* (Washington, D C: National Academy Press, 2000).

³ “Centers for Disease Control and Prevention. Second National Report on Human Exposure to Environmental Chemicals, January 2003.”

⁴ E.J. Zillioux, D.B. Porcella, and J.M. Benoit, “Mercury Cycling and Effects in Freshwater Wetland Ecosystems,” *Environmental Toxicology and Chemistry* 12 (1993), pp. 2245-2264.

⁵ J. Raloff, Mercurial Risks From Acid’s Reign, *Science News*, 1991. 130:152-166.

⁶ “Planning to Eat Your Catch?,” Ohio Environmental Protection Agency, (February 2004), <http://web.epa.state.oh.us/dsw/fishadvisory/2004%20fish%20advisory%20card.pdf>

⁷ T.A. Jackson, “Long-range Atmospheric Transport of Mercury to Ecosystems and the Importance of Anthropogenic Emissions: Critical Review and Evaluation of the Published Evidence,” *Environmental Reviews* 5 (1997), pp. 99-120.

⁸ For example, preliminary estimates in recent research indicates that 58 percent of the mercury reaching Lake Superior sediments arrives via the atmosphere (Rolphus, K.R. et al., Distribution and Fluxes of Total and Methylmercury in Lake Superior, *Environmental Science and Technology*, 37(5): 865-872). And according to results from the Lake Michigan Mass Balance study, 84 percent of the mercury entering Lake Michigan comes from the atmosphere (Landis, M.S., Keeler, G.J., Atmospheric mercury deposition to Lake Michigan during the Lake Michigan Mass Balance Study, *Environmental Science and Technology*, 36(21): 4518-4524).

⁹ Northeast States for Coordinated Air Use Management, *Northeast States and Eastern Canadian Provinces Mercury Study: A Framework for Action* (Boston, MA: NESCAUM, February 1998).

¹⁰ R.P. Mason, W.F. Fitzgerald, and F.M.M. Morel, “The Biogeochemical Cycling of Elemental Mercury: Anthropogenic Influences”, *Geochimica et Cosmochimica Acta*, 58(15) (1994), pp. 3191-3198.

¹¹ For water, see for example J.P. Hurley, S.E. Cowell, M.M. Shafer, P.E. Hughes, Tributary Loading of Mercury to Lake Michigan: Importance of Seasonal Events and Phase Partitioning, *Science of the Total Environment*, 213 (1998), 129-137; and J.P. Hurley, J.M. Benoit, C.L. Babiarez, M.M. Shafer, A.W. Andren, J.R. Sullivan, R. Hammond, D.A. Webb, Influences of Watershed Characteristics on Mercury Levels in Wisconsin Rivers, *Environmental Science & Technology*, 29 (1995), 1867-1875. For fish tissue, see for example C.R. Hammerschmidt, J.G. Wiener, B.E. Frazier, R.G. Rada, Methylmercury Content of Eggs in Yellow Perch Related to Maternal Exposure in Four Wisconsin Lakes, *Environmental Science & Technology*, 33 (1999), 999-1003.

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People and Nature: Our Future is in the Balance