QUICKSILVER CAUCUS … QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS**
…QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS** … QUICKSILVER CAUCUS
QUICKSILVER CAUCUS … QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS**
…QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS** … QUICKSILVER CAUCUS
QUICKSILVER CAUCUS … QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS**
…QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS** … QUICKSILVER CAUCUS
QUICKSILVER CAUCUS … QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS**
…QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS** … QUICKSILVER CAUCUS
QUICKSILVER CAUCUS … QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS**
…QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS** … QUICKSILVER CAUCUS

2005 Compendium of States' Mercury Activities

October 2005

QUICKSILVER CAUCUS … QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS**
…QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS** … QUICKSILVER CAUCUS
QUICKSILVER CAUCUS … QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS**
…QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS** … QUICKSILVER CAUCUS
QUICKSILVER CAUCUS … QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS**
…QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS** … QUICKSILVER CAUCUS
QUICKSILVER CAUCUS … QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS**
…QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS** … QUICKSILVER CAUCUS
QUICKSILVER CAUCUS … QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS**
…QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS** … QUICKSILVER CAUCUS
QUICKSILVER CAUCUS … QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS**
…QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS** … QUICKSILVER CAUCUS
QUICKSILVER CAUCUS … QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS**
…QUICKSILVER CAUCUS … **QUICKSILVER CAUCUS** … QUICKSILVER CAUCUS

The *2005 Compendium of States' Mercury Activities* updates and expands upon *Mercury in the Environment States Respond to the Challenge: A Compendium of State Mercury Activities* published by the Environmental Council of the States (ECOS) in 2001. This compendium is based on a survey of state governments conducted from December 2004 through April 2005. Members of the Quicksilver Caucus (QSC) wrote the survey, distributed it to states, and gathered state responses. Forty-five states responded to the survey.

Many people played key roles in developing this compendium. Special thanks go to the many staff from state environmental agencies who gathered the information and work daily to reduce mercury pollution. Special recoginition goes to the Quicksilver Caucus Team Members and NWF National Wildlife Federation Mercury Staff for seeing this project through to its completion.

The QSC developed this document under Cooperative Agreement Number X5 83227101, awarded by the United States Environmental Protection Agency (U.S. EPA). Generous support from the Garfield Foundation also helped make this compendium possible.

The QSC, a coalition of state associations, formed to address and resolve health and environmental problems resulting from the release of mercury to the environment. The membership of the QSC includes ECOS, the Association of State and Territorial Solid Waste Management Officials, the State and Territorial Air Pollution Program Administrators, the Association of Local Air Pollution Control Officials, the Association of State and Interstate Water Pollution Control Administrators, the Association of State Drinking Water Administrators, and the National Pollution Prevention Roundtable.

The Environmental Council of the States
444 North Capitol Street, NW, Suite 445
Washington, DC 20001
Phone: 202-624-3660
www.ecos.org

National Wildlife Federation
1400 16th Street, NW, Suite 501
Washington, DC 20036
Phone: 202-797-6890
www.nwf.org/mercury

Table of Contents

Table of Contents

Part 2: Individual State Activities (continued)

Appendices

Executive Summary

Mercury is a naturally occurring trace element found in air, water, and soil. When converted by microorganisms to its organic form mercury found in aquatic systems, called methylmercury, is toxic. Methylmercury bio-accumulates in the aquatic food chain and poses significant threats to fish-consuming humans and animals. As a result, 46 states and the U.S. Food and Drug Administration have adopted public health advisories throughout the country due to mercury contamination. Because mercury is released from many different products and processes in several forms, creative, innovative, and systematic efforts are needed to address the mercury problem.

Over the past several years, significant state activity has reduced sources of mercury pollution. These efforts range from educational programs that raise public awareness about mercury sources and voluntary initiatives to encourage recycling, to statutes banning the sale of specific mercury-containing products. Much of this activity has been spurred on by increased visibility of the issue.

The Quicksilver Caucus and the National Wildlife Federation created this compendium, describing how state governments have responded to this critical issue, as a roadmap to assist individuals, policymakers, businesses, and communities in developing, implementing, and strengthening mercury-reduction efforts.

The compendium reveals that states have increased their activities to reduce mercury in the environment since the first *Compendium of State Mercury Activities* was published in 2001. While the actions varied from state to state, three areas of note include creating multimedia state strategies or action plans, designing activities to address mercury in consumer products, and taking measures to deal with mercury in vehicle switches.

The fact that states are developing overall action plans and strategies is significant because they can drive the amount and type of work that gets done to reduce mercury in the environment. More than one-third of the states responding to this survey reported that they had a mercury action plan or strategy document. Another six states plan to develop one. While these plans and strategies vary, two activities seem to support them—related statutes or regulations and task forces or workgroups that focus specifically on mercury issues.

While many states are coordinating their mercury activities via an action plan or strategy or through task forces and workgroups, even more states are addressing mercury in consumer products. More than 40% of the states responding to the survey have taken steps to curb mercury use in products and to prevent improper disposal. States' activities range from phaseouts and bans to labeling and collecting mercury and mercury-containing products. The most common activity related to mercury-containing products is voluntary mercury take-back programs—80% of the states reported sponsoring such activities and over one-third of the states also reported having phaseouts and sales bans of some products.

Many states are also taking action to address mercury-containing switches in vehicles. Nearly half of the states reported proposed or enacted vehicle-switch legislation. Although only a handful of states have mandatory switch removal, over a quarter of the states had activities related to voluntary switch removal from end-of-life vehicles. While states reported facing many challenges in dealing with the issue of vehicle switches, the most frequently cited was the lack of funding for removal programs.

Two additional mercury sources that states are beginning to address are utilities and the dental sector. Emissions from coal-fired electric power plants are a widely recognized problem. 24 states report that they are the largest source of mercury emitted within their state. This source is beginning to be addressed; 10 states reported having regulations on mercury releases from coal-fired power plants.

Though the dental sector is a smaller source of mercury pollution to the environment, states are beginning to look for ways to reduce mercury from dentists. Four states reported having regulations on mercury releases from dental separators. Eleven states take into account the number of dentists with amalgam separators when quantifying their mercury-reduction progress.

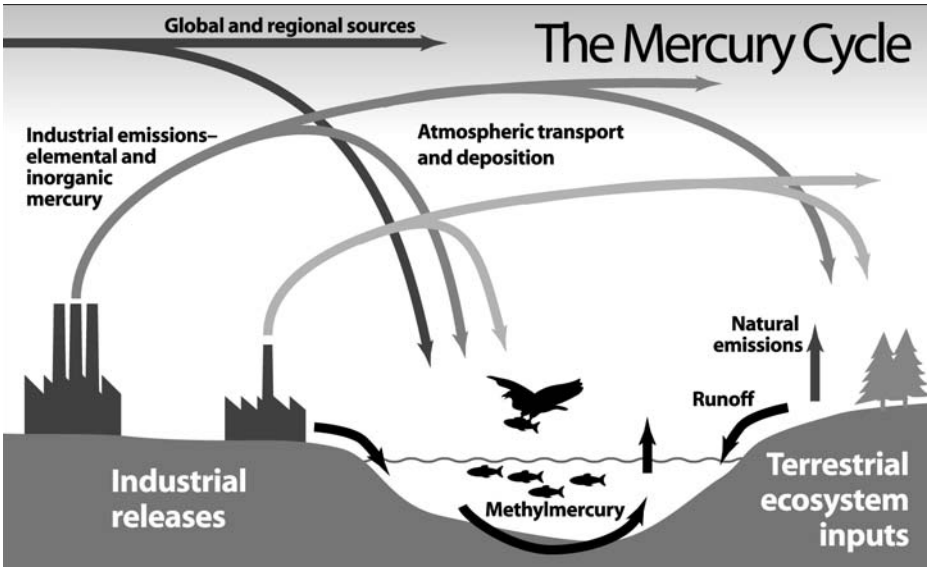
While many states are just beginning to pursue mercury pollution reduction, in some areas action is universal or nearly universal. For example, 100% of the states responding to the survey are engaged in some mercury-related outreach or education activity; nearly 50% provide some of these communications in more than one language. And nearly all states perform mercury monitoring. Forty-three of the 45 states responding to this survey reported engaging in some sort of mercury monitoring activity.

Background: Sources and Impacts of Mercury Pollution

Mercury is a highly volatile, toxic heavy metal. Although mercury exists naturally in the environment, human activities are primarily responsible for the high mercury levels that contaminate lakes, rivers, and coastal waters.[1] Unnaturally high levels of mercury in the environment pose a significant risk to our health, our economy, and our wildlife.

Mercury is released by a variety of sources including coal-fired power plants, chemical plants, product use and disposal, waste-burning incinerators, and dental offices. Additionally, intentional mercury use in consumer products such as relays and switches (found in vehicles and many other products), fluorescent lamps, thermostats, thermometers, medical measuring devices, lab chemicals, vaccines, pharmaceuticals, and dental fillings remains widespread in the United States. The mercury in these products can be released to the environment either when the products are disposed of in a landfill, incinerated with other waste, or discarded in wastewater. As a trace element in fossil fuels, particularly coal, mercury is also released into the air when coal is burned to generate electricity or heat. Research indicates that these and other human activities have caused the rate of mercury deposition around the world to increase by as much as a factor of 3–10 over pre-industrial levels.[2]

Mercury continuously cycles between air, water, and land. After being released as air pollution from industrial sources, mercury falls back to earth in rain, snow, or dry particles and is deposited locally or downwind on neighboring regions. Bacteria can then convert it into its most toxic form, methylmercury, which is readily absorbed by living things. Rather than break down in the environment like many pollutants, mercury accumulates in increasingly toxic concentrations as it works its way up the food chain. As a result, species at the top of the food chain, such as large predatory fish like bass and trout, can have mercury levels up to 1 million times that of the surrounding water.[3]



Mercury Effects on Human Health and Wildlife

People and wildlife that eat mercury-contaminated fish, as well as their unborn offspring, can suffer serious health problems. Mercury is a potent neurotoxin that harms the development and function of the central nervous, cardiovascular, and reproductive systems. While occasional severe mercury poisoning still occurs in the United States – from industrial, laboratory, medical, or home accidents – most people are exposed to mercury at lower levels over longer periods of time. The primary ways people are exposed to mercury is through eating mercury-contaminated fish and from dental amalgams.[4] Another significant source of exposure can be from inhalation of volatilized mercury from spills. These low-level, chronic exposures pose widespread risks for people and wildlife of all ages.

Children at Risk

Babies *in utero* and young children are most vulnerable to mercury's toxic effects. Children are extremely sensitive to methylmercury's toxic effects because their brains are still developing. Even at low levels, mercury can cause subtle but permanent damage to the brain and central nervous system, leading to impaired fine motor skills, attention span, memory, vision, and learning difficulties.[5] Infants exposed to chronic levels of mercury may experience delay in their developmental milestones such as walking and talking, and higher mercury exposure levels can result in cerebral palsy or mental retardation.[6]

One in six women of child-bearing age has blood mercury levels that could pose a risk to a developing fetus, according to the U.S. Environmental Protection Agency and the Centers for Disease Control and Prevention.[7] As a result, approximately 300,000 children born every year in the United States are at risk of neurological damage due to prenatal mercury exposure.[8]

Adult Health Concerns

Recent medical evidence shows that relatively low level methylmercury exposure can affect the cardiovascular, immune, and reproductive systems of adults.[9] Researchers found that high consumption of mercury-contaminated fish may be associated with the doubling or tripling in risk of a fatal heart attack.[10] Some studies have also linked mercury to other debilitating diseases such as Parkinson's and Alzheimer's disease.[11] One study found that blood mercury levels of patients with Alzheimer's disease were more than twofold higher than in people without Alzheimer's.[12] Another study found evidence that at high levels, inhaled elemental mercury can damage lungs, lead to kidney dysfunction, and can suppress the normal function of the immune system.[13]

Mercury Threatens Wildlife

Mercury is not just harmful to people, it also poses a serious risk to wildlife. Fish-eating wildlife – including otter; mink; and many birds such as loons, ducks, herons, and eagles – have been found with elevated mercury levels. Recent studies have also found high mercury levels in wildlife that do not eat fish, indicating that mercury is finding its way into the larger food web.[14] Documented adverse effects in wildlife include a decreased ability to reproduce successfully, impaired growth and development, abnormal behavior, and death.[15] For birds such as herons, egrets, starlings, red-tailed hawks, mallard ducks, and loons, mercury exposures can cause reduced food intake and weight loss, weakening in wings and legs, difficulty flying, walking, and perching, eggshell thinning, and increased numbers of eggs laid outside the nest. Scientific research indicates that mercury may be a contributing factor in the population decline of several species including walleye and the endangered Florida panther.[16]

Mercury Affects Our Economy

In addition to posing serious human health and wildlife threats, mercury pollution can also affect state and local economies. Forty-six states have issued fish consumption advisories warning people to limit or avoid eating certain species of fish because of mercury contamination. The mercury contamination is so widespread that 29 states have issued some kind of statewide fish consumption advisories.[17] While these measures are necessary to protect public health, the increasing prevalence of mercury consumption advisories threatens the country's multi-billion dollar fishing industry. According to the American Sportfishing Association, fishing ranks among the top family leisure-time activities. An estimated 44 million people fish in the United States and generate nearly $42 billion in retail sales each year.[18] Studies show that mercury advisories cause anglers to choose other locations to fish and take fewer overall fishing trips.[19] For local economies that are heavily dependent on fishing, the impact of lost revenue could be significant.

With its potential to cause brain damage and to harm commercial and recreational fishing, mercury poses a serious economic risk. Two studies were published in 2005 addressing the economic consequences of mercury pollution. One assessment by researchers at the Harvard School of Public Health's Center for Risk Analysis estimated the health costs to the national economy of mercury pollution from U.S. coal-fired utilities, concluding that they range from $100 million to $5 billion per year, for this sector alone.[20] Another study by researchers at the Mt. Sinai Medical School assessed the economic costs from the reduced IQs of those exposed to mercury and concluded that mercury pollution from all sources costs the United States from $2.2 billion to $43.8 billion each year.[21]

National Overview of State Actions

In early 2005, the Environmental Council of States (ECOS) and the Quicksilver Caucus asked states to complete a comprehensive survey about their efforts to address mercury pollution. This compendium reflects the responses from the 45 states that completed the survey. In the sections that follow, states' responses are described in detail. While the survey included more than 60 questions, this report focuses on the major initiatives and policies that states have adopted to reduce mercury in the environment. More detail on individual state efforts are summarized in Part 2. The table below is a snapshot of actions that states have taken to reduce or manage mercury.

National Overview of State Actions

State	Overall Mercury Action Plan	Quantify Progress Reducing Mercury	Inventory Mercury Sources	Conduct Mercury Monitoring	Mercury TMDLs, Watershed Plans, or Other Alternatives	Mercury Fish Consumption Advisory	Labeling Mercury-Containing Products	Phase-out Mercury-Containing Products	Mercury Collection Program	Mercury Vehicle Switch Removal	On-going Public Outreach	Mercury Related Research/Studies
Total Number of States	**22**	**25**	**29**	**43**	**18**	**42**	**12**	**18**	**37**	**19**	**45**	**28**
Alaska				✓				✓			✓	
Arizona	✓			✓	✓	✓			✓	✓	✓	✓
Arkansas				✓	✓	✓			✓	✓	✓	
California		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Colorado	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
Connecticut	✓	✓	✓	✓		✓*	✓	✓	✓	✓	✓	✓
Delaware			✓	✓		✓			✓		✓	✓
Florida	✓	✓	✓	✓		✓*		✓	✓		✓	✓
Georgia				✓	✓	✓			✓		✓	
Hawaii				✓		✓*			✓	✓	✓	✓
Illinois		✓	✓	✓		✓*		✓	✓		✓	✓
Indiana		✓	✓	✓		✓*		✓	✓		✓	
Kansas				✓	✓	✓			✓		✓	
Kentucky	P			✓		✓*					✓	
Louisiana	P	✓	✓	✓	✓	✓			✓	✓	✓	✓
Maine	✓	✓	✓	✓	✓	✓*	✓	✓	✓	✓	✓	✓
Maryland		✓	✓	✓	✓	✓*	✓	✓	✓		✓	✓
Massachusetts	✓	✓	✓	✓	✓	✓*		✓	✓		✓	✓
Michigan	✓	✓	✓	✓	✓	✓*		✓	✓	✓	✓	✓
Minnesota	✓	✓	✓	✓		✓*	✓	✓	✓	✓	✓	✓
Mississippi				✓	✓	✓			✓		✓	✓
Missouri	✓		✓	✓		✓*			✓		✓	

Key:

✓ = Yes
✓* = Statewide Advisory
P = Planned
A = Inventory of Air Sources Only

State	Overall Mercury Action Plan	Quantify Progress Reducing Mercury	Inventory Mercury Sources	Conduct Mercury Monitoring	Mercury TMDLs, Watershed Plans, or Other Alternatives	Mercury Fish Consumption Advisory	Labeling Mercury-Containing Products	Phase-out Mercury-Containing Products	Mercury Collection Program	Mercury Vehicle Switch Removal	On-going Public Outreach	Mercury Related Research/Studies
Montana				✓		✓*			✓		✓	
Nebraska				✓		✓		✓	✓		✓	
Nevada			✓			✓			✓		✓	✓
New Hampshire	✓	✓	✓	✓		✓*		✓	✓	✓	✓	✓
New Jersey	✓	✓	✓	✓		✓*	✓	✓			✓	✓
New York	P	✓	A	✓	✓	✓	✓	✓	✓	✓	✓	✓
North Carolina		✓	✓	✓	✓	✓			✓		✓	✓
North Dakota		✓		✓		✓*					✓	✓
Oklahoma	P		✓	✓					✓		✓	
Oregon	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Pennsylvania	✓	✓	✓	✓	✓	✓*			✓	✓	✓	
Rhode Island	✓	✓	✓		✓	✓*	✓	P			✓	
South Carolina	P		✓	✓		✓					✓	✓
South Dakota			✓	✓		✓					✓	
Tennessee				✓		✓			✓		✓	
Texas		✓	✓	✓		✓			✓		✓	✓
Utah				✓		✓			✓	✓	✓	
Vermont		✓	✓	✓		✓*	✓		✓	✓	✓	✓
Virginia	P	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Washington	✓	✓	✓	✓	✓	✓*	✓	✓	✓	✓	✓	✓
West Virginia		✓	✓	✓		✓*			✓		✓	
Wisconsin	✓		✓	✓		✓*			✓	✓	✓	✓
Wyoming				✓							✓	

Mercury Strategies

State and local officials are using diverse approaches to address mercury contamination. Until recently, these approaches have almost always been piecemeal—that is, they have not been part of a coordinated comprehensive program to reduce and eliminate mercury uses and releases. A growing trend toward developing comprehensive programs has emerged as states recognize the need for a broader commitment to phase out persistent toxic chemicals like mercury.

Of the 45 states surveyed, 16 (36%) have developed an overall mercury action plan or strategy document, and six more plan to develop one in the future. For those states with an action plan or strategy, the most commonly reported major elements in these documents are:

- ✓ mercury recycling;
- ✓ public outreach and education to reduce exposure;
- ✓ small business and household mercury waste management;
- ✓ medical and dental mercury waste management; and
- ✓ reduction of mercury use in consumer products.

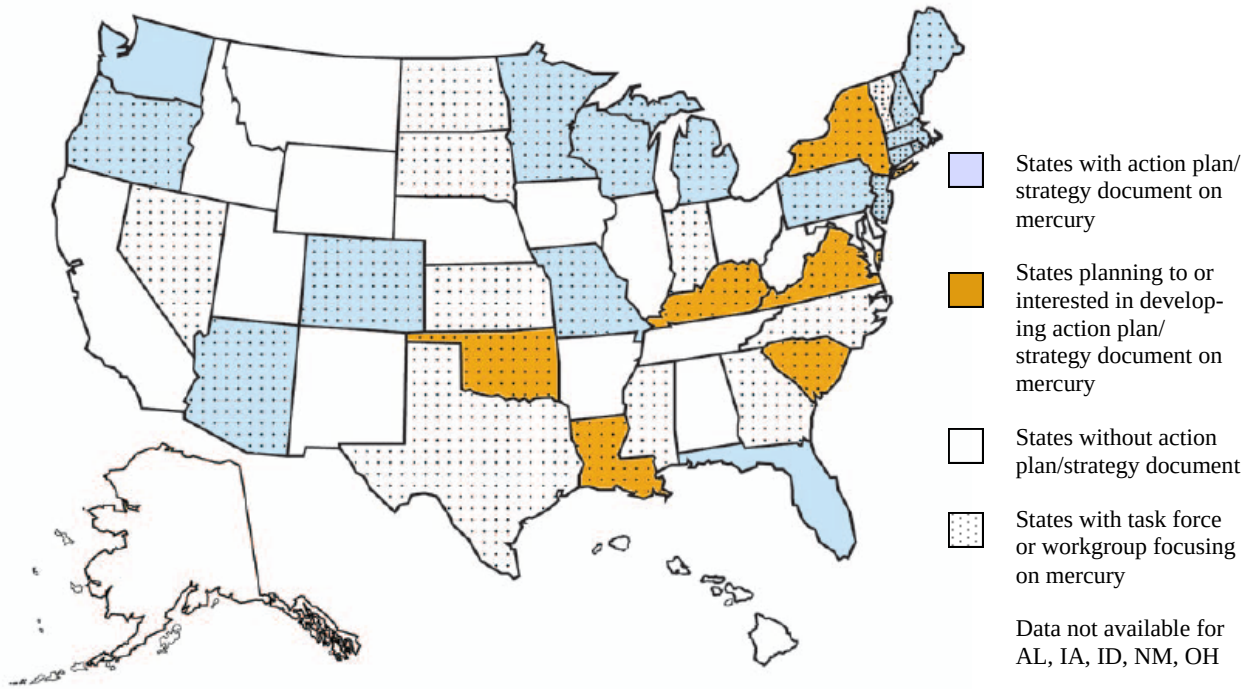
Thirteen of the 16 states with action plans or strategies have related statutes and/or regulations.

Regional Strategy: New England Governors & Eastern Canadian Premiers Mercury Task Force

In 1998, the New England Governors and Eastern Canadian Premiers adopted a landmark goal to "virtually eliminate" releases of mercury from human activities into the environment. They also created an action plan to eliminate 50% of emissions by 2003.

Almost all states with comprehensive mercury strategies have formed task forces or workgroups specifically focused on mercury issues. Thirteen (29%) states have comprehensive mercury task forces or workgroups. Thirty (67%) states have task forces or workgroups that focus on a specific mercury issue such as: the health effects of mercury; fish consumption advisories; mercury air emissions; mercury-containing products; mercury's impact on public health; government procurement; health care uses; public education; mining; and TMDLs. The task forces vary in their composition; some are internal to the government agency and others are more like stakeholder groups – composed of citizens, business, government, environmental, and public health representatives.

States with Mercury Action Plans and Task Forces



The ability to track changes in mercury uses and releases is essential for measuring the success of a reduction program. This requires developing a baseline of mercury pollution from all sources and maintaining an accurate annual mercury releases inventory. Developing a reliable baseline helps states design a program by identifying mercury sources that are unique to their state and a starting point against which to measure progress.

Measuring progress is not only important for assessment purposes. It also becomes a valuable communications tool—it conveys to the public the extent of the problem and can illustrate whether current efforts are adequately eliminating the problem in an appropriate timeframe.

Twenty-five states (56%) quantify their progress on reducing mercury pollution. As the table shows, the two most used outcome measures are the total amount of mercury collected and mercury levels in fish tissue. In addition to the measures listed in the table, states are using: surveys of local agencies' understanding of mercury issues; number of public outreach events; number of website visits; and ambient water monitoring.

Outcome Measures Used by States

Measure	# of States
Total amount of mercury collected (pounds of mercury from devices, stocks, or wastes)	20
Mercury levels in fish tissue	20
Number of mercury-containing devices collected (thermostats, switches, etc.)	18
Number of fishing advisories/impaired waters	17
Air emissions	17
Number of schools that have conducted mercury cleanup	15
Number of dentists that installed amalgam separators	11
Mercury deposition	11
Wastewater discharges	11
Ambient air quality improvements	10
Wildlife monitoring	8
Mercury levels in water body sediments	8
Number of organizations adopting mercury-free purchasing specifications	7

When asked what they thought were the measures that can best quantify states' progress on mercury pollution reduction, state responses indicated that the top five best ways were:

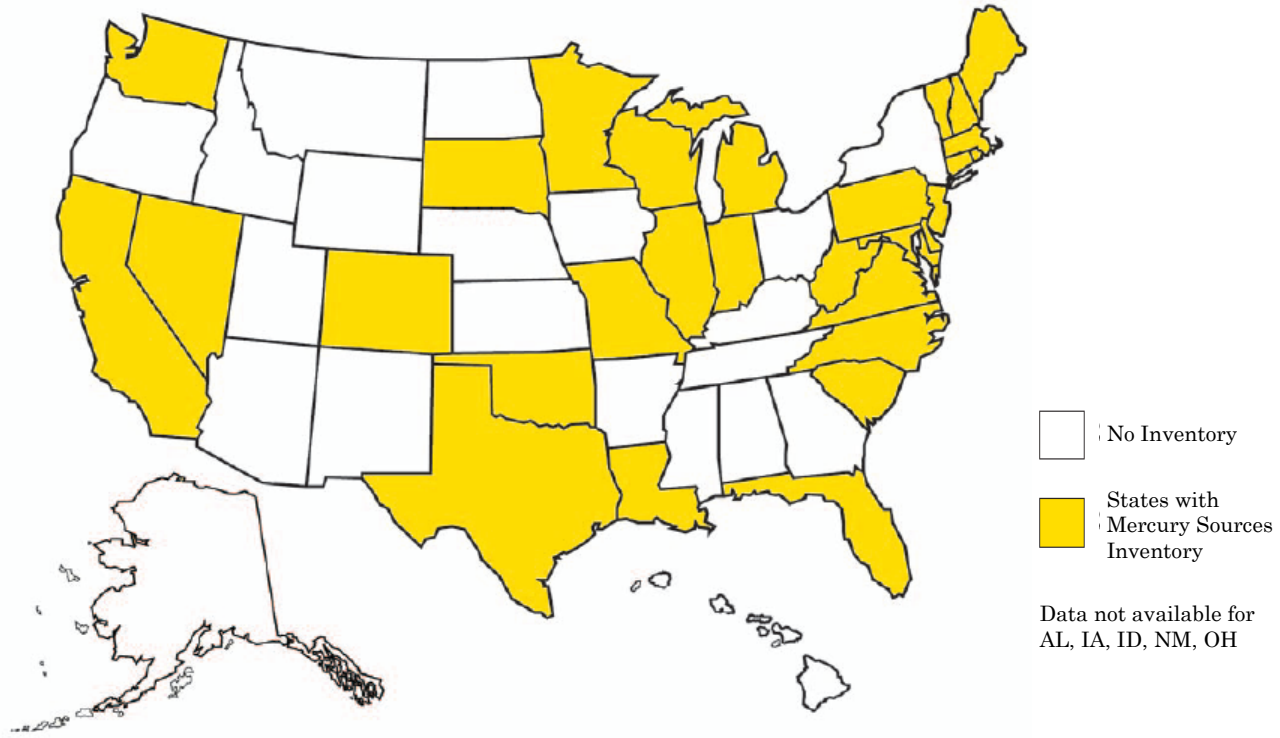
- ✓ air emission monitoring (19);
- ✓ fish and other wildlife sampling (16);
- ✓ the number of mercury-containing products collected and recycled (10);
- ✓ total amount of elemental mercury collected (9); and
- ✓ deposition monitoring (6).

Four of these top five measures are also in the top five most used outcome measures. Only deposition monitoring, which was the fifth most frequently identified best measure for progress on mercury pollution reduction, is not in the top five most used measures. Deposition monitoring ranks eighth in use while number of fishing advisories/impaired waters ranks fifth.

Mercury Monitoring

States across the country are investing significant resources into mercury monitoring and research. Twenty-nine states (64%) maintain an inventory of in-state mercury sources, though the methods they use to develop inventories vary greatly.

States With a Mercury Sources Inventory



The most concrete method for measuring progress toward eliminating mercury is to measure releases and track mercury uses. For emission sources like incinerators, compliance with emission limits is often determined by periodic stack tests, emission factors, or continuous emissions monitors (CEMs). Routine monitoring or installing CEMs can be more accurate and should be explored as part of a mercury-reduction program. Most inventories may not include all sources of mercury. Sources of mercury emissions frequently missing from source inventories include crematories and dental offices.

The biggest gap—and greatest data challenge—is the ability to accurately track mercury uses and releases. Some states, such as Indiana, Maine, and New Jersey, incorporate mercury stack emissions testing or discharge monitoring as a requirement for permitting. States can also incorporate reporting and tracking requirements in product legislation to better measure compliance with product bans or disposal bans. This may include sales disclosures, disclosures in raw material purchases and use, or manufacturer take-back requirements.

In addition to maintaining inventories of mercury sources, states are very involved in atmospheric and ecological mercury monitoring, from air deposition and sediment sampling, to fish tissue and wildlife monitoring. Twenty-one states (47%) participate in the National Mercury Deposition Network (MDN). The MDN is a national database of weekly concentrations of total mercury in precipitation and the seasonal and annual flux of total mercury in wet deposition. The data collected are used to develop information on spatial and seasonal trends in mercury deposited to surface waters, forested watersheds, and other sensitive receptors.

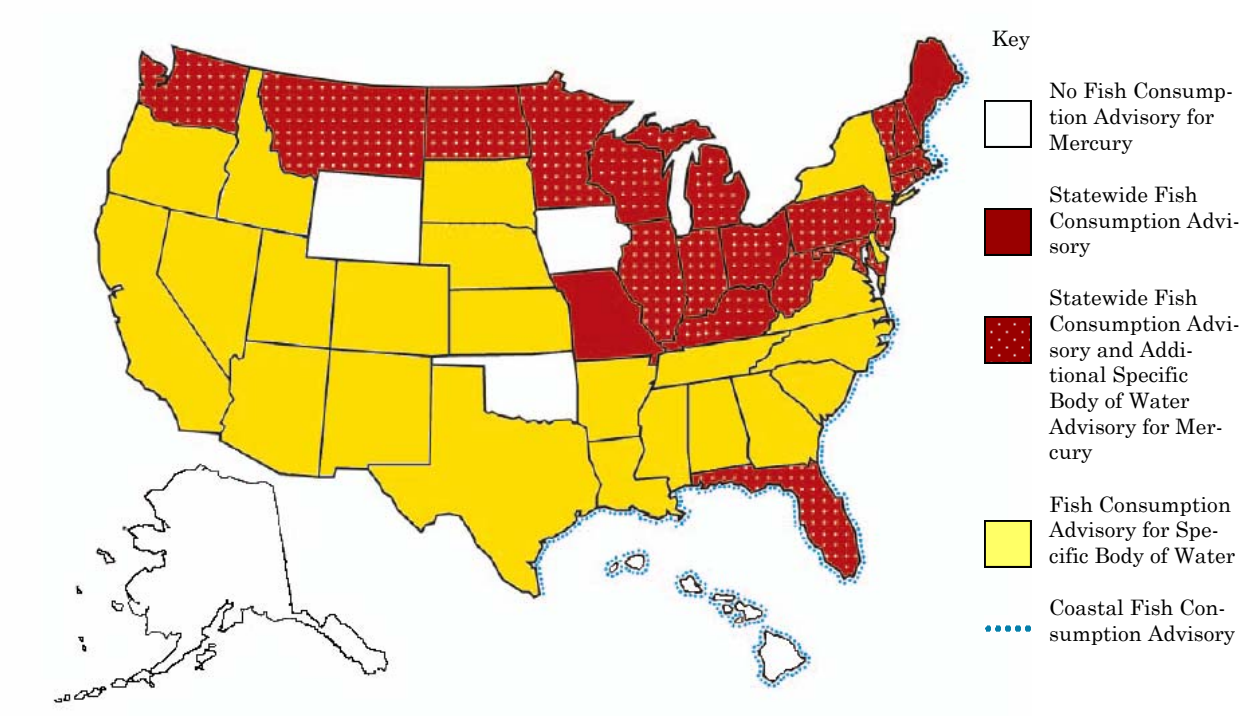
Mercury Monitoring by States

State	Emissions	Ambient Air	Ambient Water	Wastewater Discharge	Mercury Deposition	Waterbody Sediment	Wildlife	Fish Tissue	Mercury Collection
Total Number of States	**17**	**20**	**10**	**28**	**23**	**26**	**14**	**42**	**16**
Alaska								✓	
Arizona			✓	✓	✓	✓	✓	✓	Switches from end-of life vehicles
Arkansas				✓				✓	
California		✓	✓	✓		✓		✓	Medical devices from HELP award recipients
Colorado	✓	✓		✓	✓		✓	✓	
Connecticut	✓	✓		✓		✓		✓	✓
Delaware			✓	✓		✓		✓	
Florida	✓	✓			✓		✓	✓	✓
Georgia		✓		✓	✓	✓	✓	✓	
Hawaii	✓							✓	
Illinois		✓		✓				✓	All types of mercury-containing devices
Indiana	✓	✓			✓			✓	
Kansas				✓				✓	
Kentucky		✓		✓	✓	✓		✓	
Louisiana			✓	✓	✓	✓		✓	
Maine	✓		✓	✓	✓	✓	✓	✓	Devices, switches, lamps
Maryland	✓			✓	✓			✓	Mercury drop-off locations, school lab collections, & spill responses
Massachusetts	✓			✓	✓	✓	✓	✓	✓
Michigan	✓	✓	✓	✓	✓	✓	✓	✓	✓
Minnesota					✓	✓	✓	✓	School collections
Mississippi				✓		✓		✓	
Missouri				✓	✓	✓		✓	✓
Montana	✓							✓	
Nebraska			✓					✓	
Nevada									
New Hampshire	✓	✓						✓	
New Jersey	✓	✓		✓	✓	✓		✓	
New York	✓	✓		✓		✓	✓	✓	✓
North Carolina		✓		✓	✓	✓		✓	
North Dakota					✓	✓	✓	✓	
Oklahoma								✓	
Oregon				✓	✓	✓		✓	✓
Pennsylvania	✓	✓			✓			✓	
Rhode Island									
South Carolina		✓			✓			✓	

State	Emissions	Ambient Air	Ambient Water	Wastewater Discharge	Mercury Deposition	Waterbody Sediment	Wildlife	Fish Tissue	Mercury Collection
South Dakota		✓		✓				✓	
Tennessee				✓		✓	✓	✓	✓
Texas	✓	✓	✓	✓	✓	✓			✓
Utah	✓	✓				✓	✓	✓	Thermometers
Vermont		✓			✓	✓	✓	✓	
Virginia				✓	✓	✓		✓	
Washington			✓	✓		✓		✓	
West Virginia				✓				✓	
Wisconsin	✓	✓		✓	✓	✓	✓	✓	
Wyoming			✓			✓		✓	

While 42 states reported that they monitor mercury in fish tissue, only 39 (87%) states complete on-going fish tissue sampling for mercury. Just two of those 39 have not issued a fish consumption advisory. Several states indicated that the amount of financial resources available to the agency determined the frequency and number of water bodies sampled.

State Fish Consumption Advisories



Twenty-eight states (62%) have conducted scientific research related to mercury. Sixteen of those states fund a portion or all of the mercury research completed by the state.

Research and Studies by States

State	Approx. Total Amount	Description of Research and Studies
AZ	$225,000	Lake coring study across northern Arizona & other soil & sediment sampling. Established 1st MDN site in Arizona. Contracted study of baseline trends in mercury across AZ (1998).
AR	$60,000	Mercury research has been eliminated due to lack of funding.
CA	$15,000,000 since 2000	Mercury removal from stream channels. Study evaluating the ability of drum-top crushers for spent fluorescent lamps to effectively control mercury vapor emissions. Research to better understand the sources, fate, and transformation of inorganic mercury to methylmercury in impaired water bodies in California's Central Valley. Plans for projects at mercury mine sites to stop the input of new mercury and improve the Cache Creek settling basin to trap mercury that has already left the mines but not yet arrived in the estuary. Studying how mercury biomagnifies in fish with the goal of developing watershed management measures that will suppress it.
CO	Not available	Mercury deposition research. Monitoring fish for mercury impacts.
CT	$1,560,000	Mercury levels in fish and sediments, stack emissions testing, atmospheric deposition. Research on mercury cycling in Long Island Sound.
DE	Not available	Monitoring for mercury contamination in surface soils, subsurface soils, groundwater, surface water, and sediments.
FL	$40,000,000 over 12 years	Research to better understand the multimedia cycling of mercury. Developing methods for improving measurements of mercury in various environmental media.
HI	Not available	Developing a database to track medical documentation of mercury levels in blood.
IL	Not available	Compared water sampling techniques to determine if EPA Method 1699 (clean hands/dirty hands), which is resource intensive, was necessary to obtain reliable results when testing for very low concentrations of mercury.
LA	$50,000 to $75,000 annually	Characterization of ambient soil heavy metal concentrations. Research into historic contamination from natural gas meter sites. Compiling data on ratio of total mercury to methylmercury with aim of determining methylation rates.

Mercury Research

State	Approx. Total Amount Funded	Description of Research and Studies
MA	$75,000 to $100,000 annually	Co-sponsored testing of continuous emission monitoring technologies as part of the U.S. EPA Environmental Technology Verification Program. Supported research on dental amalgam separators. Research evaluating in-state mercury pollution sources, impacts of mercury pollution, and pollution controls.
MD	$804,532 from 1995–2005	Mercury emissions stack testing & process control at coal-fired power plants.
ME	$492,000 + technical in-kind support to NESCAUM Emissions Inventory	Strategies to reduce mercury in products. Developing wildlife criterion for mercury.
MI	Consulting — $180,000, University — $550,000, Federal government — $1,370,000	Co-sponsors mercury deposition (rain sampling) network in MI. Research assessing fugitive mercury releases. Studies on automotive mercury switches.
MN	$250,000 over 4 years	Studies on mercury bioaccumulation.
MS	Not available	Cooperating with the Pat Harrison Waterway District to evaluate liming as a means to reduce mercury in fish in the Archusa Creek Reservoir.
NV	Not available	Supported studies by the University of Nevada Reno and Desert Research Institute on the fate and transport of mercury, natural sources of mercury, and potential control mechanisms.
NH	Not available	Participated in U.S. EPA's assessment of mercury in waters, sediments, and biota of New Hampshire and Vermont lakes using a geographically randomized design. Participated in a study with U.S. Fish and Wildlife Service to measure mercury concentrations in fish from southeast NH ponds.
NJ	Not available	Methylmercury reference dose studies. Ongoing research relating to mercury switches in automobiles.
NY	Not available	Study of the Neversink Reservoir Watershed to gain a better understanding of the factors controlling mercury methylation and its bioavailability. Study to test a mass balance/biogeochemical model to predict the fate of mercury in drainage lake ecosystems. Participation in the Biodiversity Research Institute study on the effects of dry deposition of mercury in the Catskill Mountains on local songbirds. Study to monitor mercury levels in eagles to establish baseline patterns.

State	Approx. Total Amount Funded	Description of Research and Studies
NC	Not available	Atmospheric mercury trends in North Carolina.
ND	$250,000	Research related to the fate and transport, methylization rates, and deposition to depressional wetlands and effects on wildlife.
OR	Not available	Developed a mass balance model for mercury cycling as part of the Willamette River TMDL development. Developed an aquatic food web biomagnification model for estimating mercury target levels. Study mercury levels and relationships in water, sediment, and fish tissue.
PA	$376,000 over 4 years	Monitoring mercury emissions from the Centralia Mine Fire.
VA	Not available	Assisting the U.S. FWS to perform an environmental risk assessment for bald eagles and other fish consuming wildlife in the Great Dismal Swamp National Wildlife Refuge.
VT	$200,000 since 1998	Creating a model to determine mercury transport to and through the Lake Champlain ecosystem. Mercury levels in blood of the threatened Bicknell's thrush and other insectivorous woodland birds.
WA	Not available	Testing mercury levels in fish, human hair, and canned tuna.
WI	$960,000	Several studies on watershed transport and transformations of atmospherically derived mercury. Impacts of reservoir creation on methylmercury production. Monitoring atmospheric deposition of mercury and developing an atmospheric modeling system for the Great Lakes region.

Industrial Sources of Mercury

More than 50% of the states surveyed cited coal-fired electric power plants as the top intrastate anthropogenic mercury source in their state. More than 80% of the states included coal-fired electric power plants in the top three intrastate anthropogenic mercury sources for their state. While no state identified cement kilns as their top source, it was in the top three sources 11 times. Appendix A provides state-by-state information on the top intrastate anthropogenic mercury sources.

Top Intrastate Mercury Sources

Source	# of States
Coal-fired power plants	24
Mining	5
Industrial boilers	4
Municipal solid waste incinerators	3
Chlor-alkali plants	2

Intrastate Mercury Sources Identified in States' Top Three

Source	# of States
Coal-fired power plants	37
Industrial boilers	12
Cement kilns	11
Mining	10
Municipal solid waste incinerators	9

69% of the states surveyed have a state regulation limiting mercury releases from major sources of mercury emissions. Many states rely on the federal government to establish limits on mercury releases.

Coal-Fired Power Plants

The 430 coal-fired power plants, located throughout the United States, annually emit nearly 50 tons of mercury into the air.[22] Twenty-four states (53%) reported coal-fired electric power plants as the top intrastate manmade source of mercury in their state. Thirty-seven states (82%) identified them in their top three intrastate manmade sources. Recognizing coal-fired power plants as a major source of mercury pollution within their borders, 10 states reported having state regulations for mercury releases from this source. Further emphasizing the importance of air emissions in addressing mercury pollution, 17 states (38%) use air emission reductions to quantify progress on reducing pollution and 10 of the 16 states with mercury action plans or strategies have emission limits as a major element in the plan or strategy. Appendix B provides other information on state legislation related to coal-fired power plants.

Chlor-Alkali Plants

Only nine mercury-cell chlor-alkali plants still operate in the United States. They are located in eight states: Alabama, Delaware, Georgia, Louisiana, Ohio, Tennessee, West Virginia, and Wisconsin. The nine mercury-cell chlor-alkali plants produce just 10% of the chlorine manufactured in the United States. According to the EPA's Toxics Release Inventory, in 2003 U.S. chlor-alkali plants released or disposed of 15,948 pounds of elemental mercury.

Five states (Delaware, Kentucky, Louisiana, Tennessee, and West Virginia) reported chlor-alkali plants as one of their top three intrastate sources of mercury. The importance of chlor-alkali plants as a source of mercury pollution is revealed in the fact that nine states (20%) reported having state regulations for chlor-alkali plants. Only two of those states – Delaware and Louisiana – have chlor-alkali plants operating within their borders. Appendix C provides additional information on chlor-alkali plants.

States Regulating Mercury Releases

	Coal-Fired Power Plants	Electric Arc Furnaces	Industrial Boilers	Steel Recycling Facilities	Sewage Sludge Incinerators	Wastewater Treatment	Chlor-alkali Plants	Municipal Solid Waste Incinerators	Medical Waste Incinerators	Mining	Cement kilns
Arizona						✓				✓	
Arkansas	✓			✓		✓	✓		✓		✓
California											✓
Connecticut	✓							✓	✓		
Delaware	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Florida								✓	✓		
Georgia						✓					
Indiana					✓			✓	✓		✓
Kentucky			✓	✓	✓	✓	✓				✓
Louisiana		✓		✓			✓	✓	✓		
Maine			✓	✓		✓		✓			✓
Maryland		✓	✓	✓	✓		✓	✓	✓		✓
Massachusetts	✓					✓					
Michigan						✓		✓	✓		
Minnesota						✓		✓	✓		
Montana	✓		✓								✓
New Hampshire								✓	✓		
New Jersey	✓	✓						✓	✓		
New York		✓		✓		✓		✓			
North Carolina					✓			✓	✓		
Oregon			✓					✓			
Pennsylvania						✓					
Rhode Island									✓		
South Carolina	✓	✓	✓		✓		✓	✓	✓		✓
South Dakota						✓					
Texas	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Virginia	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Washington						✓	✓	✓			
West Virginia						✓					
Wisconsin	✓					✓					
Wyoming						✓				✓	
Total	10	8	9	8	8	18	9	18	16	5	17

Mercury in Consumer Products

Many products in the home and office contain mercury that often goes unnoticed. Certain models of gas-fired appliances and HVAC equipment contain mercury flame sensors as a safety device. Stoves and ovens, automobiles, and appliances with alarms or automatic shut-offs are among the many products that may contain mercury switches or relays. Switches and relays individually can contain large amounts of mercury, ranging from 0.5 grams to 153 grams for some relays. Thermostat switches contain about 3 grams of mercury per switch, and because some thermostats contain multiple switches, the average thermostat contains about 4 grams of mercury. Laboratories are filled with chemicals and instruments that contain elemental mercury or mercury compounds. Fortunately, mercury-free alternatives are available that can be purchased in place of most mercury-containing products.

Annual Amount of Mercury Disposed Through Products[23]

Product	Tons of Mercury
Electrical lighting	17 tons
Measuring devices	9–17 tons
Thermostats	15–21 tons
Switches and relays	36–63 tons
Dental preparations	34–54 tons
Batteries	negligible

State governments are taking the lead in developing innovative ways to deal with mercury in products. Twenty states (44%) have taken a variety of steps to curb mercury use in products and to prevent the improper disposal of mercury-containing products still in use. The most common action taken by states related to products containing mercury is the phase-out of some items, with 19 states (42%) reporting having phased out or being in the process of phasing out one or more mercury-containing products. Mercury thermometers have been phased out more than any other product. Thermostats, batteries, mercury-added novelties, and packaging containing mercury are other commonly phased-out products. In addition to phasing out items, 17 states (38%) reported having some type of sales ban.

The products most often banned are mercury thermometers and mercury-added novelties. While not as common as sales bans, use bans are in place in nine (20%) states. The most frequently banned use of mercury and mercury-containing products is in schools.

Another recent trend is the labeling and notification of products that contain mercury to help consumers recycle their products and purchase alternative products. Although no state reported having a voluntary product-labeling program, 12 (27%) states reported having mandatory product labeling requirements that range in scope from those limited solely to mercury-containing lamps or thermometers to those that cover all mercury-containing products. When state statutes require labeling of specific products, the two most commonly labeled products are lamps and thermometers.

Even with sales bans, use bans, phasing out of mercury-containing products, and product labeling, some mercury and mercury-containing products are still used. To help ensure proper handling of wastes generated from these uses, 11 (24%) states have some type of disposal ban for mercury or mercury-containing products.

California's Proposition 65 requires manufacturers to provide a "clear and reasonable warning" before exposing anyone to a listed chemical, which includes mercury. This warning can take the form of a label.

Even as awareness of mercury pollution and efforts to eliminate its sources increases, some manufacturers are beginning to introduce mercury into new products. Mercury has been entering product lines where consumers would least expect it, such as automobile headlamps—high-intensity discharge lamps contain mercury. Without a mandatory labeling law or a complete ban on mercury use in consumer products, new products will likely be designed without the knowledge of consumers or procurement officers.

State Actions Related to Mercury in Products (Excluding Vehicle Switches)

State	Labeling Requirements	Ban Mercury in Schools	Sales ban, use ban or phase out						Limits on Mercury in Products	Disposal Ban
			Thermometers	Thermostats	Manometers	Novelty Items	Certain Types of Switches	Other		
California	✓		✓	✓		✓	✓			✓
Connecticut	✓		✓	✓	✓	✓	✓	✓	✓	
Florida									✓	✓
Illinois		✓	✓			✓	✓			
Indiana			✓**			✓				
Maine	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Maryland	✓	✓	✓							✓
Massachusetts			✓							
Michigan		✓	✓					✓	✓	
Minnesota	✓		✓		✓	✓	✓	✓	✓	✓
Nebraska			✓							
New Hampshire		✓	✓					✓	✓	
New Jersey	✓							✓	✓	
New York	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Oregon	✓		✓	✓				✓	✓	
Rhode Island	✓		✓			✓			✓	✓
South Dakota										✓
Vermont	✓									✓
Virginia	✓ *							✓	✓	✓
Washington	✓		✓						✓	✓
Total	**12**	**5**	**15**	**5**	**4**	**8**	**6**	**9**	**12**	**11**

Key:
✓ = Yes
* limits mercury in packaging only
** must be sold behind the counter

Mercury Disposal and Collection Programs

Using funding from a U.S. EPA grant, Georgia provided free thermometers and training to local governments and schools wishing to perform mercury thermometer exchanges.

For mercury-containing products still in use, proper end-of-life management is critical. Removing mercury-containing products from the waste stream before they end up broken, incinerated, landfilled, or poured down the drain avoids unnecessary emissions. Despite the current trend towards bans and phaseouts, given the fact that products already in use contain many tons of mercury, disposal and safe handling remains an important issue.

Eighty-two percent (37) of states have sponsored voluntary mercury collection programs for elemental mercury, mercury waste, or mercury-containing products. Only eight states indicated that they did not have any mercury collection or recycling programs. The types of state-sponsored mercury collection and recycling programs include: designated drop-off collection sites, school sweeps, and thermometer exchanges. Many states rely on federal funding to support their mercury collection programs.

In addition to state mercury collection programs, the thermostat manufacturing industry has set up a take-back program. Appendix E provides more detail on this program.

Over the past 5 years, the U.S. EPA provided funding which allowed Wisconsin to invest $1,870,000 to pilot Community Mercury Reduction Programs in 20 communities, focusing on collecting mercury waste from medical and dental offices, school, thermostats, auto switches, and dairy farming products. These programs resulted in the collection of 13,000 pounds of elemental mercury and the state is developing a Community Mercury Reduction Guidance Manual.

Long-Term Mercury Storage

A handful of states are discussing creating a long-term mercury storage program. Currently, only the U.S. Department of Defense (DoD) maintains a mercury stockpile for surplus federal mercury. States have unsuccessfully requested that DoD accept elemental mercury from the state governments and elsewhere, such as the chlor-alkali industry. Several states expressed the need for the federal government to organize a national long-term mercury storage program and the chlor-alkali industry has indicated a willingness to transfer retired mercury to a federal stewardship program.

The Quicksilver Caucus (QSC) and the Environmental Council of the States (ECOS) have published information and expressed state views on mercury stewardship and long-term storage needs. In their resolution, "United States Mercury Stockpile Sales," which was originally passed in 1996 and has been renewed through 2006, ECOS members called on the federal government to look into long-term management of the U.S. mercury stockpile. In another resolution, "Mercury Retirement and Stockpiling," which was originally passed in February of 2001 and was renewed in April of 2004, ECOS members recognized that long-term storage of mercury is a federal responsibility, asked the federal government to create and implement a plan to manage long-term mercury storage, and requested that large consumers of mercury be included in the development of the plan. Additionally, in 2003, the QSC published four documents on mercury stewardship, which discussed supply and demand for mercury, mercury storage options, and best-management practices for mercury storage. Appendix D provides more detailed information on ECOS' resolutions related to mercury and on the QSC's mercury stewardship documents.

Convenience-light and vanity-light switches in vehicles can each contain 1 gram or more of mercury, and are found in many domestic vehicles still on the nation's roads. This mercury becomes a problem when vehicles are retired from use. It is released during vehicle shredding and the steel recycling/smelting processes.

Twenty-one (47%) of states have either proposed or enacted legislation or regulations regarding mercury switches. Most of these initiatives call for vehicle manufacturer take-back or require scrap metal recyclers to remove switches prior to shredding. Six states (13%) reported currently having mandatory removal of mercury switches from end-of-life vehicles. Another six states reported having plans to mandate removal of switches from end-of-life vehicles. In addition to those states with mandatory removal, 13 states (29%) indicated that they have activities related to voluntary removal of switches from end-of-life vehicles. No state reported having mandatory removal of mercury switches from on-the-road vehicles, but seven states did report having voluntary programs for on-the-road vehicles. The vehicles most affected by all of these switch-removal programs are passenger cars and trucks; as 19 states (42%) reported that these vehicles were covered in their programs. Commercial trucks were only addressed in the switch-removal programs of nine states (20%). The switch-removal programs focus on removing hood-light and trunk-light switches with 18 states (40%) removing these. Vanity-light switches and ABS-sensor switches are less frequently targeted; seven states (16%) and eight states (18%) respectively reported removing them. Although 11 states (24%) reported having state financial incentives for switch removal, lack of funding was the most often identified major challenge to state switch-removal programs. Other frequently mentioned barriers to state switch-removal programs included the lack of a legislative mandate, the need for training of and outreach to dismantlers and auto recyclers, and the lack of industry acceptance. (More detailed information on vehicle switch-removal programs can be found in the report from the Quicksilver Caucus: *Removing Mercury Switches from Vehicles: A Pollution Prevention Opportunity for States* which can be found on the ECOS website at www.ecos.org.)

Buying Mercury-Free Vehicles
In Minnesota, state vehicle bid specifications require disclosure of vehicle mercury content and notify vehicle manufacturers of the state's goal to purchase only mercury-free vehicles.

A national dialogue involving the U.S. EPA and affected stakeholders took place during 2004–2005 but these efforts were not successful in developing a national voluntary program. Without a national vehicle switch-removal program, states will continue to deal with vehicle shredder waste and scrap metal that contain remnants of mercury switches. Any national initiative that may be developed should be balanced with successful state programs already in place.

.

Vehicle Switches

State Vehicle Switch Activities

State	Proposed or Enacted Mercury Switch Legislation or Regulation	Removal from End-of-Life Vehicles	Removal from On-the-Road vehicles	Prohibit Replacement Mercury Switches	Prohibit in New vehicles	Vehicle Manufacturer Responsibility in Switch Removal	State Financial Incentives for Switch Removal
Arizona	✓	M					
Arkansas	✓	M				✓	
California	✓	M	V		✓		
Colorado		V					✓
Connecticut	✓	V	V		✓		✓
Hawaii		V					
Illinois	✓						
Indiana		P					
Louisiana	✓	V*	V*				
Maine	✓	M	V	✓	✓	✓	✓
Massachusetts	✓	P		P	P		
Michigan	✓	V				✓	
Minnesota	✓	M	V			✓	✓
Missouri		P					
New Hampshire		V					✓
New Jersey	✓	P				✓	✓
New York	✓	V*	V				
North Carolina	✓						✓
Oregon	✓	M	V		✓		✓
Pennsylvania	✓	V*					✓
Rhode Island	✓	P				✓	
South Carolina	✓						
Texas	✓	P	P				
Utah		V					
Vermont	✓	V					
Virginia		V					✓
Washington	✓	V*		✓	✓		
Wisconsin	✓	V					✓
Total	**21**	**25**	**8**	**3**	**6**	**6**	**11**

Key:
✓ = Yes
M = Mandatory
V = Voluntary
V* = Have voluntary removal, plan to implement mandatory removal
P = Plan to Implement

Hospitals and dental offices can be significant sources of mercury-containing waste. Elemental mercury is used throughout the medical community within mercury-containing equipment, laboratory reagents, dental amalgams, pharmaceuticals, and vaccines. Examples of mercury-containing medical equipment and products include thermometers, sphygmomanometers, dilation and feeding tubes, lab chemicals, and cleaning products.

The U.S. EPA ranks the health care sector as the fourth largest source of mercury air emissions because of their contribution to medical waste incinerators. To address this source, under the Clean Air Act the federal government set emission guidelines for mercury and other pollutants from both old and new medical waste incinerators. Fifteen states have adopted laws phasing out or banning mercury-containing thermometers, but a majority of those laws contain exceptions that allow the sale and use of mercury-containing thermometers to pharmacists or physicians.

Because mercury is commonly used in medical equipment, many states have pursued activities related to medical waste management issues. Fourteen states reported having medical/dental waste management as a major element in their existing state's action plan or strategy on mercury. Fourteen states also indicated that they had state regulations on mercury releases from medical waste incinerators. These regulations and other activities appear to have limited some mercury releases from the medical field; only one state reported medical waste incinerators as one of the top three sources of intrastate anthropogenic mercury releases to the environment.

In addition to requiring labeling of mercury-containing products and prohibiting the sale, use, or improper disposal of certain products, many states encourage health care facilities to participate in the voluntary Hospitals for a Healthy Environment Initiative (H2E). H2E is a joint project of the American Hospital Association (AHA), EPA, Health Care Without Harm, and the American Nurses Association with some support from state government. H2E's primary goal is to educate health care professionals about pollution prevention opportunities in hospitals and health care systems. Through activities, such as the development of best practices, model plans for total waste management, resource directories, and case studies, the project aims to provide hospitals and health care systems with enhanced tools for minimizing the volumes of waste generated and the use of persistent, bioaccumulative, and toxic chemicals. The Tennessee Department of Environmental Conservation coordinates, encourages, and supports the H2E within the state. Texas promotes mercury reduction in hospitals and dental offices through its Clean Texas, Clean World Program. Wisconsin and California have published guides for medical professionals on how they can phase out mercury uses and releases.

The dental sector is a source of mercury pollution because it uses mercury-containing dental amalgam. While dental amalgam can be a significant source of mercury releases into the environment, only one state reported it as one of their top three sources of intrastate anthropogenic mercury releases to the environment. Although states have not historically addressed this sector as much as some others, states are increasing their mercury-reduction activities related to dentists. Massachusetts has supported research on dental amalgam separators. Four states reported having regulations on mercury releases from dental amalgam separators. Additionally, 11 states (24%) use the number of dentists that have installed amalgam separators to help them quantify their progress on reducing mercury pollution. Additional information on dental amalgam laws can be found in Appendix F.

Outreach and Public Education

States are undertaking extensive public outreach efforts to educate individuals, businesses, schools, and government employees about the sources and solutions to mercury pollution, with the aim of protecting public health by reducing exposure. Tools and tactics being used by states to educate the public about mercury include factsheets, videos, reports, posters, brochures, workshops, press releases, training, and public service announcements.

Forty-five states (100% of survey respondents) engage in some type of public outreach or education activity. At least two states – Delaware and Washington – have state laws requiring the state environmental agency to conduct public outreach and education about mercury. Thirty-nine states (87%) target their outreach to specific constituencies such as sport fishermen (32 states), pregnant women (32), women of child-bearing age (27), and subsistence anglers (16). Other constituencies targeted include children, health care professionals, schools, scrap metal recyclers, and tradesmen. Twenty-one states (47%) provide outreach in languages other than English.

Number of States Engaging in Various Types of Public Outreach on Mercury

	Sources	Monitoring	Disposal & Clean-up	Health Effects	Research	Reduction Progress
Factsheets	18	6	20	25	3	9
Videos	4	2	4	5	2	3
Reports	18	18	9	12	9	10
Posters	6	1	3	7	1	3
Brochures	13	3	10	22	1	2
Workshops	11	7	10	10	6	6
Emails	4	2	2	2	2	2
Press Releases	8	10	11	15	3	10
Business Training	9	1	10	3	1	5
Citizen Training	2	0	5	3	0	1
PSAs	2	1	9	6	0	1
Media Events	5	5	10	7	1	5
Phone Hotlines	11	6	18	17	4	7

The most common type of public outreach by states is raising public awareness about safe fish consumption. Aside from the above-mentioned strategies, several states are more aggressively reaching out to the public through direct communication methods. States distribute information about fish-consumption advisories with the sale of fishing licenses, post signs with warnings at waterbodies' public access points, post information on websites, and direct mailings to newlyweds (VT) and fishing license holders with young children (determination made by cross-referencing license holders against birth registries in ME). Some states simply "pass along" fish consumption guideline information provided by the U.S. EPA, and do not disseminate state fish or waterbody-specific guidance.

A few states have developed creative public outreach initiatives that target children. In Vermont, the Department of Environmental Conservation partnered with video-game design students at Champlain College to develop an educational video game about mercury. The interactive computer program is aimed at eighth grade students. After playing the game, students in Vermont classrooms view a video that emphasizes the overall message. Vermont also sends direct mail to childcare providers. In Minnesota, Clancy, the mercury-detecting dog, is used in schools to educate children about the issue and to locate spilled mercury.

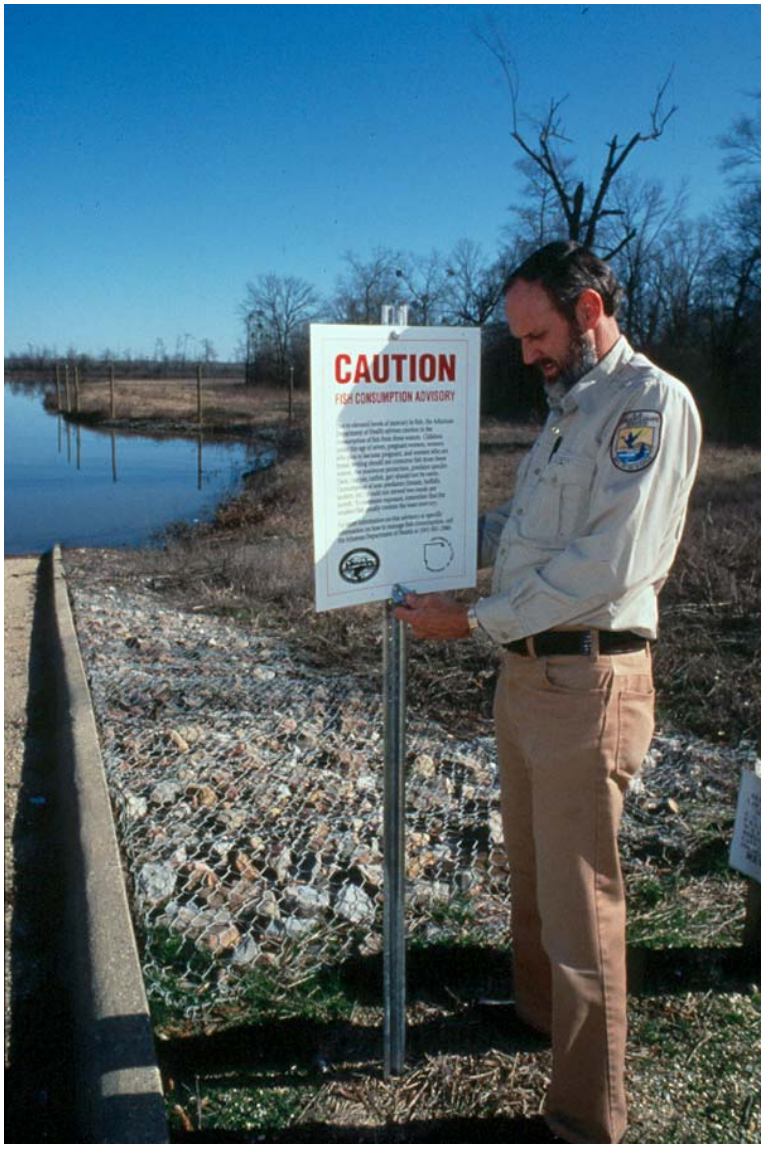


Photo: U.S. Fish and Wildlife Service

By organizing workshops and publishing self-training guides, several states are actively reaching out to businesses—such as hospitals and scrap metal recyclers—that have significant potential to reduce mercury pollution from consumer products. California held a series of 12 workshops throughout the state and developed self-training guides and best-management practices to assist dismantlers and automobile repair facilities in identifying, locating, and removing mercury switches from vehicles. The guides are published in English, Spanish, and Russian. Connecticut distributes "Environmentally Responsible Dental Office" brochures and other educational materials to health professionals via direct mail.

State Perspectives: Needs and Challenges

Although no shortage exists of challenges to solving our country's mercury contamination problems, several themes and needs were repeatedly expressed by states completing this survey.

Access to long-term elemental mercury storage

Currently, only the U.S. Department of Defense (DoD) maintains a mercury stockpile. States have unsuccessfully requested that DoD accept elemental mercury from state governments. Several states expressed a need for the federal government to organize a national long-term mercury storage program. Permanent storage and sequestration opportunities are needed within the United States to remove excess elemental mercury from commerce.

Knowledge about mercury clean-up and control methods

States identified two basic knowledge gaps – methods to identify and clean up legacy mercury and contaminated sediments, and affordable and effective mercury pollution control technologies for industrial sources.

Lack of legislative mandate

Without direction and authority from state legislatures, many state agencies are unable to initiate efforts to encourage or require mercury pollution reductions. State legislatures need to authorize and provide guidance and support for efforts to address this toxic problem.

Lack of funding

Whether for public education and outreach or for monitoring and research to identify the impacts of and solutions to mercury pollution, lack of financial resources was one of the most common challenges reported by states. For many states, funding for mercury-pollution reduction initiatives has been sporadic and available only for short periods of time. Few states have provided for long-term funding. Increased and sustained funding from state and federal governments remains critical to addressing the mercury pollution problem.

Mercury contamination is widespread in the United States. The risk to public health and wildlife is real. While states across the country have made measurable progress in addressing mercury pollution, opportunities for further reductions remain. Many of these opportunities are apparent in the diverse approaches that states have undertaken and reported in this survey. Although these varied strategies certainly point to potential actions that states can pursue, the diversity of these activities also reflects the limited coordination that has occurred among the states. The information provided in this compendium can help states identify potential partners and assistance as they continue their work to reduce mercury pollution and can help identify areas where coordination among states will reap further reductions. Also, the Quicksilver Caucus plans to use this information to futher its work in reducing mercury in the environment.

This compendium also shows the leadership role states have taken on to reduce mercury pollution. Through regulations on a variety of mercury sources, from mercury-related research to public outreach and education, states are actively engaged in efforts to reduce mercury pollution and to educate the public.

The Quicksilver Caucus and National Wildlife Federation hope that the information in this compendium will help states, communities, businesses, policymakers, and individuals better understand the types of actions they can pursue to reduce mercury pollution and provide them a better idea of what a comprehensive mercury reduction program could contain.

Citations

1 U.S. Environmental Protection Agency, Mercury Report to Congress, Vol. 1, EPA-452/R-97-003, December 1997.

2 Bergen, T., et al. Mercury in the global troposphere: A three-dimensional model study. *Atmospheric Environment*, 1999, 33(10): 575-1585; Mason, R.P. et al., 1994. The biogeochemical cycling of elemental mercury: Anthropogenic influences, *Geochimica et Cosmochimica Acta,* 58(15): 3191-3198.

3 Zillioux,E.J., Porcella, D.B., and J.M. Benoit. Mercury cycling and effects in freshwater wetland ecosystems. *Environmental Toxicology and Chemistry,* 1993, 12:2245-2264.

4 Agency for Toxic Substances and Disease Registry. Toxicological profile for mercury. 1999. Available at: www.atsdr.cdc.gov/toxprofiles/tp46.html

5 Clarkson, T.W. Mercury: Major issues in environmental health. *Environmental Health Perspectives,* 1992, 100:31-38.

6 Mahaffey, K.R. Recent advances in recognition of low-level methylmercury poisoning, *Current Opinion in Neurology*, 2000, 13:699-707; Committee on the Toxicological Effects of Methylmercury. 2000. Toxicological Effects of Methylmercury. National Research Council. National Academy Press.

7 Mahaffey, K.R. U.S. EPA Presentation to the Fish Forum, San Diego, CA. January 2004; U.S. Centers for Disease Control and Prevention. Second National Report on Human Exposure. 2003.

8 U.S. Environmental Protection Agency. Mercury website: human exposure. Available at: http:// www.epa.gov/mercury/exposure.htm

9 Committee on the Toxicological Effects of Methylmercury. Toxicological Effects of Methylmercury. 2000. National Research Council. National Academy Press.

10 Salonen, J.T., Seppanen, K. et al. Intake of mercury from fish, lipid peroxidation, and the risk of myocardial infarction and coronary, cardiovascular, and any death in eastern Finnish men. *Circulation*, 1995, 91(3):645-655.

11 Hatherill, J.R. The BrainGate: The Little-Known Doorway That Lets Nutrients in and Keeps Toxic Agents Out. 2001. LifeLine Press.Washington, DC.

12 Rock, C. et al. Increased blood mercury levels in patients with Alzheimer's disease. *Journal of Neural Transmission.* 1998, 105:59-68.

13 Bigazzi, P.E. Metal and kidney autoimmunity. *Environmental Health Perspectives*, 1999, 107:753-765.

14 Evers, D., Taylor, K.M., Major, A., Taylor, R.J., Poppenga, R.H. and A.M. Scheuhammer. Common loon eggs as indicators of methylmercury availability in North America. *Ecotoxicology,* 2003, 12:69-81; Kamman, N. et al. Biogeochemistry of Mercury in Vermont and New Hampshire Lakes: An Assessment of Mercury in Waters, Sediments and Biota of Vermont and New Hampshire Lakes. 2003; Evers, D., Yates, D. and L. Savoy. Investigation of mercury exposure in Maine's mink and river otter. Report BRI 2002–10 submitted to Maine Department of Environmental Protection and Maine Inland Fisheries and Wildlife. 2002. BioDiversity Research Institute.

15 Evers, D. et al.

16 Duvall, S.E. and M.G. Barron. A Screening Level Probabilistic Assessment of Mercury in Florida Everglades Food Webs. *Ecotoxicology and Environmental Safety*, 2000, 47:298-305

17 U.S. Environmental Protection Agency. 2004 National Listing of Fish Advisories. September 2005. Available at: http://epa.gov/waterscience/fish/advisories/fs2004.pdf

18 American Sportfishing Association. *Sportfishing in America: Values of Our Traditional Pastime.* 2002.

19 Jakus, P., McGuinness, M., and A. Krupnick. "The Benefits and Costs of Fish Consumption Advisories for Mercury, Resources for the Future." Discussion Paper 02-55. October 2002. Available at http://www.rff.org/Documents/RFF-DP-02-55.pdf.

20 Harvard Center for Risk Analysis & Northeast States for Coordinated Air Use Management (NESCAUM). Health benefits of controlling mercury emissions from U.S. coal-fired power plants. February 2005. Available at: http://bronze.nescaum.org/airtopics/mercury/rpt050315mercuryhealth.pdf

21 Trasande, L. et al. Public health and economic consequences of methyl mercury toxicity to the developing brain. *Environmental Health Perspectives,* February 2005, 113:590-597.

22 U.S. Environmental Protection Agency. www.epa.gov/mercury

23 U.S. Environmental Protection Agency, NRMRI. Use and release of mercury in the United States. 2002. Available at: http://www.chem.unep.ch/mercury/Report/1st-draft-Comments/Govs/Comm-21-gov.pdf

This Page Intentionally Left Blank

Alaska's Mercury Actions

Alaska Department of Environmental Conservation
Contact: Ron Klein ◆ phone: 907-269-7595 ◆ fax: ◆ Ron_Klein@dec.state.ak.us

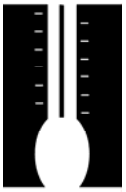
Mercury Monitoring

- ✓ On-going fish tissue testing and sampling. Over 500 marine and freshwater fish from 11 to 20 waterbodies are tested for mercury annually.
- ✓ Also run a Coastal Survey Environmental Monitoring and Assessment Program.
- ✓ On-going human biomonitoring: Alaska Division of Public Health's maternal hair mercury biomonitoring program and Alaska Native Tribal Health Consortium's maternal infant cord blood study are the basis of current statewide monitoring.

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ Water Quality Standards for industrial wastewater, non-domestic wastewater, and non-point source pollution.
- ✓ Alaska's Air Quality regulations adopt all federal standards regulating mercury as a primacy state. Coal-fired power plants will be required to source test and monitor emissions for mercury by 2007.



Mercury Products

- ✓ State regulations on mercury spills and broken mercury-containing products.
- ✓ Voluntary phaseout of mercury-containing thermometers.
- ✓ Waste incinerators are regulated to limit wastes containing mercury.

Public Outreach Efforts

Languages: English

Targeted Constituencies: subsistence fishermen

TMDL Status

- 0 of 2 TMDLs completed.
- 0 watershed cleanup plans in lieu of TMDLs.

Top Intrastate Mercury Sources

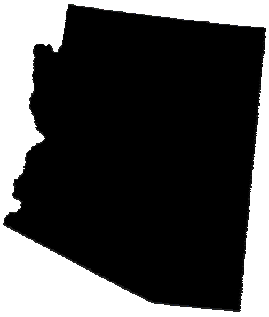
State Estimate

1 → coal-fired power plants
2 → mining
3 → sewage sludge incinerators

Documented Mercury Spills & Releases

Year	# of Spills	Cost
2000	4	unknown
2001	1	unknown
2002	none reported	unknown
2003	none reported	unknown

Arizona's Mercury Actions



Arizona Department of Environmental Quality
Contact: Linda Taunt ◆ phone: 602-771-4416 ◆ fax: 602-771-4528 ◆ lc1@azdeq.gov

Mercury Strategies & Outcome Measures

Arizona has an overall mercury action plan. Major elements of the plan include: data collection and research to better define levels and sources in state; public education and outreach to key population sectors and users to reduce exposure and encourage mercury recycling; and both regulatory and non-regulatory methods to reduce and/or eliminate use of mercury. The state has a mercury task force comprised of health services, game and fish, and environmental media programs.

Top Intrastate Mercury Sources
State Estimate

1 → mining
2 → coal-fired power plants
3 → cement kilns

Fish Consumption Advisory

- 5,811 lake acres under advisory
- 11 lakes and ponds under advisory

Documented Mercury Spills & Releases

Year	# of Spills	Cost
2000	1	$125,000
2001	1	$5,000

TMDL Status

- 3 TMDLs completed for lakes. An abandoned placer mine was found to be a source for one of the lakes.
- 0 watershed cleanup plans in lieu of TMDLs.

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

✓ State regulations on mercury releases from wastewater treatment, hazardous waste, and mining.

Mercury Products

✓ Voluntary mercury collection programs for elemental mercury, mercury waste, mercury-containing products, and recycling of collected mercury. The state has two commercial mercury recycling facilities regulated through the state's hazardous waste program. These facilities are subject to routine inspection.
✓ Support for voluntary mercury collection through the state recycling grant program.

Vehicle Switches

✓ Mandatory removal of mercury switches (any component that is hazardous) from end-of-life passenger and commercial vehicles.
✓ Switches are managed as hazardous waste until legislation is adopted.

Mercury Monitoring

✓ On-going fish tissue testing and sampling. Tested 45 waterbodies.
✓ Also monitor: wastewater discharges, aerial deposition, water column and sediment, and wildlife.
✓ Arizona conducts soil/sediment sampling, lake coring, and is setting up its first National Mercury Deposition Network monitoring site.

Public Outreach Efforts

Topics: sources, monitoring, disposal, & cleanup

Outreach Tools: factsheets, reports, press releases, & phone hotlines

Languages: Fish advisories in Spanish, Hmong, and Vietnamese.

Targeted Constituencies: women of child-bearing age, pregnant women, & sport-fishermen

Citation

1. Available at: www.azdeq.gov/environ/water/assessment/ongoing.html#merc

Arkansas' Mercury Actions

Arkansas Department of Environmental Quality ◆ www.adeq.state.ar.us
Contacts: Alan Price ◆ phone: 501-682-0542 ◆ fax: 501-682-0936 ◆ adp@adeq.state.ar.us
Darren Morrissey ◆ phone: 501-682-0824 ◆ fax: 501-682-0880 ◆ morrissey@adeq.state.ar.us

Laws & Policies to Reduce Mercury Use & Releases

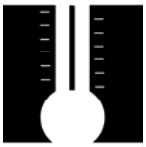
Industrial Releases

✓ State regulations on mercury releases from steel recycling facilities, wastewater treatment, hazardous waste, medical waste incinerators, & cement kilns.

Fish Consumption Advisory

Waterbody-Specific
Fish Consumption Advisory Due to Mercury Contamination

- 35,500 lake acres under advisory
- 365 river miles under advisory
- More than 12 lakes and ponds are under a more stringent advisory



Mercury Products

✓ Voluntary mercury collection programs for elemental mercury. Recycling of collected mercury is voluntary. Collected mercury is stored at ADEQ and periodically shipped to a recycling facility.

Vehicle Switches

✓ Mandatory removal of mercury switches (hood lights, trunk lights, vanity lights & ABS sensors) from end-of-life vehicles weighing less than 12,000 pounds.
✓ Transportation, management, & storage requirements apply.
✓ Require vehicle manufactures to develop a mercury minimization plan that provides a method to finance the removal, collection, and recovery of mercury auto switches, so that at a minimum, manufacturers pay $5.00 for each switch removed by a vehicle recycler.

Mercury TMDL Status

- 1 TMDL completed.
- 0 watershed cleanup plans in lieu of TMDLs.

Mercury Monitoring

✓ Fish tissue testing and sampling completed periodically. Tested fish from approximately 400 waterbodies.
✓ Also monitor: wastewater discharge.

Public Outreach Efforts

Topics: monitoring, & health effects

Outreach Tools: factsheets, videos, reports, posters, public service announcements, press releases, phone assistance

Languages: English

Targeted Constituencies: women of child-bearing age, pregnant women, & sport-fishermen

California's Mercury Actions

California Environmental Protection Agency
Contact: Peggy Harris ◆ phone: 916-324-7663 ◆ fax: 916-327-4495 ◆ pharris@dtsc.ca.gov

Mercury Strategies & Outcome Measures

California has mercury task forces at the local level.

Outcome measures used to quantify progress include:

- ✓ Number of organizations adopting mercury-free purchasing specifications
- ✓ Number of mercury-containing devices collected
- ✓ Total amount of mercury collected
- ✓ Wastewater discharge reductions
- ✓ Reduction in fish tissue mercury levels
- ✓ Wildlife monitoring
- ✓ Reduction in the number of fish consumption advisories/impaired waters

Top Intrastate Mercury Sources

State Estimate

1 → industrial boilers
2 → electric utilities
3 → petroleum manufacturing

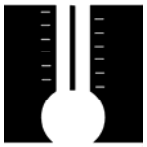
Mercury TMDL Status

- 3 draft TMDLs in progress for Cache Creek, Clear Lake, and San Francisco Bay. Sources of contamination are primarily legacy mining waste. Technical TMDLS have been completed for Clear Lake, three Creeks, an estuary, and the San Francisco Bay. Only the Clear Lake TMDL has an approved basin plan amendment or control program.
- 0 watershed cleanup plans in lieu of TMDLs.

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from hazardous waste, cement kilns, and broken mercury-containing products and spills.
- ✓ Facilities must report types and quantities of toxic air emissions.



Mercury Products

- ✓ Requires manufacturers to give a "clear and reasonable warning" for any listed chemical, usually as a label, but not necessarily on the product itself.
- ✓ Phased out the sale of mercury-containing fever thermometers, novelties, thermostats, and vehicles manufactured after January 1, 2005 that contain a mercury light switch.
- ✓ Disposal-bans on mercury-containing lamps, thermostats, switches, novelties, and products that exhibit California's defined hazardous waste characteristic.
- ✓ Voluntary mercury collection programs for collection of elemental mercury and mercury-containing products. Elemental mercury from recreational miners is collected under a variance and recycled. CA EPA, local governments, and hospitals conduct thermometer exchange events periodically.
- ✓ Mercury-containing thermostats and blood pressure gauges are treated as universal waste. Handlers keep records of universal waste shipments and receipts, and hazardous waste manifests are used to monitor elemental mercury.

California's Mercury Actions, continued

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling. Tested fish from approximately 300 waterbodies so far.
- ✓ Also monitor: ambient air; wastewater discharge; mercury collection; and waterbody sediments.
- ✓ CAL-FED has funded an effort to understand the sources, fate, and transformation of inorganic to methylmercury in listed waterbodies in the Central Valley. Future goals are to attempt to stop the input of new mercury at mine sites, to trap mercury that has already left the mine site, and to minimize the conversion of inorganic mercury to methylmercury. There has been success so far at identifying several sites where methylation happens, including sewage treatment plants and marshes.
- ✓ California has carried out some mercury removal from stream channels.
- ✓ DTSC has conducted a study of drum-top crushers for spent fluorescent lamps to test their ability to effectively control mercury vapor emissions, and meet OSHA and CalOSHA standards.

Fish Consumption Advisory[1]

- 330,000 lake acres under advisory
- 100 coastal wetland miles under advisory
- 150 river miles under advisory
- 30 lakes and ponds under advisory

Public Outreach Efforts

Topics: sources, monitoring, disposal, cleanup, health effects, research, & reduction progress

Outreach Tools: factsheets, reports, posters, brochures, workshops, press releases, business training, & media events

Languages: Spanish, Korean, Vietnamese, Cambodian, Mandarin, Cantonese, Thai, Japanese, Lao, & Russian

Targeted Constituencies: women of child-bearing age, pregnant women, & sport-fishermen

Unique Outreach: Multi-lingual outreach and workshops on pollution prevention to medical clinics, hospitals, medical facilities, auto dismantlers, scrap metal processors, & appliance recyclers.

Documented Mercury Spills & Releases

Year	# of Spills	Cost
2000	5	unknown
2001	10	unknown
2002	6	unknown
2003	13	unknown

Vehicle Switches

- ✓ Voluntary removal of mercury switches (hood lights, trunk lights) from on-the-road passenger and commercial vehicles.
- ✓ Mandatory removal of mercury switches from end-of-life passenger and commercial vehicles, and mandatory prohibition on sale of new passenger and commercial vehicles with mercury switches.
- ✓ Progress is quantified by the number of switches collected.
- ✓ All automotive mercury switches may be managed as universal waste[2].

✓ DTSC has developed a BMP document to assist dismantlers in removing and handling mercury light switches.

Biggest Challenge: Financial assistance to auto dismantlers, more resources for the state's outreach and education programs.

Citations

1. Available at www.oehha.ca.gov/fish.html
2. 2001 SB 633. Available at http://www.leginfo.ca.gov/cgi-bin/postquery?bill_number=sb_633&sess=0102&house=B&author=sher

Colorado's Mercury Actions

Colorado Department of Public Health & Environment
www.cdphe.state.co.us/hm/mercury/mercuryhom.asp
Contact: Mark McMillan ◆ phone: 303-692-3140 ◆ fax: 303-782-5493 ◆ mark.mcmillan@state.co.us

Fish Consumption Advisory

Waterbody-Specific Fish Consumption Advisory Due to Mercury Contamination.[2]

- 505,170 lake acres under advisory
- 4 lakes and ponds under advisory

Top Intrastate Mercury Sources

State Estimate

1 → mining
2 → coal-fired power plants
3 → electric arc furnaces

Mercury TMDL Status

- 2 TMDLs underway (McPhee & Narraguinnep reservoirs)
- Phase I completed (data collection & modeling)
- Sources include: past mining activities, atmospheric deposition, and natural occurrence.

Mercury Strategies & Outcome Measures

Colorado has an overall mercury action plan. Major elements of the plan include: small business, household, medical, and dental mercury waste management; limiting mercury discharges into water; reduction of mercury use in consumer products; technical assistance for industries; mercury recycling; public outreach/education; and a comprehensive mercury sources inventory. The state has a pollution prevention initiative at an area steel mill. Also, the state has policies and regulations relating to the mercury action plan.

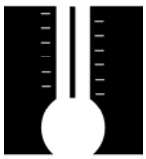
Outcome measures used to quantify progress include:

- ✓ Air emission reductions
- ✓ Ambient air quality improvement
- ✓ Wastewater discharge reductions
- ✓ Total amount of mercury collected
- ✓ Number of mercury-containing devices collected
- ✓ Reduction in number of fishing advisories/impaired waters
- ✓ Number of dentists that have installed amalgam separators
- ✓ Results of local agency surveys
- ✓ Number of outreach presentations
- ✓ Number of website hits

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations for hazardous waste cover mercury and mercury-containing wastes.
- ✓ Colorado participates in a voluntary initiative to reduce mercury releases from dental facilities into publicly owned wastewater treatment facilities.



Mercury Products

- ✓ Mercury-containing devices are included in the state hazardous waste regulations, which are analogous to the federal regulations.[1]
- ✓ Colorado has voluntary collection and recycling programs for elemental mercury, mercury waste, and mercury-containing products.
- ✓ The state has an agreement with a private contractor to collect, maintain, and recycle mercury devices.
- ✓ Colorado provides both financial and in-kind support for collection, oversees the recycling and disposal of the collected mercury through a tracking system.
- ✓ Colorado participates in the Stewardship Committee of the Quicksilver Caucus, reviewing long-term options for mercury storage and disposal.
- ✓ Colorado has a voluntary initiative to reduce the number of mercury thermostats going to landfills.

Colorado's Mercury Actions, continued

Documented Mercury Spills & Releases

Year	# of Spills	Cost
2000	6	$150,000
2001	8	$200,000
2002	4	$100,000
2003	3	$75,000

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling. Tested fish from 36 waterbodies so far. Colorado has a 5-year monitoring plan of approximately 130 lakes and rivers of interest. Fish tested are those most likely to be caught and consumed by people, and those high up in the food chain.
- ✓ Also monitor: emissions, ambient air, wastewater discharges, deposition, and wildlife.

Public Outreach Efforts

Topics: sources, monitoring, disposal, cleanup, health effects, research, & reduction progress

Outreach Tools: website[1], factsheets, reports, brochures, workshops, press releases, business training, citizen training, media events, & hotlines

Targeted Constituencies: women of child-bearing age, pregnant women, sport-fishermen, & auto dismantlers/shredders

Unique Outreach: Fish advisories posted at affected waterbodies.

Vehicle Switches

- ✓ Voluntary removal of mercury switches (hood & trunk lights) from end-of-life passenger and commercial vehicles.
- ✓ Colorado's universal waste rule governs the transportation, management, and storage of collected switches.
- ✓ The state pays for the equipment, collection, transport, & disposal of collected switches.
- ✓ Progress is quantified by: number of switches & pounds of mercury collected. Also by comparing the amount of mercury collected to the number of vehicles processed.
- ✓ The state provides fact sheets, workshops, business training, and phone assistance to support auto switch collection.

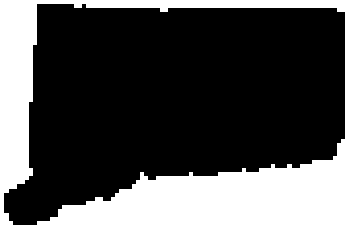
Biggest Challenge: A national regulation or switch collection program that does not give ample credit/recognition to existing state programs could negatively impact this state program.

Citations

1. 6 CCR 1007-3, Part 273. Online at: www.cdphe.state.co.us/op/regs/hazwaste/10073273universalwastemanagement.pdf
2. Advisory available online at: www.cdphe.state.co.us/wq/FishCon/FishCon.htm

Connecticut's Mercury Actions

Connecticut Department of Environmental Protection ◆ www.dep.state.ct.us/wst/mercury/mercury.htm
Contact: Robert Kaliszewski ◆ phone: 860-424-3003 ◆ fax: 860-424-4153 ◆ robert.kaliszewski@po.state.ct.us



Top Intrastate Mercury Sources

State Estimate

1 → municipal waste combustors
2 → sewage sludge incinerators
3 → coal-fired power plants

Mercury Strategies & Outcome Measures

Connecticut has an overall mercury action plan. Major elements of the plan include: small business, household, medical, & dental mercury waste management; mercury emission limits; limiting mercury discharges to water; reduction of mercury use in products; recycling; and outreach and education. The state has policies, statutes, and regulations relating to the mercury action plan.

Outcome measures used to quantify progress include:

- ✓ Air emission reductions
- ✓ Total amount of mercury collected
- ✓ Number of mercury-containing devices collected
- ✓ Reduction in number of fish advisories
- ✓ Number of dentists that have installed separators
- ✓ Number of schools that have conducted mercury cleanup
- ✓ Reduction in the amount of mercury in fish tissue

Fish Consumption Advisory

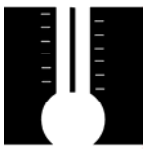
Statewide Fish Consumption Advisory Due to Mercury Contamination.[5]

♦ Additional guidelines provided for specific waterbodies

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from coal-fired power plants[1], municipal waste combustors[2], medical waste incinerators, and dental facilities.[3]



Mercury Products

- ✓ Requires labeling of mercury-containing products.[4]
- ✓ Phased out mercury-containing thermostats, switches, and products containing >1 gram or 250 ppm of mercury.[4]
- ✓ Banned the sale of mercury-containing thermometers, dairy manometers, and novelties.[4]
- ✓ Restrictions on the sale and use of elemental mercury.[4]
- ✓ Mandatory manufacturer collection of mercury waste and mercury-containing products.[4]
- ✓ Voluntary collection of elemental mercury and recycling of mercury.
- ✓ Collected mercury is recycled through licensed hazardous waste haulers to recycling facilities out of state. Monitoring occurs through the hazardous waste manifest system.

Connecticut's Mercury Actions, continued

Documented Mercury Spills & Releases

Year	# of Spills	Cost
2000	46	unknown
2001	54	unknown
2002	63	unknown
2003	78	unknown

Mercury Monitoring

- ✓ Comprehensive testing has been performed and continues to be updated. Continually testing fish from numerous waterbodies.
- ✓ Also monitor: emissions, wastewater discharges, mercury collection, waterbody sediments, deposition, and mercury cycling.
- ✓ Connecticut has provided approximately $1.56 million in funding to Connecticut-based education institutions for research.

Public Outreach Efforts

Topics: sources, monitoring, disposal, cleanup, health effects, & research

Outreach Tools: website,[6] factsheets, videos, reports, posters, brochures, workshops, press releases, citizen training, public service announcements, media events, & phone hotlines

Languages: English, Spanish, Hmong, Vietnamese, Cambodian, & Laotian

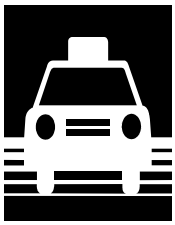
Targeted Constituencies: women of child-bearing age, pregnant women, WIC program participants, subsistence fishers, & sport-fishermen

Unique Outreach: Developed "Exposing Mercury" table top display, & "Environmentally Responsible Dental Office" brochure.

Mercury TMDL Status

- 0 TMDLs completed
- 0 watershed cleanup plans in lieu of TMDLs

Vehicle Switches



- ✓ Prohibition on sale of new vehicles with mercury switches.[4]
- ✓ Voluntary removal of mercury switches (hood & trunk lights) from end-of-life and on-the-road passenger vehicles.
- ✓ Collected switches are managed through licensed hazardous waste transporters and manifests.
- ✓ CT conducted a short-term collection pilot program.
- ✓ Progress is quantified by the number of switches collected & the pounds of mercury collected.

Biggest Challenge: Cost and willingness of auto recyclers to remove switches.

Citations

1. CGS 22a-199. Online at: www.cga.ct.gov/2003/act/Pa/2003PA-00072-R00HB-06048-PA.htm
2. RCSA Title 22a, 174-38. Online at: /www.dep.state.ct.us/air2/regs/mainregs/sec38.pdf
3. CGS Title 22a, Chapter 446m. Online at: www.cga.ct.gov/2005/pub/Chap446m.htm
   Required Best Management Practices online at: www.dep.state.ct.us/wst/mercury/dental_bmp.htm
4. CGS Title 22a, Chapter 446m. Online at: www.cga.ct.gov/2005/pub/Chap446m.htm
5. Advisory online at: www.dph.state.ct.us/BRS/EOHA/ificatchit.pdf
6. www.dep.state.ct.us/wst/mercury/mercury.htm

Delaware's Mercury Actions

DE Department of Natural Resources and Environmental Control ◆ www.dnrec.state.de.us/dnrec2000/
Primary Contact: Kimberly Chesser ◆ phone: 302-739-9909 ◆ fax: 302-739-6242 ◆ kimberly.chesser@state.de.us
Alternate: Robert Zimmerman ◆ phone: 302-739-9000 ◆ fax: 302-739-6242 ◆ robert.zimmerman@state.de.us

Top Intrastate Mercury Sources
State Estimate

1 → chlor-alkali plant
2 → coal-fired power plants
3 → industrial boilers

Mercury TMDL Status

- 5 TMDLs needed
- 0 TMDLs completed (First TMDL due in 2009)
- 0 watershed cleanup plans in lieu of TMDLs

Fish Consumption Advisory

Waterbody-Specific Fish Consumption Advisories Due to Mercury Contamination[1]

- 183 lake acres under advisory
- 2 lakes and ponds under advisory
- 3 estuarine waters

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

✓ Delaware is developing multi-pollutant regulations for power plants that address mercury.

Mercury Products

✓ Delaware has a voluntary collection program for mercury-containing batteries. The statewide Solid Waste Authority manages the handling of these collected items.

Mercury Monitoring

✓ On-going fish tissue testing and sampling. All surface waters in the state have been tested.
✓ Also monitor: wastewater discharges & waterbody sediments
✓ Additionally, Delaware has tested 45 sites statewide and found mercury contamination in surface soil, subsurface soil, groundwater, surface water, & sediments.
✓ Delaware is conducting a monitoring project for mercury at a chlor-alkali plant.

Public Outreach Efforts

Topics: monitoring

Outreach Tools: factsheets, reports, brochures, public service announcements, & media events

Languages: English & Spanish

Targeted Constituencies: subsistence fishers & sport-fishermen

Unique Outreach: Fish consumption advisories posted at public access points on all waterbodies under advisory.

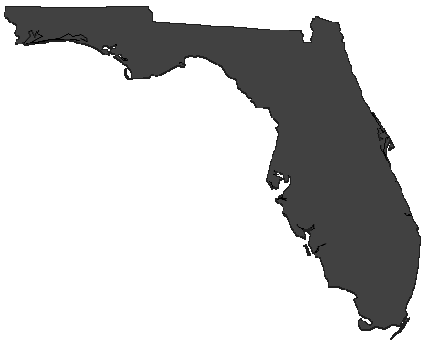
Citations

1. Available at: www.dnrec.state.de.us/fw/advisory.htm

Florida's Mercury Actions

Florida Department of Environmental Protection
www.dep.state.fl.us/waste/categories/mercury/default.htm
Contacts: Thomas Atkeson ◆ phone: 850-245-3032 ◆ fax: 850-245-3147 ◆ thomas.atkeson@dep.state.fl.us
Alvaro Linero ◆ phone: 850-921-9523 ◆ fax: 850-922-6979 ◆ alvaro.linero@dep.state.fl.us

Mercury Strategies & Outcome Measures



Florida has an overall mercury action plan. Major elements of the plan include: prevention of mercury pollution from existing mine operations; mercury emission limits; reduction of mercury use in consumer products; technical assistance for industries; mercury recycling; and public outreach and education. The state has regulations, but no statutes or policies relating to the mercury action plan.

In 1989, Florida's Governor created a Mercury in Fish and Wildlife Task Force which developed a science-based approach to mercury issues. In 1992 the state designated a statewide mercury coordinator to carry out the recommendations of the task force. In 1994 a consortium among state, federal & private interests provided support for this effort via a multi-agency South Florida Mercury Science Program, which continues to work to resolve science questions regarding mercury cycling in the environment.

Outcome measures used to quantify progress include:

- ✓ Air emission reductions
- ✓ Ambient air quality improvement
- ✓ Mercury deposition reductions
- ✓ Number of mercury-containing devices (thermostats & thermometers) collected
- ✓ Wastewater discharge reductions
- ✓ Reduction in fish tissue mercury levels
- ✓ Wildlife monitoring
- ✓ Reduction in the number of fish consumption advisories/impaired waters

Top Intrastate Mercury Sources

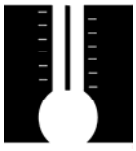
State Estimate

1 → municipal solid waste incinerators
2 → coal-fired power plants
3 → medical waste incinerators

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from municipal waste incinerators[1] and medical waste incinerators.



Mercury Products

- ✓ State law limits mercury use in products and prohibits mercury in packaging.[2]
- ✓ Prohibits incineration of fluorescent lights.
- ✓ Voluntary mercury collection programs for elemental mercury, mercury waste, and mercury-containing products. Recycling of collected mercury is voluntary. State law encourages and establishes recycling programs.
- ✓ Florida works with the Thermostat Recycling Corporation.

Florida's Mercury Actions, continued

Mercury TMDL Status

- 0 TMDLs completed.
- To supplement a watershed approach, Florida is planning a statewide emissions inventory & modeling assessment to provide atmospheric loading terms for Florida's inland and coastal waters.

Documented Mercury Spills & Releases

- On average 6 to 12 mercury spills occur each year. The costs of these spills are unknown.

Fish Consumption Advisory

Statewide Fish Consumption Advisory Due to Mercury Contamination[3]

- Entire Florida coastline under advisory
- Waterbody-specific advisories
- 3,456 lake acres under advisory
- 1,200 river miles under advisory
- Approximately 200 lakes and ponds under advisory

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling. Tested fish from 250 waterbodies so far. Annual fish tissue sampling to track long-term trends is the state's highest priority effort, but new waterbodies are sampled each year.
- ✓ Also monitor: stack emissions; ambient air; product and elemental collections; and wildlife monitoring.
- ✓ Mercury monitoring supersites measure for three different forms of mercury on a continuous or semi-continuous basis, plus ancillary measurements to allow inference of specific source influences.
- ✓ Florida participates in the National Mercury Deposition Network.

Public Outreach Efforts

Topics: sources, monitoring, disposal, cleanup, health effects, research, & reduction progress

Outreach Tools: website, factsheets, videos, reports, posters, brochures, workshops, press releases, business training, citizen training, & phone hotlines

Languages: English

Targeted Constituencies: pregnant women, & sport-fishermen

Unique Outreach: Health advisory brochures are updated annually and distributed at fishing license outlets.

Citations

1. Ch. 403.7895
2. Ch. 403.7191
3. Available at: www.doh.state.fl.us/environment/community/fishconsumptionadvisories/fish_consumption_guide.htm

Georgia's Mercury Actions

Georgia Department of Natural Resources ◆ www.dnr.state.ga.us/dnr/environ/
Contacts: Marlin Gottschalk ◆ phone: 404-657-5419 ◆ fax: 404-651-5778 ◆ marlin_gottschalk@dnr.state.ga.us
David Gipson ◆ phone: 404-657-5120 ◆ fax: 404-651-5130 ◆ david_gipson@dnr.state.ga.us

Fish Consumption Advisory

Waterbody-Specific Fish Consumption Advisories Due to Mercury Contamination

- 293,316 lake acres under advisory
- 1,950 river miles under advisory
- 30 sq. miles of coastal wetlands under advisory
- 33 lakes and ponds under advisory

Mercury TMDL Status

- U.S. EPA Region 4 developed TMDLs for waterbodies listed impaired for mercury (as measured in fish tissue) on Georgia's 303(d) list. U.S. EPA's TMDL assessments concluded that 99% of the mercury loading is from atmospheric sources.[1]

Public Outreach Efforts

Topics: sources, & health effects

Outreach Tools: website, & brochures

Languages: English, & Spanish

Targeted Constituencies: women of child-bearing age, pregnant women, & sport-fishermen

Citations

1. Available at: www.epa.gov/region4/

Mercury Strategies & Outcome Measures

Georgia has one workgroup composed of technical managers from the EPD land, air, program coordination, and water branches. The workgroup was formed to develop a response to rule changes proposed by the U.S. EPA.

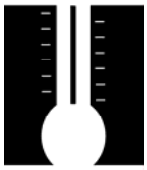
Mercury Monitoring

- ✓ On-going fish tissue testing and sampling. Tested fish tissue from 62 lakes, 135 river segments, and 10 estuarine areas.
- ✓ Also monitor: ambient air; wastewater discharge; mercury deposition; waterbody sediments; fish tissue levels; and alligator tissue levels for mercury.

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from wastewater treatment facilities.
- ✓ State has air toxic guidelines for new or expanding emission sources.

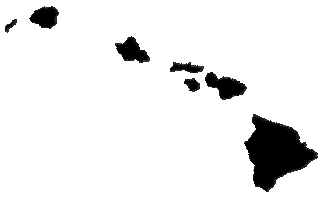


Mercury Products

- ✓ Voluntary mercury collection programs for elemental mercury, mercury waste, and mercury-containing products. In some areas, mercury can be dropped off at locally operated household hazardous waste programs.
- ✓ Financial incentives were provided by the state (using U.S. EPA funding) for mercury collection that included: mercury-free thermometers and training to local governments and schools wishing to perform mercury thermometer exchanges. The project facilitated the removal of mercury sources from 18 school districts within the state.

Hawaii's Mercury Actions

Hawaii State Department of Health
Contact: Grace Simmons ◆ phone: 808-586-4226 ◆ fax: 808-586-7509 ◆ gsimmons@eha.health.state.hi.us



Top Intrastate Mercury Sources
State Estimate

1 → industrial boilers
2 → municipal solid waste incinerators
3 → refineries

Documented Mercury Spills & Releases

Year	# of Spills	Cost
2001	5	$622,462
2002	4	unknown
2003	2	$1,763.53

Fish Consumption Advisory

Statewide Fish Consumption Advisory Due to Mercury Contamination

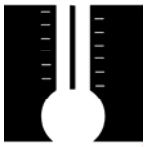
Mercury TMDL Status

- 0 TMDLs completed.
- 0 watershed cleanup plans in lieu of TMDLs.

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

✓ State regulations on mercury releases from broken mercury-containing products and from hazardous waste sources.



Mercury Products

✓ Mercury collection programs for elemental mercury, mercury waste, mercury-containing products, and recycling of collected mercury are voluntary. Collections are done through state-sponsored mercury cleanout projects. Local governments accept mercury waste through household hazardous waste collections. These collections are permitted though the state solid waste program. For state collection, special funds are used to hire contractors, and in-kind services of staff and other agencies.

Vehicle Switches

✓ Removal of mercury switches is found in permits for recyclers and auto salvagers.
✓ Voluntary removal of mercury switches (hood lights, trunk lights, vanity lights, & ABS sensor) from end-of-life passenger and commercial vehicles.
✓ Progress is quantified by annual reporting requirements for permitees.

Biggest Challenge: State agency prioritization.

Mercury Monitoring

✓ Tested one waterbody so far.
✓ Also monitor: stack emissions.
✓ The state monitors mercury found in blood. Information is received from hospitals and clinics and entered into a database.

Public Outreach Efforts

Topics: sources, disposal, cleanup, & health effects

Outreach Tools: factsheets, brochures, & public service announcements

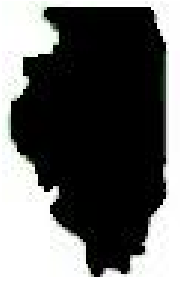
Languages: English, Korean, Vietnamese, Samoan, Filipino, & Micronesian dialects

Targeted Constituencies: women of child-bearing age, & pregnant women

Unique Outreach: DOH has an EPA lamp recycling grant to educate the public on the mercury found in lamps.

Illinois' Mercury Actions

Illinois Environmental Protection Agency ◆ www.epa.state.il.us/mercury/
Contact: Becky Lockhart ◆ phone: 217-524-9642 ◆ fax: 217-557-2125 ◆ becky.lockhart@epa.state.il.us



Mercury Strategies & Outcome Measures

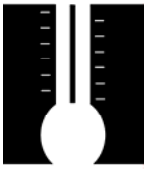
Outcome measures used to quantify progress include:

- ✓ Total amount of mercury collected
- ✓ Number of schools that have conducted mercury cleanup
- ✓ Amount of mercury releases

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from hazardous waste.
- ✓ Federal MACT rules and wastewater treatment permit limits are implemented where appropriate.



Mercury Products

- ✓ Phased out the sale of mercury fever thermometers and mercury novelty products.[1]
- ✓ Effective in 2007, sale of selected mercury electrical switches and relays (with exemptions) will be prohibited.[2]
- ✓ Phase out the use of mercury and mercury-containing devices in K–12 schools.
- ✓ Mercury collection programs for elemental mercury, mercury waste, mercury-containing products, and recycling of collected mercury are voluntary. Mercury collection is done by contractors who are required to ship mercury to permitted retorting facilities. Contractors must provide disposition certificates from the reporting facilities prior to the IEPA's approval for payment.
- ✓ IEPA funds 30–45 household hazardous waste collections per year, as well as cleans 200–250 K–12 schools per year through the school waste program.
- ✓ Cooperative initiative with the Illinois Dental Association to collect mercury and amalgams from dentists.
- ✓ Mercury switches and regulators must be removed from appliances before shredding/scrapping.
- ✓ State law restricts the burning of mercury-containing fluorescent bulbs.
- ✓ Universal waste rules adopted to encourage recycling of mercury-containing products.

Fish Consumption Advisory

Statewide Fish Consumption Advisory
Due to Mercury Contamination[3]

- ♦ 6,264 lake acres under advisory
- ♦ 1,034 river miles under advisory
- ♦ 8 lakes and ponds under advisory

Top Intrastate Mercury Sources

State Estimate

1 → coal-fired power plants
2 → industrial boilers
3 → cement kilns

Illinois' Mercury Actions, continued

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling.
- ✓ Also monitor: ambient air, wastewater discharge, fish tissue, and mercury collection (pounds of mercury collected from IEPA household waste collection program is recorded).
- ✓ The Bureau of Water performed a pilot test to compare water sampling techniques to determine if EPA Method 1699, which is resource-intensive, was necessary to obtain reliable results when testing for very low concentrations of mercury.

Public Outreach Efforts

Topics: disposal, cleanup, & reduction progress

Outreach Tools: factsheets, brochures, website, public service announcements, & media events

Vehicle Switches

- ✓ IEPA prepared a report identifying options for mercury switch removal and management from discarded vehicles.
- ✓ Legislation to require automakers to establish a removal and management program for mercury switches from discarded vehicles has been introduced.

Citations

1. Public Act 93-165. Online at: http://www.ilga.gov/legislation/publicacts/fulltext.asp?name=093-0165&GA=093
2. Public Act 93-964. Online at: http://www.ilga.gov/legislation/publicacts/fulltext.asp?093-0964&GA=093
3. Fish Consumption Advisory. Online at: http://www.idph.state.il.us/envhealth/fishadv/fishadvisory05.htm

Indiana's Mercury Actions

Indiana Department of Environmental Management
Contact: Paula Smith ◆ phone: 317-233-5624 ◆ fax: 317-233-5627 ◆ psmith@idem.IN.gov

Mercury Strategies & Outcome Measures

In Indiana the Air Workgroup, Triennial Streamlined Mercury Variance Workgroup, and the Internal Mercury Workgroup are comprised of a variety of participants that specifically focus on mercury issues.

Outcome measures used to quantify progress include:

- ✓ Air emission reductions
- ✓ Ambient air quality improvements
- ✓ Wastewater discharge reductions
- ✓ Total amount of mercury collected
- ✓ Number of mercury-containing devices collected
- ✓ Reduction in the number of fishing advisories/impaired waters
- ✓ Mercury deposition reductions
- ✓ Number of schools that have conducted mercury cleanup
- ✓ Reduction in the amount of mercury in fish tissue
- ✓ Other—dental mercury collections

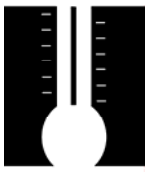
Top Intrastate Mercury Sources

1 → coal-fired power plants
2 → cement kilns
3 → electric arc furnaces

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from sewage sludge incinerators, hazardous waste, municipal solid waste incinerators, medical waste incinerators, cement kilns, and broken mercury-containing products and spills.
- ✓ Adoption of federal MACT for commercial and institutional solid waste incinerators.



Mercury Products

- ✓ Phased out the sale of mercury containing thermometers and novelties. Mercury fever thermometers must be sold behind the counter.
- ✓ Mercury collection programs for elemental mercury, mercury waste, and mercury-containing products. IDEM manages the Mercury Awareness Program that collects and recycles household mercury for all Indiana residents.
- ✓ Collections are made by a licensed hazardous waste contractor and are managed through an IDEM grant program. Household/small business collection/recycling program is funded through recycling and household hazardous waste grant programs and local entities that pick up the remainder of the cost. Indiana has a regulatory mandate for solid management districts to collect recycling.
- ✓ IDEM manages the Indiana mercury pledge for schools.
- ✓ Indiana participates in a thermostat recycling program through Thermostat Recycling Corporation.
- ✓ State has a U.S. Department of Defense mercury stockpile.

Indiana's Mercury Actions, continued

Fish Consumption Advisory

Statewide Fish Consumption Advisory Due to Mercury Contamination

- 4,007 river miles under advisory in 2004
- 59 coastal wetland miles under advisory in 2004
- 55 lakes and ponds under advisory in 2004
- 68,050 lake acres under advisory (not including Great Lakes) in 2004

Indiana is taking a more comprehensive look at their fish consumption advisory process and will soon be revising their analysis.

Documented Mercury Spills & Releases

Year	# of Spills	Cost
2000	96	N/A
2001	187	N/A
2002	171	N/A
2003	141	N/A

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling.
- ✓ Also monitor: ambient air, mercury deposition, mercury discharge.
- ✓ NESHAP stack testing for medical, hazardous, and municipal solid waste combustors.
- ✓ Indiana participates in the National Mercury Deposition Network.

TMDL Status

- No TMDL's completed, but Indiana has participated in regional and national discussions on mercury TMDL approaches.

Vehicle Switches

- ✓ Indiana is planning to implement voluntary removal of mercury switches from end-of-life vehicles.

Biggest Challenge: Funding for a reward/recovery program.

Public Outreach Efforts

Topics: sources, monitoring, disposal, cleanup, health effects, & reduction progress

Outreach Tools: factsheets, reports, posters, brochures, workshops, emails, press releases, business training, media events, & phone hotlines

Languages: Mercury brochure provided in Spanish.

Targeted Constituencies: subsistence anglers, women of child-bearing age, pregnant women, sport-fishermen, schools, homeowners, & heating ventilation & air conditioning contractors & wholesalers

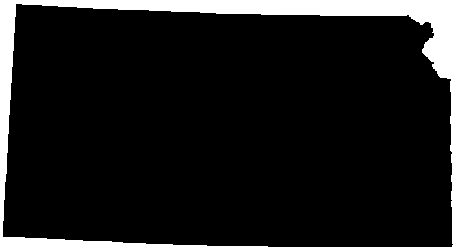
Unique Outreach: Mercury awareness outreach materials developed to encourage wastewater treatment plants to begin mercury pollution prevention education locally.

Kansas' Mercury Actions

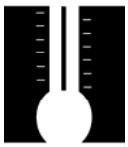
Kansas Department of Health and Environment
Contacts: Ron Hammerschmidt ◆ phone: 785-296-1535 ◆ fax: 785-296-8464 ◆ rhammers@kdhe.ks.state.us
Jim Rudeen ◆ phone: 785-296-1603 ◆ fax: 785-296-8909 ◆ jrudeen@kdhe.state.ks.us

Mercury Strategies & Outcome Measures

Kansas has some mercury workgroups that include government and universities.



Laws & Policies to Reduce Mercury Use & Releases



Mercury Products

- ✓ Mercury collection programs for elemental mercury, mercury waste, mercury-containing products, and the recycling of collected mercury is voluntary. Material is either reclaimed or sent to a permitted hazardous waste facility for disposal. The hazardous waste program is subject to permitting and inspection. The hazardous waste program and direct cleanup activities are state-funded.
- ✓ Elemental mercury collections in 1998 and 2001 totaled 3,200 pounds.

Vehicle Switches

- ✓ An effort on mercury switch removal is under discussion for implementation in the next state fiscal year.

Documented Mercury Spills & Releases

Year	# of Spills	Cost
2000	14	$8,000
2001	10	$3,200
2002	3	$2,000
2003	13	$5,000

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling. There are 318 stream chemistry stations.
- ✓ Also monitor: wastewater discharge for mercury.

Fish Consumption Advisory

- 129 lake acres under advisory
- 98 river miles under advisory
- 3 lakes and ponds are under a more stringent advisory

Public Outreach Efforts

Topics: disposal, & cleanup

Outreach Tools: factsheets, posters, press releases, & public service announcements

Targeted Constituencies: subsistence fishers, & sport-fishermen

Mercury TMDL Status

- 1 TMDL completed—developed for a stream. The potential sources of mercury are broken pipeline manometers, old batteries, and soil and atmospheric deposition.
- 0 watershed cleanup plans in lieu of TMDLs.

Top Intrastate Mercury Sources

State Estimate

1 → coal-fired power plants
2 → cement kilns
3 → wastewater treatment

Kentucky's Mercury Actions

Kentucky Department of Environmental Protection
Contact: Guy Delius ◆ phone: 502-564-7181 ◆ fax: 502-564-6533 ◆ guy.delius@ky.gov

Mercury Strategies & Outcome Measures

Kentucky has task forces comprised of representatives from environmental, commerce, public health, and fish and wildlife agencies. The Mercury Task Force is working on evaluating Kentucky's mercury programs statewide.

Fish Consumption Advisory

Statewide Fish Consumption Advisory Due to Mercury Contamination

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from industrial boilers, steel recycling facilities, sewage sludge incinerators, wastewater treatment, chlor-alkali plants, hazardous waste and cement kilns.
- ✓ State developed an acceptable health action level for mercury in public environments.

Mercury Products

- ✓ Kentucky has a pilot program in one county to collect mercury for recycling or proper disposal from individuals and businesses

Top Intrastate Mercury Sources

State Estimate

1 → coal-fired power plants
2 → cement kilns
3 → chlor-alkali plants

Public Outreach Efforts

Topics: monitoring, & health effects

Outreach Tools: website, reports, & press releases

Targeted Constituencies: pregnant women, & sport-fishermen

Unique Outreach: "Mercury Information to Schools" document helps schools react quickly to mercury spills.

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling. Tested fish from 32 lakes and 58 streams between 1995–2004.
- ✓ Also monitor: ambient air, wastewater discharge, mercury deposition, and waterbody sediment.

Louisiana's Mercury Actions

Louisiana Department of Environmental Quality ◆ www.deq.louisiana.gov/surveillance/mercury
Contacts: Hall Bohlinger ◆ phone: 225-219-3965 ◆ fax: 225-219-3971 ◆ hall.bohlinger@la.gov
Linda Brown ◆ phone: 225-219-3502 ◆ fax: 225-219-3240 ◆ linda.brown@la.gov

Mercury Strategies & Outcome Measures

Louisiana is partnering with business, industry, and the general public through citizen's environmental groups to develop an overall mercury action plan. Major elements of the plan will include: small business and household mercury waste management, medical and dental mercury waste management, remediation of legacy and existing natural gas metering sites, reductions in mercury emissions, reductions in mercury discharges to water, reduction of mercury use in consumer products, technical assistance for industries, recycling, and public outreach and education. Statutes and regulations may be developed as the state's mercury action plan is finalized and implemented.

Outcome measures used to quantify progress include:

- ✓ Air emission reductions
- ✓ Ambient air quality improvement
- ✓ Wastewater discharge reductions
- ✓ Total amount of mercury collected
- ✓ Number of mercury-containing devices collected
- ✓ Reduction in the number of fishing advisories/impaired waters
- ✓ Mercury deposition reductions
- ✓ Waterbody sediment reductions
- ✓ Number of dentists that install amalgam separators and/or implement BMPs
- ✓ Number of schools that have conducted mercury cleanup
- ✓ Reduction in mercury levels in fish tissue
- ✓ Number of organizations adopting mercury-free purchasing policies
- ✓ Number of natural gas meter sites remediated

Top Intrastate Mercury Sources

State Estimate

1 → chlor-alkali plants
2 → coal-fired power plants
3 → electric arc furnaces

Fish Consumption Advisory

Waterbody-Specific Fish Consumption Advisories Due to Mercury Contamination

- 251,220 lake acres under advisory
- 2,114 river miles under advisory
- 22 lakes and ponds under advisory

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from electric arc furnaces, steel recycling facilities, hazardous waste, municipal solid waste incinerators, and medical waste incinerators.

Mercury Products

- ✓ A non-essential mercury-containing product phase-out may be a component of the state's mercury action plan once finalized.
- ✓ Voluntary mercury collection programs for elemental mercury, mercury waste, and mercury-containing products. Recycling of collected mercury is voluntary. Mercury is handled by permitted hazardous waste or universal waste facilities.
- ✓ Louisiana provides funding to local governments for mercury thermometer collection from residential sources.

Louisiana's Mercury Actions, continued

Mercury TMDL Status

- U.S. EPA Region 6 has developed six mercury TMDL Reports for the State including Catahoula Lake & Little River, Ouachita River, the Coastal Bays and Gulf Waters of Louisiana, Mermentau & Vermillion River Basins, and two for the Calcasieu River Basin.
- Mercury Minimization Program requirements to be implemented into LDPES discharge permits in lieu of end-of-pipe mercury limitations.
- 0 watershed cleanup plans in lieu of TMDLs

Vehicle Switches

✓ Voluntary removal of mercury auto switches. Plan to have mandatory removal of mercury switches from end-of-life and on-the-road vehicles.

Biggest Challenge: Cost to dismantler for mercury switch collection, transportation, and recycling.

Public Outreach Efforts

Topics: monitoring, disposal, cleanup, health effects, & reduction progress

Outreach Tools: factsheets, reports, consumer brochures, workshops, emails, public service announcements, press releases, media events, & phone hotlines

Languages: English, & Vietnamese

Targeted Constituencies: subsistence anglers; recreational fishermen, their friends and families, and those who eat recreationally caught fish; residential and commercial waste generators and handlers; women of child-bearing age, pregnant women; school system and local government officials; and hospitals and dentists

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling since 1993. Tested fish from all significant waters at least once, which total more than 400 sites sampled.
- ✓ Also monitor: wastewater discharges, deposition, waterbody sediments, and ambient water quality.
- ✓ Louisiana participates in the National Mercury Deposition Network.
- ✓ Compiling data on the ratio of total mercury to methylmercury in order to determine methylation rates.
- ✓ Louisiana has also provided funding for research to characterize ambient soil heavy metal concentrations in order to gain information about historic contamination from natural gas meter sites. The sediment sampling aims to help detect unknown sources to surface waters.

Maine's Mercury Actions

Maine Department of Environmental Protection◆ www.maine.gov/dep/mercury/index.htm
Contact: Ginger Jordan-Hillier ◆ phone: 207-287-7863 ◆ fax:207-287-2814 ◆ Ginger.Jordan-Hillier@maine.gov

Mercury Strategies & Outcome Measures

Maine has an overall mercury action plan. Major elements of the plan include: small business, household, medical, and dental mercury waste management; mercury emission limits; limiting mercury discharges to water; reduction of mercury use in products; technical assistance for industries; recycling; remediation of contaminated sites; expanded mercury research; regional and national advocacy for mercury reduction; and outreach and education. The state has statutes and regulations relating to the mercury action plan.

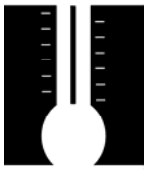
Outcome measures used to quantify progress include:

- ✓ Air emission reductions
- ✓ Total amount of mercury collected
- ✓ Number of mercury-containing devices collected
- ✓ Mercury deposition reductions
- ✓ Number of dentists that have installed separators
- ✓ Number of schools that have conducted mercury cleanup
- ✓ Fish and wildlife monitoring

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from all air emission sources, including industrial boilers, steel recycling facilities, municipal solid waste incinerators, and cement kilns.[1]
- ✓ State regulations on mercury releases from dental facilities[2] and wastewater treatment and other discharges.[3]



Mercury Products

- ✓ Mandatory product labeling requirements.[4]
- ✓ Phased out or banned the sale of the following mercury-containing products: thermometers, dairy manometers, thermostats, instruments and measuring devices, switches and relays, and elemental mercury.[5]
- ✓ Disposal ban on mercury-containing products.[6]
- ✓ Prohibits the use of mercury in schools.[5]
- ✓ Voluntary collection programs for elemental mercury, mercury waste, and mercury-containing products.
- ✓ Maine has mandatory recycling of collected mercury.
- ✓ Maine's Universal Waste Regulations and household hazardous waste regulation cover handling and disposal of mercury-added products. Universal waste consolidators must file quarterly reports, and the requirements include inspections.
- ✓ Technical and financial support for household collections and technical support for school collections.
- ✓ Regulatory requirement for thermostat collection centers & consolidation centers for switches and headlamps.

Top Intrastate Mercury Sources

State Estimate

1 → residential combustion & industrial boilers
2 → broken mercury-containing products & spills
3 → municipal solid waste incinerators

Mercury Monitoring and Research

- ✓ On-going fish tissue testing and sampling. Tested fish from 251 waterbodies so far.
- ✓ Also monitor: air emissions, wastewater discharges, mercury collection, deposition, waterbody sediments, wildlife, & ambient water.
- ✓ Maine has done research into a wide range of mercury topics, including products and contamination levels.[9]
- ✓ Maine has supported significant biomonitoring & surface water research.[10]

Maine's Mercury Actions, continued

Fish Consumption Advisory

Statewide Fish Consumption Advisory Due to Mercury Contamination.[7]

- 987,172 lake acres under advisory
- 31,672 river and stream miles under advisory
- 5,782 lakes and ponds under advisory

Documented Mercury Spills & Releases

Year	# of Spills
2000	8
2001	10
2002	42
2003	26

Mercury TMDL Status

- 0 TMDLs completed
- Maine joined Massachusetts in submitting an alternative proposal to EPA in lieu of TMDLs.

Laws & Policies to Reduce Mercury Use & Releases

Vehicle Switches

- ✓ Mandatory removal of mercury switches from end-of life vehicles.[8]
- ✓ Voluntary removal of mercury switches (hood lights, trunk lights, & ABS sensor) from on-the-road non-commercial vehicles.[8]
- ✓ Prohibition on replacement mercury switches.[8]
- ✓ Prohibition on sale of new cars with mercury switches.[8]
- ✓ Switches covered include hood, trunk, and vanity light switches, ABS sensors, mercury-added luxury headlamps, and security system switches.
- ✓ Vehicles covered include passenger and commercial cars and trucks, motorcycles, and recreational vehicles.
- ✓ Maine's auto switch program contains substantial manufacturer responsibility requirements, including providing for the collection and recycling of switches and paying a minimum $1 bounty per switch collected.
- ✓ Maine DEP provides guidance and supplies to auto dismantlers & junkyards.
- ✓ Progress is quantified by the number of switches collected and the number of pounds of mercury collected.

Biggest Challenge: Driving distance between junkyards and consolidation facilities can be lengthy.

Public Outreach Efforts

Topics: sources, monitoring, disposal, cleanup, health effects, recycling, research, & reduction progress

Outreach Tools: website, factsheets, videos, reports, posters, brochures, workshops, business training, & phone hotlines

Targeted Constituencies: women of child-bearing age, pregnant women, & sport-fishermen on health advisories

Unique Outreach: Targeted mailings to intersection of fishing licenses & birth registry. Mailings to ob/gyns, certified nurses, mid-wives, & family practitioners who deliver babies.

Citations

1. 38 MRSA Subsection 585B. Online at: http://janus.state.me.us/legis/statutes/38/title38sec585-b.html
2. 38 MRSA Subsection 1667. Online at: http://janus.state.me.us/legis/statutes/38/title38ch16-Bsec0.html
3. 38 MRSA Subsection 420. Online at: http://janus.state.me.us/legis/statutes/38/title38sec420.html
4. 38 MRSA Subsection 1662. Online at: http://janus.state.me.us/legis/statutes/38/title38sec1662.html
5. 38 MRSA Subsection 1661-C. Online at: http://janus.state.me.us/legis/statutes/38/title38sec1661-C.html
6. 38 MRSA Subsection 1663. Online at: http://janus.state.me.us/legis/statutes/38/title38sec1663.html
7. Advisory available online at: www.maine.gov/dhhs/ehu/fish/
8. 38 MRSA Subsection 1665-A, Online at: http://janus.state.me.us/legis/statutes/38/title38sec1665-A.html
9. Research available online at: www.maine.gov/dep/mercury/reports.htm
10. Research available online at: www.maine.gov/dep/blwq/docmonitoring/swat/

Maryland's Mercury Actions

Maryland Department of Environment
www.mde.state.md.us/programs/landprograms/hazardous_waste/mercury/index.asp
Contact: Richard Eskin ◆ phone: 410-537-3572 ◆ fax: 410-537-3998 ◆ reskin@mde.state.md.us

Mercury Strategies & Outcome Measures

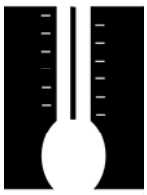
Measures used to quantify progress include:

- ✓ Number of collected products containing mercury
- ✓ Total amount of mercury collected
- ✓ Number of schools that conducted mercury cleanup
- ✓ Reduction of mercury levels in fish tissue
- ✓ Reduction in the number of fish consumption advisories/ impaired waters

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from electric arc furnaces, industrial boilers, steel recycling facilities, sewage sludge incinerators, hazardous waste, municipal solid waste incinerators, and cement kilns.
- ✓ Wastewater treatment facilities and mines are regulated through water quality standards.



Mercury Products

- ✓ The state gives a purchasing preference to products that are mercury-free or contain the least amount of mercury necessary to meet performance standards.[1]
- ✓ Beginning April 1, 2006, mercury-containing products may not be sold in Maryland unless the product is clearly labeled to inform the consumer that it contains mercury.[2]
- ✓ Phase out the sale of mercury containing thermometers (except with prescription) and the use of mercury-containing devices in primary and secondary schools (except in schools engaged in vocational training).[2]
- ✓ Requirement that on or after October 1, 2006, fluorescent lamps containing mercury be discarded at an appropriate reclamation facility.[2]
- ✓ Voluntary mercury collection programs for elemental mercury, mercury waste, and mercury-containing products. Mercury is dropped off at Clean Sweep Sites or Household Hazardous Waste program facilities. Mercury from spills, broken mercury-containing products, and collected mercury is managed at collection sites by the MDE Emergency Response Division, which ensures safe storage and transportation of these items to Bethlehem Apparatus in Pennsylvania.
- ✓ MDE is investigating opportunities to collect and recycle mercury dental amalgam including reduced cost mercury mailers, cooperative agreements with dental amalgam distributors, and activities during household hazardous waste collection days.
- ✓ The state previously financed: thermometer exchange programs; collection services to remove mercury from Maryland schools; a day-long workshop on the minimization and management of hazardous wastes at health care facilities; and a collection point for bulk mercury and dental amalgam at the Chesapeake Dental Conference.

Top Intrastate Mercury Sources

1 → coal-fired power plants
2 → mining
3 → municipal solid waste incinerators

Maryland's Mercury Actions, continued

Mercury TMDL Status

- 9 TMDLs completed — The source of mercury is atmospheric deposition from coal-fired power plants.[4]

Mercury Monitoring

- ✓ On-going fish tissue sampling. Tested fish from about 60 waterbodies.[4]
- ✓ Other monitoring: stack emissions; wastewater discharge; product and elemental mercury collections.
- ✓ Maryland participates in the National Mercury Deposition Network.

Documented Mercury Spills & Releases

Year	# of Spills	Cost
2000	16	$16,900
2001	27	$18,200
2002	33	$28,600
2003	36	$35,100
2004	51	$39,000

Fish Consumption Advisory

- 77,398 lake/impoundment acres under a statewide fish consumption advisory
- 567 lake/impoundment acres and 6 river miles under a more stringent fish consumption advisory

Public Outreach Efforts

Topics: State has outreach on mercury sources, monitoring, proper disposal, cleanup, health effects.

State law requires MDE to provide outreach assistance to schools regarding proper management, recycling, & disposal of mercury and mercury-containing products.

Outreach Tools: websites, factsheets, reports, posters, brochures, workshops, emails, press releases, business training, media events, phone hotlines

Languages: English, Fish consumption advisory posters and brochures in English and Spanish

Targeted Constituencies: pregnant women, women of child-bearing age, sport fishermen, hospitals, & dentists, Maryland Women, Infants, and Children (WIC)

Unique Outreach: MDE worked closely with the state Department of Health and Mental Hygiene to develop a brochure suitable for use by WIC programs and County Environmental Health Departments.

MDE has signed up as a "Hospitals for Healthy Environment Champion for Change" and has agreed to assist health care facilities in achieving national goals as well as to lead by example at MDE facilities. As part of this effort, MDE partnered with the U.S. EPA and the Maryland Hospitals Association to sponsor an environmental compliance seminar for hospital environmental staff.

Partnering with the Maryland State Dental Association, MDE developed a brochure and Power Point presentation on best management practices for dental amalgam. The brochure was distributed by the Maryland State Board of Dental Examiners to all licensed dentists in the state.

Citations

1. Md. Code Ann., Environment § 14-406 (2001).
2. Md. Code Ann., Environment § 6-905 (2004).
3. See www.mde.state.md.us/CitizensInfoCenter/FishandShellfish/home/
4. See www.mde.state.md.us/Programs/WaterPrograms/TMDL/

Massachusetts' Mercury Actions

Massachusetts Department of Environmental Protection ♦ www.mass.gov/dep/bwp/hgres.htm
Contact: C. Mark Smith ♦ phone: 617-292-5509 ♦ fax: 617-556-1006 ♦ c.mark.smith@state.ma.us

Mercury Strategies & Outcome Measures

Massachusetts has an overall mercury action plan with the goal of virtually eliminating all anthropogenic sources of mercury and a milestone goal of 75% reduction by 2010.[1,2] Major elements of the plan include: small business, household, medical, and dental mercury waste management; strict mercury emission limits; limiting mercury discharges to water; reduction of mercury use in products; recycling; and outreach and education. The state has policies, statutes, and regulations relating to the mercury action plan. Massachusetts also participates in the New England Governors and Eastern Canadian Premiers mercury action plan.[3]

Outcome measures used to quantify progress include:

- ✓ Reduction of mercury in fish tissue
- ✓ Emission reductions: overall 70% reduction achieved since 1996
- ✓ Wastewater discharge reductions
- ✓ Total amount of mercury collected
- ✓ Mercury deposition reduction using monitoring and modeling
- ✓ Mercury inputs to sediments
- ✓ Number of dentists that have installed separators
- ✓ Number of schools that have conducted mercury cleanups
- ✓ Wildlife monitoring

Top Intrastate Mercury Sources

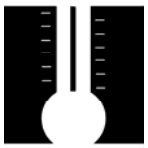
State Estimate

1 → municipal solid waste incinerators
2 → residential/commercial boilers
3 → wastewater treatment (includes sewage sludge incinerators)

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ Strict state regulations on mercury releases from coal-fired power plants (85% and 95% control by 2008 and 2010)[3], municipal waste incinerators (three-fold more stringent than EPA)[5], dental offices, and wastewater treatment.
- ✓ Massachusetts has a voluntary program that provides dentists with an incentive to install amalgam separators.[6] MA DEP will be adopting regulations requiring dentists to install amalgam separators in 2006.



Mercury Products

- ✓ Massachusetts has banned the sale of mercury thermometers and completed a statewide collection program that recycled more than 95,000 thermometers.
- ✓ Massachusetts' waste incinerator rules[5] require facilities to implement mercury source separation plans in their wastesheds.
- ✓ Mercury products are managed as universal or hazardous wastes and recycled.
- ✓ Massachusetts monitors collection activities through audits, inspections, and self-certification provisions.
- ✓ MA DEP supports mercury cleanouts and education programs in schools and other community recycling efforts.

Fish Consumption Advisory

Statewide Fish Consumption Advisory Due to Mercury Contamination[7]

- ♦ Additional guidelines provided for more than 100 specific waterbodies
- ♦ Advisories for marine species

Mercury TMDL Status

- ♦ MA has submitted an alternative proposal to EPA in lieu of TMDLs.

Massachusetts' Mercury Actions, continued

Public Outreach Efforts

Topics: sources, monitoring, disposal, cleanup, health effects, research & reduction progress

Outreach Tools: website[8], factsheets, videos, reports, posters, brochures, workshops, emails, press releases, business training, citizen training, public service announcements, media events, & phone hotlines

Languages: Spanish, Hmong, Vietnamese, Cambodian, & English

Targeted Constituencies: women of child-bearing age, pregnant women, subsistence fishers, sport-fishermen, consumers, dentists, businesses, & schools

Mercury Monitoring

- ✓ Massachusetts conducts on-going fish tissue monitoring. Preliminary data indicate a 20-30% decrease in mercury levels in fish in a high deposition zone concomitant with emission reductions.
- ✓ Also monitor: emissions, wastewater discharges, mercury collection, deposition, waterbody sediments, & wildlife.
- ✓ Massachusetts collaborates with other NE states, universities, and EPA New England to implement a variety of monitoring programs which are supported through state funds, research grants, and state scientist staff time.
- ✓ DEP co-sponsored pilot testing of continuous emission monitoring systems, and supported university research on amalgam separator technology.

Citations

1. A summary of Massachusetts' and regional activities can be found in Ecotoxicology 14:19-35, 2005 at www.springerlink.com
2. Action plan online at: www.mass.gov/envir/Sustainable/resources/pdf/Resources_Hg_Strategy.pdf
3. Online at: www.mass.gov/dep/ors/files/negecp.pdf
4. 310 CMR 7.29. Online at: www.mass.gov/dep/bwp/daqc/files/regs/hgreg.pdf
5. 310 CMR 7.08 (2). Online at: www.mass.gov/dep/bwp/daqc/files/mwcregs.pdf
6. Information about MA's dental program is online at: www.mass.gov/dep/erp/dentists.htm
7. Fish consumption information available online at: http://db.state.ma.us/dph/fishadvisory/
8. Mercury resources online at: www.mass.gov/dep/bwp/hgres.htm

Michigan's Mercury Actions

Michigan Department of Environmental Quality ◆ www.michigan.gov/deqmercuryp2
Contacts: Steve Kratzer ◆ phone: 517-373-0939 ◆ fax: 517-373-3675 ◆ Kratzers@Michigan.gov
Joy Taylor Morgan ◆ phone: 517-335-6974 ◆ fax: 517-214-2915 ◆ Taylorj1@Michigan.gov

Mercury Strategies & Outcome Measures

Michigan has an overall mercury action plan. Major elements of the plan include: medical/dental mercury waste management; limits on mercury discharges into water; reduction of mercury use in consumer products; technical assistance for industries; mercury recycling; and public outreach and education.

A Michigan Mercury Utility Workgroup was convened August 2003, that includes representatives of industry, non-governmental organizations, government, and academia. The workgroup was tasked to develop a mercury reduction strategy for the states coal-fired power plants. A full report and recommendations from the workgroup were released in June of 2005.

Outcome measures used to quantify progress include:

- ✓ Air emission reductions
- ✓ Mercury deposition reductions
- ✓ Number of organizations adopting mercury-free purchasing specifications
- ✓ Number of schools that conducted mercury cleanup
- ✓ Number of mercury-containing devices collected
- ✓ Total amount of mercury collected
- ✓ Wastewater discharge reductions
- ✓ Reduction in fish tissue mercury levels
- ✓ Wildlife monitoring

Top Intrastate Mercury Sources

State Estimate

1 → coal-fired power plants

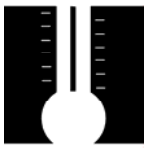
2 → volatilization during solid waste collection and processing

3 → steel manufacturing

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from wastewater treatment and industrial facilities, municipal waste incinerators, and medical waste incinerators.
- ✓ Air permits for certain sources such as shredders and sewage sludge incinerators include mercury specific limits or Best Management Practices (BMP) Requirements.[1]



Mercury Products

- ✓ Mercury-free purchasing policy for state procurement.
- ✓ Phased out the sale of mercury containing thermometers[2], the use of mercury-containing devises in K–12 schools[3], and the sale of mercury-containing batteries that exceed allowable mercury amounts[4].
- ✓ Mercury collection programs for elemental mercury, mercury waste, and mercury-containing products. Mercury is dropped off at Clean Sweep Sites or Household Hazardous Waste program facilities. Collected mercury and mercury devices are lab packed and transported for recycling by licensed vendors. Recycling of the mercury collected is voluntary. MDEQ encourages Clean Sweep Sites to retain mercury manifests and/or invoices for a minimum of 3 years.

Michigan's Mercury Actions, continued

Fish Consumption Advisory

Statewide Fish Consumption Advisory Due to Mercury Contamination

- 205,583 lake acres under advisory (does not include Great Lakes)
- 478 river miles under advisory

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling. Tested 304 waterbodies' fish tissue mercury concentrations so far.
- ✓ Also monitor: stack emissions; ambient air & water; wastewater discharge; product and elemental collections; waterbody sediments; and wildlife for mercury.
- ✓ MDEQ-AQD working cooperatively with University of Michigan's Air Quality Laboratory on a mercury monitoring network in Michigan. Six sites in MI collect mercury precipitation (event-based) samples and two of those sites collect mercury-speciated data for estimating both dry and wet deposition.
- ✓ MDEQ-AQD also works cooperatively with the Minnesota Pollution Control Agency and the Wisconsin DNR on assessing fugitive mercury releases with the application of a shared mobile mercury monitoring trailer that houses mercury monitoring and meteorological equipment.

Documented Mercury Spills & Releases[5]

Year	# of Spills
2000	767
2001	1,350
2002	1,261
2003	774

Mercury TMDL Status

- 1 TMDL completed — developed for Hammell Creek in Houghton County, MI. The source of mercury is an abandoned mine discharge.
- 2 corrective action plans in lieu of TMDLs— Newburgh Lake in Wayne County, and unnamed tributary of Wolf Creek in Montcalm County

Public Outreach Efforts

Topics: sources, monitoring, disposal, cleanup, health effects, research, & reduction progress

Outreach Tools: factsheets, videos, reports, posters, brochures, workshops, emails, press releases, business training, citizen training, public service announcements, media events, & phone hotlines

Languages: mercury ritual use brochure & alerts in Spanish

Targeted Constituencies: women of child-bearing age, pregnant women, & sport-fishermen

Unique Outreach: MDCH and MDEQ have conducted training for environmental health professionals and first responders, to build capacity in local areas to respond to spills and promote preventative measures.

Vehicle Switches

- ✓ Voluntary removal of mercury switches (hood lights, trunk lights, & ABS sensor) from end-of-life non-commercial vehicles.
- ✓ Vehicle manufacturers provide training materials, buckets, pick-up and transport.
- ✓ MDEQ recommends that mercury switches be managed as Universal Waste.[6]
- ✓ Biggest Challenge: apportioning out shared responsibilities among industry and government.

Citations

1. Utility Mercury Report at http://www.deq.state.mi.us/documents/deq-aqd-air-aqe-mercury-report.pdf
2. 1994 Mich. Pub. Act 451. Available at: www.legislature.mi.gov/mileg.asp?page=getObject&objName=mcl-324-17202
3. 1976 Mich. Pub. Act 451. Available at: http://www.legislature.mi.gov/mileg.asp?page=getObject&objName=mcl-380-1274b
4. 1994 Mich. Pub. Act 451. 324.17105a and 324.17105b www.michiganlegislature.org/mileg.asp?page=Home
5. Data from the Michigan Poison Control Centers
6. Universal waste requirements, Available at: www.deq.state.mi.us/documents/deq-wmd-Universl.pdf

Minnesota's Mercury Actions

Minnesota Pollution Control Agency ◆ http://www.pca.state.mn.us/air/mercury.html
Contact: Ned Brooks ◆ phone: 651-296-7242 ◆ fax: 651-297-8676 ◆ ned.brooks@state.mn.us

Fish Consumption Advisory

General Fish Consumption Advisory for all State Waterbodies[1]

- 1,240 lakes and river segments impaired due to fish mercury levels, out of 1,500 waterbodies tested.

Mercury TMDL Status

- Developed a draft statewide mercury TMDL plan.[2]

Mercury Strategies & Outcome Measures

Minnesota has an overall mercury action plan. Major elements of the plan include: small business, household, medical, and dental mercury waste management; prevention of mercury pollution from existing iron/taconite mine operations; mercury emission limits; limiting mercury discharges into water; reduction of mercury use in consumer products; mercury recycling; public outreach and education programs to reduce exposure; voluntary reductions; and encouragement of a national and international plan. The state has statutes and policies establishing a voluntary program and reduction goals relating to the mercury action plan. Minnesota has four mercury working groups — a health care mercury reduction advisory group composed of government, environmental groups, and industry; an inter-agency coordination group composed of state agencies only; a state inter-agency group that coordinates fish sampling and testing; and a state and local government purchasing/prevention group.

Outcome measures used to quantify progress include:

- ✓ Air emission reduction
- ✓ Mercury deposition reduction
- ✓ Reduction in the amount of mercury in fish tissue
- ✓ Wastewater discharge reduction
- ✓ Total amount of mercury collected
- ✓ Number of mercury-containing devices collected
- ✓ Reduction in the number of fishing advisories/impaired waters
- ✓ Lake sediment reduction
- ✓ Number/percent of dentists that have installed amalgam separators
- ✓ Number of schools that have pledged to be mercury free and conducted mercury cleanup
- ✓ Loon monitoring
- ✓ Number of organizations adopting mercury-free purchasing specifications

Mercury Monitoring

- ✓ On-going fish tissue sampling and testing. Tested fish from approximately 1,500 waterbodies so far.
- ✓ Minnesota participates in the National Mercury Deposition Network.
- ✓ Also monitor: lake sediment and loons.

Public Outreach Efforts

Topics: sources, monitoring, disposal, cleanup, health effects, research, & reduction progress

Outreach Tools: factsheets, reports, posters, brochures, workshops, press releases, business training, & phone hotlines

Languages: fish consumption advice in Spanish & Hmong

Targeted Constituencies: women of child-bearing age, pregnant women, subsistence fishers, sport anglers, households, businesses using/handling mercury products.

Unique Outreach: Clancy, the mercury-detecting dog, is used in schools to locate spilled mercury and as an educational tool.

Top Intrastate Mercury Sources

State Estimate

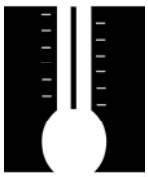
1 → coal-fired power plants
2 → mining
3 → electric arc furnaces

Minnesota's Mercury Actions, continued

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from wastewater treatment, municipal solid waste incinerators, medical waste incinerators, and broken mercury-containing products and spills.



Mercury Products

- ✓ Specified mercury-containing products must be labeled, and disclosure is required to lamp purchasers.
- ✓ Phase-out sale of mercury-containing dairy barn manometers, toys, games, thermometers, inks, pigments, dyes, paints, fungicides, switches in tax-exempt wearing apparel.
- ✓ The Metropolitan Council Environmental Services and the MN Dental Association have a Memorandum of Agreement regarding the installation and maintenance of mercury dental amalgam separators in the MCES Wastewater Service area and statewide.
- ✓ Ban on all product disposal in solid waste. A State Universal Waste Rule covers federal mercury wastes and all other mercury wastes by MPCA Program Management Decision.
- ✓ Voluntary mercury collection programs for elemental mercury, mercury waste, and mercury-containing products. Mandatory recycling of collected mercury. Minnesota has two state contracts for management of mercury waste whose providers are subject to audit before and throughout the life of the contract. State provides a master contract, in-kind administrative support, and limited financial support to the state's Regional HHW management programs. State law requires counties to have an HHW collection program available to their residents, and state agencies are provided funding for technical and programmatic assistance to businesses and homeowners. Some HHW facilities accept small business waste; all other business mercury wastes are contracted privately.
- ✓ Manufacturers of mercury thermostats are required to provide education and incentives for recovery and recycling of end-of-life thermostats.
- ✓ Manufacturers of mercury displacement relays are required to provide a system for collection and recycling of end-of-life relays.

Vehicle Switches

- ✓ Mandatory removal of mercury switches from end-of-life passenger vehicles. Voluntary removal of mercury switches (hood lights, trunk lights, ABS sensor, & alarm system) from on-the-road passenger vehicles.
- ✓ In-state secondary steel mill has collected switches from suppliers since 1997, for which it currently pays about 25 cents per switch.
- ✓ Vehicle manufacturers provide funding for a two-year outreach, collection, transportation, and recycling program that collects mercury switch assemblies and recycles them for free.
- ✓ Progress is quantified by number of switches & pounds of mercury collected, the number and percent of salvage yards and scrap processors involved, & the recovery rate of number of switches per end-of-life vehicle.
- ✓ Universal waste and record keeping.
- ✓ State conducts research on cars that do and do not contain switches, estimates switch use overall & by model year, estimates switch quantities in vehicles reaching end-of-life in state.
- ✓ State vehicle bid specifications require disclosure of vehicle mercury content.
- ✓ Replacement of mercury switches in vehicles being retired from state fleet.

Biggest Challenge: Monitoring these policies.

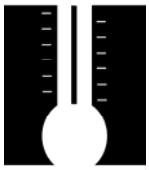
Citations

1. Available at: www.pca.state.mn.us/publications/p-p2s4-05.pdf and www.health.state.mn.us/divs/eh/fish/forms/eatfishoften.pdf
2. See www.pca.state.mn.us/water/tmdl/tmdl-mercuryplan.html

Mississippi's Mercury Actions

Mississippi Department of Environmental Quality ◆ www.deq.state.ms.us
Contacts: Henry Folmar ◆ phone: 601-664-3910 ◆ fax: 601-664-3938 ◆ henry_folmar@deq.state.ms.us
Jerry Cain ◆ phone: 601-961-5073 ◆ fax: 601-961-5703 ◆ jerry_cain@deq.state.ms.us

Laws & Policies to Reduce Mercury Use & Releases



Mercury Products

- ✓ Voluntary mercury collection programs for elemental mercury and mercury-containing products. MDEQ oversees collection through the Household Hazardous Waste Program (HHW). The state covers 75% of the HHW costs and allows local governments to match 25% of the costs with in-kind services.
- ✓ Mississippi has a Solid Waste Assistance Grants program. The grants are used for pollution prevention activities and to help divert, remove, or recycle mercury from the waste stream before landfill disposal.
- ✓ In the last 5 years, MDEQ performed 45 lab chemical removals at high school labs.

Mercury TMDL Status

- ♦ MS TMDLs are designed to reduce point source contributions. Air deposition is not addressed.
- ♦ 0 watershed plans in lieu of TMDLs.

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling since 1994. Fish from 50 to 75 sites are tested each year. To date, all major rivers and virtually all publicly owned fishing lakes in that state have been sampled.
- ✓ Also monitor: wastewater discharge & waterbody sediments for mercury.
- ✓ MDEQ is cooperating with the Pat Harrison Waterway District to evaluate liming as a means to reduce mercury levels in fish living in the Archusa Creek Reservoir.

Fish Consumption Advisory

Waterbody-Specific Fish Consumption Advisories Due to Mercury Contamination

- ♦ 35,371 lake acres under advisory
- ♦ 289 river miles under advisory
- ♦ 3 lakes and ponds under advisory
- ♦ Approximately 20 square miles of coastal wetlands under advisory.

Mercury Task Force

Mississippi's Fish Advisory Task Force makes recommendations about fish consumption advisiories.

Public Outreach Efforts

Topics: health effects

Outreach Tools: website, consumer brochures, press releases, & phone hotline

Languages: English

Targeted Constituencies: subsistence anglers, women of childbearing age, pregnant women, children, & sport-fishermen

Documented Mercury Spills & Releases

Year	# of Spills	Cost
2000	1	unknown
2001	2	unknown
2002	5	unknown
2003	12	$83,666.52

Missouri's Mercury Actions

Missouri Department of Natural Resources ◆ www.dnr.mo.gov/mercury
Contacts: Georganne Bowman ◆ phone: 573-526-1157 ◆ fax: 573-526-6802 ◆ georganne.bowman@dnr.mo.gov
Richard Allen ◆ phone: 573-751-5401 ◆ richard.allen@dnr.mo.gov

Documented Mercury Spills & Releases

Year	# of Spills	Cost
2001	17	unknown
2002	10	unknown
2003	10	unknown

Mercury TMDL Status

- 1 draft TMDL.
- 0 watershed cleanup plans.

Fish Consumption Advisory

Statewide Fish Consumption Advisory Due to Mercury Contamination[1]

- 33,634 lake acres under advisory
- 1,125 river miles under advisory
- 24 lakes and ponds under advisory

Top Intrastate Mercury Sources

State Estimate

1 → coal-fired power plants
2 → cement kilns
3 → lead smelters

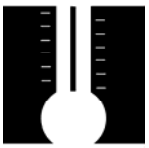
Mercury Strategies & Outcome Measures

Missouri has an overall mercury action plan. Major elements of the plan include: small business, household, medical, and dental mercury waste management; mercury recycling; and public outreach and education.

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

✓ State regulations on mercury releases from wastewater treatment facilities, municipal waste incinerators, and medical waste incinerators.



Mercury Products

✓ Voluntary mercury collection programs for elemental mercury, mercury waste, and mercury-containing products. MO DNR's environmental services program collects mercury from homeowners and schools. The collected mercury is stored properly to prevent spills and vapor emissions. Collected mercury is periodically shipped to a recycling facility. Missouri provided funds for thermometer trading and school mercury collections.

Vehicle Switches

✓ Voluntary removal of mercury switches (from end-of-life vehicles.

Biggest Challenge: Lack of legislative mandate and funding as well as resistance from auto manufacturers.

Mercury Monitoring

✓ On-going fish tissue testing and sampling. Samples are taken from lakes and streams across the state, targeting predators and bottom-feeding species. 60 to 90 fish samples analyzed annually.
✓ Also monitor: wastewater discharge; product and elemental collections; & waterbody sediments for mercury.
✓ Missouri participates in the National Mercury Deposition Network.

Public Outreach Efforts

Topics: sources, disposal, cleanup, & health effects

Outreach Tools: website, factsheets, videos, signs, presentations, news articles, & public service announcements

Languages: English, & Spanish

Targeted Constituencies: subsistence anglers, women of child-bearing age, pregnant women, & sport-fishermen

Citations

1. Available at: www.dhss.state.mo.us/NewsAndPublicNotices/04FishAdvisory.pdf

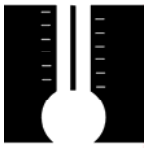
Montana's Mercury Actions

Montana Department of Environmental Quality
Contacts: Tom Ellerhoff ◆ phone: 406-444-5263 ◆ fax: 406-444-4386 ◆ tellerhoff@mt.gov
Dave Klemp ◆ phone: 406-444-0286 ◆ fax: 406-444-1499 ◆ dklemp@mt.gov

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

✓ State regulations on mercury releases from coal-fired electric power plants, industrial boilers, and cement kilns.



Mercury Products

✓ Voluntary mercury collection programs for mercury-containing products. Recycling of collected mercury is voluntary. Disposal of thermometers and thermostats is carried out through a permitted hazardous waste hauler and recycling facility. The collection and recycling program is provided by the state.

✓ In 2003 and 2004 mercury collection and recycling events were held for the public and state employees.

Public Outreach Efforts

Targeted Constituencies: women of child-bearing age, pregnant women, & sport-fishermen

Mercury Monitoring

✓Monitor stack emissions and fish tissue for mercury.

Mercury TMDL Status

- 0 TMDLs completed
- 0 watershed cleanup plans in lieu of TMDLs.

Citation

1. Available at: http://fwp.state.mt.us/habitat/fishcontaminants.pdf

Fish Consumption Advisory

Statewide Fish Consumption Advisory Due to Mercury Contamination[1]

Top Intrastate Mercury Sources

U.S. EPA TRI

1 → coal-fired power plants
2 → mining
3 → petroleum refineries

Nebraska's Mercury Actions

Nebraska Department of Environmental Quality/
Nebraska Department of Health and Human Services ◆ www.hhs.state.ne.us
Contacts: Todd Falter ◆ phone: 402-471-0782 ◆ todd.falter@hhss.ne.gov
David Haldeman ◆ phone: 402-471-4219 ◆ fax: 402-471-2909 ◆ david.haldeman@ndeq.state.ne.us

Laws & Policies to Reduce Mercury Use & Releases

Mercury Products

- ✓ Nebraska has phased out and has a sales-ban on mercury-containing thermometers.[1]
- ✓ Mercury collection programs for mercury-containing products are voluntary. The NDEQ funds the program, administered by the Department of Health, for collecting mercury thermometers and miscellaneous items.

Top Intrastate Mercury Sources

State Estimate

1 → coal-fired power plants
2 → cement kilns
3 → electric arc furnaces

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling. Tested fish from 108 waterbodies so far.
- ✓ Also monitor: water columns of lakes and streams.

Public Outreach Efforts

Topics: disposal, cleanup, & health effects

Outreach Tools: phone hotlines

Fish Consumption Advisory

- 4,671 lake acres under advisory
- 144 river miles under advisory

Mercury TMDL Status

- 0 TMDLs completed.
- 0 watershed cleanup plans in lieu of TMDLs.

Citations

1. 2004 LB 17 (Amendment). Available at http://srvwww.unicam.state.ne.us/unicam98.html

Nevada's Mercury Actions

Nevada Department of Environmental Protection
Contacts: Colleen Cripps ◆ phone: 775-687-9302 ◆ fax: 775-687-5856 ◆ cripps@ndep.nv.gov
David Friedman ◆ phone: 775-687-9466 ◆ fax: 775-687-5856 ◆ dfriedma@ndep.nv.gov

Laws & Policies to Reduce Mercury Use & Releases

Industrial Sources

✓ In 2002, Nevada collaborated with the U.S. EPA to create a voluntary mercury air emission reduction program for the four largest gold mines in the state. Due to installation of various control measures, mercury emissions reported for 2003 were 75% lower than the 2001 baseline year.

Mercury Products

✓ Mercury spill incidents sparked the state to create a voluntary mercury collection program for elemental mercury, mercury waste, and mercury-containing products. Collected mercury is managed by a hazardous waste disposal contractor.

Mercury TMDL Status

- 0 TMDLs completed.
- 0 watershed cleanup plans in lieu of TMDLs.

Mercury Monitoring

✓ Nevada participates in the National Mercury Deposition Network.
✓ NDEP helped fund some research completed by the University of Nevada and the Desert Research Institute on the fate and transport of mercury, natural sources of mercury in Steamboat Creek, and potential control mechanisms.
✓ NDEP is currently working with the Nevada Department of Wildlife on a statewide fish tissue mercury study. Between 130 and 150 fish will be collected and analyzed at 18 sites.

Fish Consumption Advisory

Waterbody-Specific Fish Consumption Advisory Due to Mercury Contamination

- Approximately 40 river miles under advisory

Public Outreach Efforts

Topics: sources, disposal, cleanup, & health effects

Outreach Tools: consumer brochures, press releases, public service announcements, & phone hotlines

Languages: English

Top Intrastate Mercury Sources

State Estimate

1 → mining
2 → coal-fired power plants
3 → cement kilns

New Hampshire's Mercury Actions

New Hampshire Department of Environmental Services◆ www.des.state.nh.us/nhppp/Mercury/
Contact: Stephanie D'Agostino ◆ phone: 603-271-6398 ◆ fax: 603-271-2867 ◆ sdagostino@des.state.nh.us

Mercury Strategies & Outcome Measures

New Hampshire has an overall mercury reduction plan. Major elements of the plan include: small business, household, medical, & dental mercury waste management; mercury emission limits; limiting mercury discharges to water; reduction of mercury use in products; technical assistance for industries; recycling; and outreach and education. The state has policies, statutes, and regulations relating to the mercury action plan.

Outcome measures used to quantify progress include:

- ✓ Air emission reductions
- ✓ Total amount of mercury collected
- ✓ Number of mercury-containing devices collected
- ✓ Number of schools that have conducted cleanups
- ✓ Wildlife monitoring

Top Intrastate Mercury Sources

State Estimate

1 → industrial boilers
2 → municipal solid waste incinerators
3 → coal-fired power plants

Fish Consumption Advisory

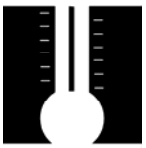
Statewide Fish Consumption Advisory Due to Mercury Contamination[3]

- Additional guidance is provided for 7 waterbodies

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from municipal waste incinerators[1], medical waste incinerators, and dental facilities.[2]



Mercury Products

- ✓ New Hampshire has phased out mercury-containing paint, pesticides, and alkaline batteries.
- ✓ State law prohibits the sale of mercury-containing thermometers and novelty items.[1]
- ✓ New Hampshire has restricted the use of elemental mercury and banned the use of it in K–12 classrooms.[1]
- ✓ Voluntary mercury collection programs for elemental mercury, mercury waste, and mercury-containing products.
- ✓ Collected mercury is handled properly and recycled according to the Universal Waste Rules.
- ✓ Mercury waste and elemental mercury is collected at DES supported events.
- ✓ DES monitors the management and collection of mercury through its hazardous waste compliance program.
- ✓ DES provides and distributes free postage-paid collection bins to electrical wholesalers and retailers for collection of thermostats.

New Hampshire's Mercury Actions, continued

Public Outreach Efforts

Topics: sources, disposal, cleanup, health effects, & reduction progress

Outreach Tools: website[4], factsheets, reports, workshops, emails, press releases, business training, citizen training, public service announcements, media events, & phone hotlines

Targeted Constituencies: women of child-bearing age, pregnant women, sport-fishermen, motor vehicle salvage yards, schools, dental offices, healthcare facilities, solid waste facilities, & industrial pre-treatment coordinators.

Documented Mercury Spills & Releases

Year	# of Spills	Cost
2000	8	unknown
2001	9	unknown
2002	12	unknown
2003	3	unknown

Vehicle Switches

✓ Voluntary removal of mercury switches (hood lights, trunk lights, & ABS sensor) from end-of-life passenger and commercial vehicles through NH DES "Green Yards" program.[5]

✓ Mercury switches are managed under New Hampshire's Universal Waste Rule.

✓ DES provides switch collection equipment for free and pays for the recycling of the collected switches. Funding for this program is tentative and uncertain.

✓ Progress is quantified by the number of switches and the number of pounds of mercury collected. To date, over 3,500 switches have been collected.

Biggest Challenge: Lack of legislative mandate and funding.

Mercury Monitoring

✓ On-going fish tissue testing and sampling. Tested fish from 195 waterbodies so far.

✓ Also monitor: emissions & ambient air.

Mercury TMDL Status

- 0 TMDLs completed
- 0 watershed cleanup plans in lieu of TMDLs.

Citations

1.NH Title X, Chapter 125-M. Online at: www.gencourt.state.nh.us/rsa/html/indexes/125-M.html
2.Available online at: www.des.state.nh.us/Rulemaking/adopted2005/Env-Ws_905_06_01_05.pdf
3.Advisory online at: www.des.state.nh.us/pdf/Mercury_Fish.pdf
4.www.des.state.nh.us/nhppp/Mercury/
5. Information online at: www.des.state.nh.us/sw/GreenYards/switchCollection.htm

New Jersey's Mercury Actions

New Jersey Department of Environmental Protection ◆ www.nj.gov/dep/dsr/mercury_task_force.htm
Contacts: Randy England ◆ phone: (609) 984-7927 ◆ fax: (609) 292-7340 ◆ randy.england.dep.state.nj.us
Mike Aucott ◆ phone: (609) 292-7530 ◆ fax: (609) 777-2852 ◆ michael.aucott@dep.state.nj.us

Mercury Strategies & Outcome Measures

In 2002, New Jersey's Mercury Task Force released recommendations for reducing mercury pollution. Major elements of the plan include: mercury emission limits, recycling, auto switch recovery, and public outreach and education. The state has passed legislation and established regulations to implement some of the plan's goals.

Outcome measures used to quantify progress include:

- ✓ Air emission reductions
- ✓ Reduction in mercury levels in fish tissue
- ✓ Quantifying mercury use and release through right-to-know program

Top Intrastate Mercury Sources

State Estimate

1 → iron and steel manufacturing plants
2 → coal-fired power plants
3 → use and disposal of various products

Fish Consumption Advisory

Statewide Fish Consumption Advisory Due to Mercury Contamination[4]

- 87 lakes and ponds under advisory
- More stringent guidelines are provided for specific waterbodies

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from coal-fired power plants, electric arc furnaces, municipal solid waste incinerators, and medical waste incinerators.[1]
- ✓ Many individual facilities have mercury limits in their permits.

Mercury Products

- ✓ Universal waste rule that includes mercury switches.
- ✓ Laws limiting the amount of mercury allowed in dry cell batteries and packaging, and banning mercury thermometers.[2]
- ✓ Program in place to limit state procurement of mercury-containing products.

Vehicle Switches

- ✓ State law requires that mercury switches (hood, trunk, & vanity light switches, as well as ABS sensor switches) be removed from end-of-life passenger vehicles prior to recycling.[3]
- ✓ Under this new law, auto manufacturers are responsible for the safe collection and disposal of the mercury switches. Additionally, scrap yards or vehicle recyclers will receive a minimum of $2 per switch from the relevant major auto manufacturer.[3]
- ✓ Mercury switches are removed from all vehicles when they are taken out of state fleet use.

Biggest Challenge: Widespread, rapid, and comprehensive implementation of the new law.

New Jersey's Mercury Actions, continued

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling. Tested fish from 42 river/stream sites since 1998, 252 sites in total. Fish from 87 waterbodies have been tested.
- ✓ Also monitor: air emissions, ambient air, wastewater discharges, deposition, groundwater & waterbody sediments.
- ✓ New Jersey is also participating in methylmercury risk assessment studies.

Public Outreach Efforts

Topics: sources, monitoring, disposal, cleanup, health effects, & research

Outreach Tools: website,[5] reports, brochures, press releases, & phone hotlines

Languages: in planning

Targeted Constituencies: subsistence fishers, & sport-fishermen

Reported Mercury Spills & Releases

Year	# of Spills	Cost
2000	29	unknown
2001	25	unknown
2002	26	unknown
2003	29	unknown

Mercury TMDL Status

- 0 TMDLs completed
- 0 watershed cleanup plans in lieu of TMDLs

Citations

1. N.J.A.C 7.27-27.5, 27.6, 27.7 & 27.8
2. Dry Cell Battery Management Act (1991) & Toxic Packaging Reduction Act (1990)
3. NJ P.L. 2005, Chapter 54. Available online at: http://www.njleg.state.nj.us/2004/Bills/PL05/54_.PDF
4. Advisory available online at: http://www.nj.gov/dep/dsr/njmainfish.htm
5. Outreach available online at: http://www.state.nj.us/health/eoh/survweb/merchome.pdf , AND http://www.nj.gov/dep/dsr/mercury_task_force.htm

New York's Mercury Actions

NY Department of Environmental Conservation ◆ www.dec.state.ny.us/website/dshm/redrecy/mercury.htm
Contact: Peter M. Pettit ◆ phone: (518) 402-8705 ◆ fax: (518) 402-8681 ◆ pmpettit@gw.dec.state.ny.us
Deborah J. Knight ◆ phone: (518) 402-9485 ◆ fax: (518) 402-9168 ◆ djknight@gw.dec.state.ny.us

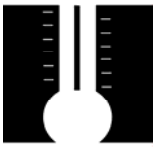
Mercury Strategies & Outcome Measures

Many programs within New York's Department of Environmental Conservation share responsibility for environmental protection on mercury issues. The state is establishing an Advisory Committee on Mercury Pollution.

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from electric arc furnaces, steel recycling facilities, wastewater treatment, hazardous wastes, municipal solid waste incinerators, and spills.
- ✓ NY DEC has approved regulations to prohibit the use and possession of non-encapsulated elemental mercury, and set standards for the recycling of dental amalgam waste and pre-encapsulated elemental mercury waste from dental offices. These regulations requires dentists to install, properly operate, and maintain mercury amalgam separation and collection equipment.[1]



Mercury Products

- ✓ Mercury-free purchasing policy for New York schools.
- ✓ Requires labeling for mercury-added consumer products and proper disposal of mercury-added products separate from solid waste.[2]
- ✓ Banned incineration of mercury-added products.
- ✓ Banned the sale of mercury-containing novelties and thermometers.[2]
- ✓ Passed legislation (not yet signed by Governor) that bans mercury-containing switches, relays, instruments, measuring devices, and thermostats.[3]
- ✓ Voluntary mercury collection programs for elemental mercury, mercury waste, and mercury-containing products.
- ✓ Provides grants to fund 50% of household hazardous waste collection.
- ✓ Requires collection and recycling of all dental amalgam waste.
- ✓ Phased out the sale of mercury-containing batteries that exceed allowable mercury amounts.

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling. Tested fish from more than 300 waterbodies.
- ✓ Also monitor: air emissions, ambient air, wastewater discharges, mercury collections, waterbody sediments, and wildlife.
- ✓ New York participates in the National Mercury Deposition Network.
- ✓ New York is studying the factors affecting methylation and bioavailability of mercury in a lake ecosystem.

Vehicle Switches

- ✓ Requires removal of mercury switches (hood lights, trunk lights, and ABS sensors) from end-of-life vehicles and commercial trucks.[2]
- ✓ Pilot program provides mail-in collection containers for recycling of hood light and trunk light mercury switches.
- ✓ Progress is quantified by pounds of mercury collected for those participating in pilot program.

Biggest Challenge: Disposal costs.

Public Outreach Efforts

Topics: sources, disposal, cleanup, health effects, & reduction progress

Outreach Tools: website,[5] factsheets, reports, brochures, workshops, posters, & phone hotlines

Languages: English & Spanish

Targeted Constituencies: sport-fishermen, schools, dental facilities, plumbers, farmers, & other businesses

Unique Outreach: Grants to reduce mercury in schools & reduce/eliminate use of mercury manometers. Also, "Mean, Mad Mercury" poster in English and Spanish warns secondary school age children about the health and environmental effects of mercury.

Fish Consumption Advisory

- Fish from more than 70 waterbodies under consumption advisory due to mercury contamination.[4]

Top Intrastate Mercury Sources

1 → coal-fired power plants

2 → municipal solid waste incinerators

3 → sewage sludge incinerators

TMDL Status

- 0 TMDLs completed
- 1 watershed cleanup plan in lieu of TMDLs (New York/New Jersey Harbor Estuary Program)

Citations

1. Proposed 6 NYCRR Part 374-4. Available at: www.dec.state.ny.us/website/dshm/redrecy/draftreg.htm
2. Chapter 145, Laws of New York, 2004. Available at: www.dec.state.ny.us/website/dshm/redrecy/chap145.html
3. NY bill A6860A & S4459A, passed 6/23/05. Available at: http://assembly.state.ny.us/leg/?bn=A06850
4. Advisory available online at: www.nyhealth.gov/nysdoh/fish/fish.htm
5. Outreach materials available online at: www.dec.state.ny.us/website/dshm/redrecy/mercury.htm

North Carolina's Mercury Actions

North Carolina Department of Environment and Natural Resources
Contacts: Gary Hunt ◆ phone: 919-715-6508 ◆ fax: 919-715-6794 ◆ gary.hunt@ncmail.net
Steve Schliesser ◆ phone: 919-715-2694 ◆ fax: 919-733-1812 ◆ steve.schliesser@ncmail.net

Top Intrastate Mercury Sources

State Estimate

1 → coal-fired power plants
2 → electric arc furnaces
3 → other coal burning industries
4 → waste incinerators

Mercury Strategies & Outcome Measures

Representatives from the North Carolina Department of Environment and Natural Resources and the Department of Health and Human Services are participating in a recently formed mercury task-force/workgroup along with other scientists from government agencies and universities to study mercury issues within the state. The group's mission is to provide a plan of action on key science and policy issues related to mercury emission, deposition, and exposure in North Carolina.

Measures used to quantify progress are expected to include:

- ✓ Air emission reductions
- ✓ Ambient air quality improvements
- ✓ Mercury deposition reductions
- ✓ Wastewater discharge reductions
- ✓ Reduction in fish tissue mercury levels
- ✓ Reduction in the number of fish consumption advisories / impaired waters
- ✓ Reduction in waterbody sediment

Fish Consumption Advisory

Waterbody-Specific Fish Consumption Advisories Due to Mercury Contamination

Mercury TMDL Status

- 2 TMDLs completed — developed for Lumber River Basin (Waccamaw River) and Roanoke Basin (Cashie River).
- 0 watershed cleanup plans in lieu of TMDLs.

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from medical, municipal, and hazardous waste incinerators.
- ✓ Through passage of the Clean Smokestacks Act in 2002, North Carolina became one of the first states to regulate air pollution from coal-fired power plants more stringently than the federal government.[1] A 60% or more reduction of mercury emissions from these plants is expected as a co-benefit of NO_x and SO_2 reductions.
- ✓ The state Division of Air Quality is working with the state Environmental Management Commission to develop rules implementing the EPA's new Clean Air Mercury Rule.

Mercury Products

- ✓ Voluntary mercury collection & recycling programs for elemental mercury, mercury waste, and mercury-containing products.
- ✓ Web-based information on pollution prevention approaches.[4]

North Carolina's Mercury Actions, continued

Vehicle Switches

- ✓ The North Carolina General Assembly passed legislation establishing a plan for the removal, collection, and recovery of mercury auto switches. The plan would pay vehicle recyclers $5.00 for each switch they recover. The plan will be funded by an additional $1.00 fee on vehicle title transfers.[5]

Mercury Monitoring

- ✓ On-going fish tissue and surface water sampling and analysis in eastern and central North Carolina.
- ✓ Also monitor: atmospheric mercury species, mercury discharge from rainwater, wastewater effluent, and waterbody sediments.[2]
- ✓ The North Carolina Division of Air Quality monitored atmospheric mercury on a regular basis from 1995–2000 in southeastern North Carolina near Lake Waccamaw. The initial results, suggesting a possible link between total atmospheric mercury and industrial mercury emissions, prompted the addition of more mercury-species monitoring equipment and closer monitoring of sites. This helped identify a clear relationship between elevated atmospheric mercury levels and wind direction from local chlor-alkali plant emissions. The relationship was reconfirmed when atmospheric mercury levels dramatically declined after the plant's closure.

Public Outreach Efforts

Topics: sources, monitoring, health effects, & reduction progress

Outreach Tools: website[3], factsheets, reports, workshops, & business training

Languages: English, & Spanish

Targeted Constituencies: subsistence anglers, women of child-bearing age, pregnant women, sport-fishermen, businesses, local governments, & government agencies

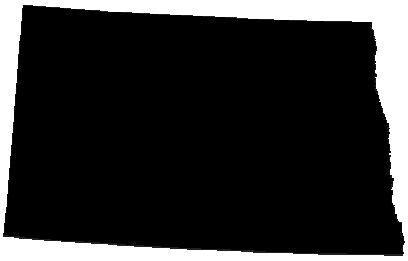
Unique Outreach: Information about fish consumption advisories is given to each person buying a fishing license, family physicians, gynecologists, & individuals at North Carolina Health Department meetings.

Citations

1. See http://daq.state.nc.us/news/leg/.
2. Available at: http://daq.state.nc.us/toxics/studies/mercury/
3. See www.epi.state.nc.us/epi/fish/
4. See www.p2pays.org/mercury
5. http://www.ncga.state.nc.us/Sessions/2005/Bills/House/PDF/H1136v8.pdf

North Dakota's Mercury Actions

North Dakota Department of Health, Environmental Health Section
Contacts: Mike Ell/Jim Semerad ◆ phone: 701-328-5210 ◆ fax: 701-328-5188 ◆ mell@state.nd.us



Mercury Strategies & Outcome Measures

North Dakota has a workgroup devoted to fish advisory communication.

Outcome measures used to quantify progress include:
- ✓ Mercury deposition reductions
- ✓ Reduction in fish tissue mercury levels
- ✓ Reduction in the number of fish consumption advisories/impaired waters

Top Intrastate Mercury Sources
U.S. EPA TRI

1 → coal-fired power plants
2 → petroleum refinery
3 → other manufacturing

Laws & Policies to Reduce Mercury Use & Releases

Mercury Products	✓ Mercury waste is subject to hazardous waste laws and rules relating to proper storage and disposal practices.
Auto Switches	Biggest Challenge: Education, awareness, and funding.

Mercury TMDL Status

- 0 TMDLs completed.
- 0 watershed cleanup plans in lieu of TMDLs.

Public Outreach Efforts

Topics: monitoring, health effects, & waste management

Outreach Tools: factsheets, reports, brochures, press releases, pollution prevention program training, & toxic material reductions workshop

Targeted Constituencies: women of child-bearing age, pregnant women, sport-fishermen, waste facilities, & general public

Fish Consumption Advisory

Statewide Fish Consumption Advisory Due to Mercury Contamination[1]

- 3 lakes/reservoirs and 2 rivers have site-specific advisories

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling. Tested fish from 100+ waterbodies so far.
- ✓ Also monitor: mercury deposition, waterbody sediment, and wildlife for mercury.
- ✓ North Dakota participates in the National Mercury Deposition Network.
- ✓ Research is being conducted related to the fate and transport of mercury, and the methylation rates and deposition to depressional wetlands and effects on wildlife.

Citation

1. Available at: www.health.state.nd.us/wq/sw/z7_publications/b_2003FishAdvisory.pdf

Oklahoma's Mercury Actions

Oklahoma Department of Environmental Quality
Contact: Eddie Terrill ◆ phone: 405-702-4100 ◆ fax: 405-702-4101 ◆ Eddie.Terrill@deq.state.ok.us

Mercury Strategies & Outcome Measures

Oklahoma DEQ divisions are participating in a workgroup to develop a mercury strategy for the state.

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling. Tested fish from 51 waterbodies to date.
- ✓ On-going water quality monitoring at 85 stream sites.

Fish Consumption Advisory

- Level at which waterbody specific advisories will be issued has been revised
- Waterbody specific advisories to be issued as data becomes available

Laws & Policies to Reduce Mercury Use & Releases

Mercury Products

- ✓ State law declares possession of more than one pound of mercury without proper documentation of ownership a felony.[1]
- ✓ Mercury collection programs for elemental mercury, mercury-containing products, and the recycling of collected mercury are voluntary. Oklahoma DEQ and EPA conduct the collection of household mercury as part of the Region 6 Superfund Removal program, where elemental mercury is a chemical of concern. Public drop-off's are designated in a community, and EPA Region 6 contracts with a hazardous materials transporter to deliver the collected mercury to a recycling facility. DEQ's activities are considered part of any state match paid for Superfund actions at the site.

Top Intrastate Mercury Sources

State Estimate

1 → coal-fired power plants
2 → petroleum refining

Public Outreach Efforts

Topics: sources, disposal, cleanup, & health effects

Outreach Tools: factsheets, press releases, business training, & citizen training

Targeted Constituencies: pregnant women

Documented Mercury Spills & Releases

Year	# of Spills	Cost
2001	2	$120,000
2003	1	$60,000

Citations

1. os 21-1726. Available at http://www.lsb.state.ok.us/

Oregon's Mercury Actions

Oregon Department of Environmental Quality
http://www.deq.state.or.us/wmc/factsheets/mercuryreductionstrategyfs.pdf
Contacts: Fenix Grange ◆ phone: 503-229-5983 ext. 260 ◆ fax: 503-229-6924 ◆ grange.fenix@deq.state.or.us
Allen Hamel ◆ phone: 503-229-6849 ◆ fax: 503-229-6957 ◆ hamel.allen@deq.state.or.us

Mercury Strategies & Outcome Measures

Oregon has an overall mercury action plan. Major elements of the plan include: small business, household, medical, and dental mercury waste management; prevention of mercury pollution from existing mine operations; reduction of mercury use in consumer products; technical assistance for industries; mercury recycling; and public outreach and education. The state has statutes, regulations, and policies relating to the mercury action plan.

Outcome measures used to quantify progress include:

- ✓ Number of mercury-containing devices collected
- ✓ Total amount of mercury collected
- ✓ Reduction in fish tissue mercury levels
- ✓ Reduction in the number of fish consumption advisories/ impaired waters

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from industrial boilers, municipal waste incinerators, and hazardous waste.

Mercury Products

- ✓ Require labeling for mercury-containing thermometers.
- ✓ Phased out the sale of mercury-containing thermometers, and in 2006 newly installed mercury-containing thermostats. Oregon also has limits on mercury in batteries, a sales ban on mercury-containing fever thermometers, and trinkets/amulets.
- ✓ Mercury collection programs for elemental mercury, mercury waste, and mercury-containing products. Recycling of collected mercury is voluntary. Collected mercury is sent for recycling whenever possible, and until then it is managed as hazardous waste. The state pays for the collection of mercury waste and mercury-containing products (excluding fluorescent lamps) from households and conditionally exempt hazardous waste generators.

Vehicle Switches

- ✓ Voluntary removal of mercury switches (hood lights, trunk lights & vanity lights) from on-road passenger vehicles; mandatory removal from end-of-life passenger vehicles; and mandatory prohibition on sale of new passenger vehicles with mercury switches in 2006[3].
- ✓ To encourage mercury switch removal, the state provides free collection of switches to small business owners and schools.[4]
- ✓ Progress is quantified by number of switches collected.

Biggest Challenge: Training of wrecking yard employees & enforcement of switch removal by wrecking yards.

Oregon's Mercury Actions, continued

Mercury Monitoring

- ✓ Tested fish from over 50 waterbodies so far.
- ✓ Also monitor: wastewater discharge; product and elemental collections; mercury deposition; and waterbody sediments for mercury.
- ✓ Oregon participates in the National Mercury Deposition Network.
- ✓ As part of the Willamette River TMDL development, DEQ has completed extensive modeling work and developed a mass balance model for mercury cycling.

Mercury TMDL Status[2]

- 1 TMDL completed (phase 1)— developed for Willamette basin. Point source limits not specified due to uncertainty of mercury model.
- 0 watershed cleanup plans in lieu of TMDLs.

Public Outreach Efforts

Topics: sources, monitoring, disposal, cleanup, & reduction progress

Outreach Tools: factsheets, press releases, public service announcements, & media events

Languages: Brochures, factsheets, and outreach in Spanish, Vietnamese, Cantonese, Laotian, & Russian

Targeted Constituencies: Native Americans, women of child-bearing age, pregnant women, sport-fishermen, & subsistence fishers

Citations

1. Fish Advisory available at www.healthoregon.org/fishadv
2. TMDL status available at http://www.deq.state.or.us/wq/wqfact/wr_mercuryfs.pdf
3. 2001 HB 3007. Available at http://pub.das.state.or.us/LEG_BILLS/PDFs_2001/EHB3007.pdf
4. Mercury Switch Collection available at http://www.deq.state.or.us/wmc/solwaste/factsheets/FreeMercuryCollectionsFS.pdf

Fish Consumption Advisory[1]

- 621 river miles under advisory
- 10 lakes under advisory

Documented Mercury Spills & Releases

Year	# of Spills
2000	2
2001	1
2002	0
2003	1

Top Intrastate Mercury Sources

State Estimate

1 → mines

2 → coal-fired power plants

Pennsylvania's Mercury Actions

Pennsylvania Department of Environmental Protection
www.dep.state.pa.us/dep/deputate/pollprev/mercury/thermometer.htm
Contact: Sharon F. Trostle ◆ phone: 717-783-1653 ◆ fax: 717-787-8885 ◆ shtrostle@state.pa.us

Top Intrastate Mercury Sources

State Estimate

1 → coal-fired power plants
2 → cement kilns
3 → municipal solid waste incinerators

Mercury Strategies & Outcome Measures

Pennsylvania has a mercury action plan. Major elements of the plan include: household, small business, and dental mercury waste management. Pennsylvania has a mercury automobile switch workgroup comprised of state agency staff, automobile recyclers and shredders, steel recyclers, mercury recyclers, and an environmental group.

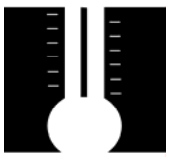
Outcome measures used to quantify progress include:

- ✓ Total amount of mercury collected
- ✓ Number of mercury-containing devices & auto switches collected
- ✓ Number of dentists that have installed amalgam separators or voluntarily implemented BMPs
- ✓ Number of schools that have conducted mercury cleanup
- ✓ Reduction of mercury in fish tissue

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from wastewater treatment plants.
- ✓ Case-by-case mercury emission limits are required through air permits on new and minor emission sources.



Mercury Products

- ✓ The state has a Universal Waste Rule that applies to mercury devices, incorporating the federal requirements for universal wastes.[1]
- ✓ The state has voluntary collection programs for elemental mercury and mercury-containing products from schools, dental offices, farms, non-profits, and individuals.
- ✓ All mercury is collected and managed according to a standard operating procedure. Only properly trained staff collect, transport and store mercury until it can be taken to a mercury recycling facility. Elemental mercury collections are maintained in a lock box under surveillance at each of DEP's six regional offices before being transported to a mercury recycler.

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling.
- ✓ Also monitor: air emissions, ambient air & deposition.
- ✓ Mine fire monitoring to begin in 2005.
- ✓ PA participates in the National Mercury Deposition Network with nine sites.

Pennsylvania's Mercury Actions, continued

Vehicle Switches

- ✓ In November 2004, Pennsylvania launched a voluntary mercury auto switch removal program through a Memorandum of Understanding signed by PA DEP and its six workgroup partners.[3] Hood and trunk convenience lighting switches are removed from end-of-life passenger cars and trucks.
- ✓ DEP pays approximately $1 per switch (based on weight) for the switches that are removed and shipped to a mercury recycler.
- ✓ Progress is quantified by: number of switches removed and pounds of mercury collected.
- ✓ DEP's program follows the universal waste regulations in terms of handling and shipping requirements.
- ✓ Legislation to require switch removal, funded by manufacturers, has been proposed.

Public Outreach Efforts

Topics: sources, disposal, cleanup, health effects, & reduction progress

Outreach Tools: videos, brochures, workshops, press releases, & media events

Languages: English

Targeted Constituencies: women of child-bearing age, & pregnant women

Fish Consumption Advisory

Statewide Fish Consumption Advisory Due to Mercury Contamination[2]

- 28,500 lake acres under advisory
- 916 river miles under advisory
- 28 lakes and ponds under advisory

Documented Mercury Spills & Releases

Year	# of Spills	Cost
2000	2	$3 million
2001	2	$35,000
2002	3	$50,000
2003	2	$12,000
2004	0	$0

TMDL Status

- 1 TMDL completed
- 0 watershed cleanup plans in lieu of TMDLs

Citations

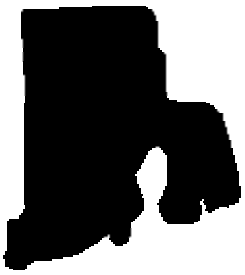
1. 25 Pa. Code, Chapter 266b Available at: www.pacode.com/secure/data/025/chapter266b/chap266btoc.html

2. Advisory available at: www.dep.state.pa.us/dep/deputate/watermgt/wqp/wqstandards/fishadvis/fishadvisory.htm

3. MOU and workgroup partners available at: www.dep.state.pa.us/dep/deputate/pollprev/mercury/mercuryswitch.htm

Rhode Island's Mercury Actions

Rhode Island Department of Environmental Management ◆ www.dem.ri.gov/topics/mercury.htm
Contact: Ronald Gagnon ◆ phone: 401-222-6822 x 7500 ◆ fax: 401-222-3810 ◆ ron.gagnon@dem.ri.gov



Top Intrastate Mercury Sources

State Estimate

1 → sewage sludge incinerators
2 → wastewater treatment
3 → broken mercury-containing products & spills

Fish Consumption Advisory

Statewide Fish Consumption Advisory Due to Mercury Contamination[4]

Mercury TMDL Status

- 0 TMDLs completed
- 4 watershed cleanup plans in lieu of TMDLs

Mercury Strategies & Outcome Measures

Rhode Island has an overall mercury action plan. Major elements of the plan include: small business, household, medical, & dental mercury waste management; emission limits; use reduction in products; and outreach and education. The state has statutes and regulations relating to the mercury action plan.

Outcome measures used to quantify progress include:

- ✓ Air emission reductions
- ✓ Total amount of mercury collected
- ✓ Number of mercury-containing devices collected
- ✓ Number of dentists that have installed amalgam separators
- ✓ Number of schools that have conducted cleanup

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from medical waste incinerators.
- ✓ The Narragansett Bay Commission has begun implementation of best management practices for dentists, which require dentists in its service area to monitor their wastewater or install amalgam separators.[1]

Mercury Products

- ✓ State law requires mandatory labeling; bans disposal of mercury-containing products; and limits amount of mercury allowed in products-based on the NEWMOA model legislation.[2]
- ✓ Rhode Island has banned the sale of mercury thermometers.[2]

Vehicle

- ✓ State law requires that mercury switches be removed from end-of-life vehicles, and that auto manufacturers manage the collection of the switches.[3]
- ✓ Manufacturers of autos sold in Rhode Island are required to provide RI DEM with a plan for how they will capture 50% of switches available for removal in 2006, and 70% in 2007 and each year thereafter.[3]

Public Outreach Efforts

Topics: health effects

Outreach Tools: factsheets, brochures, & website

Languages: English, & Spanish

Targeted Constituencies: pregnant women, children, & sport-fishermen

Citations

1. www.narrabay.com/Documents/PDFs/NewDentalBMP.pdf
2. RI General Law, Chapter 23 - 24.9. Online at: www.rilin.state.ri.us/Statutes/TITLE23/23-24.9/INDEX.HTM
3. 2005 Amendments to RI General Law 23 - 24.9-9 and 24.9-10. Online at: www.rilin.state.ri.us/Billtext/BillText05/SenateText05/S0611Aaa.pdf
4. Advisory available online at: www.health.ri.gov/environment/risk/fish.php

South Carolina's Mercury Actions

South Carolina Department of Health & Environmental Control
Contact: Claire H. Prince ◆ phone: 803-896-1132 ◆ fax: 803-896-8941 ◆ princech@dhec.sc.gov

Mercury Strategies & Outcome Measures

South Carolina has interest in developing an overall mercury action plan.

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

✓ Bureau of Air Quality incorporates federal requirements only with the exception of "Standard 8" which requires fenceline modeling to show compliance with established maximum allowable concentration.

Mercury Products

✓ Mercury-containing lamp recycling project for businesses.[2]

Mercury Monitoring

✓ On-going fish tissue testing and sampling.
✓ Also monitored: ambient air.
✓ South Carolina participates in the National Mercury Deposition Network.

Public Outreach Efforts

Topics: health effects, disposal, recycling, research, & reduction progress

Outreach Tools: website, factsheets, posters, press releases, & phone hotlines

Languages: English, & Spanish

Targeted Constituencies: subsistence anglers, women of child-bearing age, pregnant women, children, & sport-fishermen

Fish Consumption Advisory

Waterbody-Specific Fish Consumption Advisory Due to Mercury Contamination[1]

- 237,251 lake acres under advisory
- 1,836 river miles under advisory
- 17 lakes and ponds under advisory

Top Intrastate Mercury Sources

State Estimate

1 → coal-fired power plants
2 → cement kilns
3 → industrial boilers

Mercury TMDL Status

- 0 TMDLs completed.
- 0 watershed cleanup plans in lieu of TMDLs.

Citations

1. Available at: www.scdhec.net/fish
2. See: www.scdhec.gov/brap/html/whatsnew.html

South Dakota's Mercury Actions

South Dakota Department of Environment and Natural Resources
Contacts: Patrick Snyder ◆ phone: 605-773-3351 ◆ fax: 605-773-5286 ◆ Patrick.Snyder@state.sd.us
Kyrick Rombough ◆ phone: 605-773-3151 ◆ fax: 605-773-5286 ◆ Kyrick.Rombough@state.sd.us

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases	✓ State regulations on mercury releases from waste-water treatment facilities.
Mercury Products	✓ Disposal ban on mercury-containing products.

Fish Consumption Advisory[1]

- 5 lakes and ponds are under specific advisories

Mercury Monitoring

- ✓ South Dakota state agencies work together on fish flesh monitoring.
- ✓ On-going fish tissue testing and sampling. Tested fish from 91 waterbodies so far.
- ✓ Also monitor: ambient air & water; wastewater discharge for mercury.

Mercury TMDL Status

- 0 TMDLs completed.
- 0 watershed cleanup plans in lieu of TMDLs.

Public Outreach Efforts

Topics: health effects

Outreach Tools: press releases

Targeted Constituencies: women of child-bearing age, pregnant women, children under age 7, & the general population

Top Intrastate Mercury Sources

State Estimate

1 → coal-fired power plants
2 → cement kilns
3 → industrial boilers

Citation

1. Fish Advisory available at www.state.sd.us/doh/Fish/index.htm

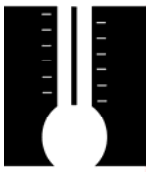
Tennessee's Mercury Actions

Tennessee Department of Environment and Conservation ◆ www.state.tn.us/environment
Contacts: Sherry H. Wang ◆ phone: 615-532-0656 ◆ fax: 615-532-0046 ◆ sherry.wang@state.tn.us
Travis Blake ◆ phone: 615-532-0617 ◆ fax: 615-532-0614 ◆ travis.blake@state.tn.us

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ Tennessee regulates air emissions of mercury by enforcement of Federal NSPS and MACT rules and state rules for commercial waste incinerators.
- ✓ Tennessee is working on rulemaking to reduce mercury emissions from coal-fired electric utilities.



Mercury Products

- ✓ TNDEC coordinates, encourages, and supports the Hospitals for a Healthy Environment Initiative within the state.
- ✓ Voluntary mercury collection programs for elemental mercury, mercury waste, and mercury-containing products. Recycling of collected mercury is voluntary. Tennessee contracts out disposal and recycling for collections from household hazardous waste and mercury thermometer swaps.

Mercury TMDL Status

- ♦ 0 TMDLs completed.
- ♦ Would like to adopt a Mercury Action Plan in lieu of TMDLs, pending U.S. EPA approval.

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling. Fish from most of the larger lakes and streams have been tested.
- ✓ Also monitor: wastewater discharge, mercury collections, waterbody sediments, and wildlife.
- ✓ Tennessee participates in the National Mercury Deposition Network.

Top Intrastate Mercury Sources

State Estimate

1 → coal-fired power plants
2 → chlor-alkali plants
3 → hazardous waste

Public Outreach Efforts

Topics: sources, disposal, & cleanup

Outreach Tools: reports, workshops, press releases, & media events

Languages: English

Fish Consumption Advisory

Waterbody-Specific Fish Consumption Advisory Due to Mercury Contamination[1] from two Superfund Sites.

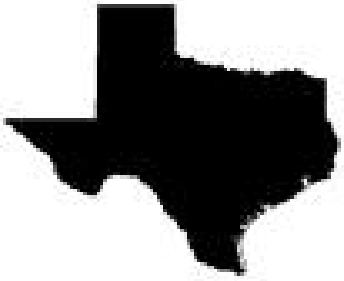
♦ 21 river miles under advisory

Citation

1. Available at: www.state.tn.us.environment/wpc/advisories

Texas' Mercury Actions

Texas Commission on Environmental Quality ◆ www.tceq.state.tx.us/exec/oppr/hhw/mercury.html
Contact: David Schanbacher ◆ phone: 512-239-3900 ◆ fax: 512-239-1794 ◆ dschanba@tceq.state.tx.us



Top Intrastate Mercury Sources
State Estimate

1 → coal-fired power plants
2 → alumina production
3 → electric arc furnaces

Fish Consumption Advisory

Waterbody-Specific Fish Consumption Advisory Due to Mercury Contamination

- 390,947 lake & reservoir acres under advisory
- 36 square miles of estuaries under advisory
- 564 miles of streams under advisory
- 3,879 square miles of the Gulf of Mexico under advisory

Mercury Strategies & Outcome Measures

Texas' Clean Rivers Initiative workgroup—which includes TCEQ, Texas Parks & Wildlife, Texas Department of Health & Human Services, and others focuses on mercury issues. TCEQ's internal agency workgroup and the Pollution Prevention Advisory Council Subcommittee also focus on mercury.

Outcome measures used to quantify progress include:
- ✓ Air emission reductions
- ✓ Mercury deposition reductions
- ✓ Number of mercury-containing devices collected
- ✓ Reduction in fish tissue mercury levels
- ✓ Wildlife monitoring
- ✓ Reduction in the number of fish consumption advisories/impaired waters

Laws & Policies to Reduce Mercury Use & Releases

Mercury Products

✓ Voluntary mercury collection programs for elemental mercury, mercury waste, and mercury-containing products. Recycling of collected mercury is voluntary. Mercury collection is handled by approved household hazardous waste contractors.

Vehicle Switches

✓ Voluntary removal of mercury switches from end-of-life vehicles.

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling by the Texas Department of Health and Human Services and Texas Commission on Environmental Quality. Tested fish from 338 waterbodies.
- ✓ Also monitor: stack emissions; ambient air & water; wastewater discharge; and waterbody sediments for mercury.
- ✓ Texas participates in the National Mercury Deposition Network.

Documented Mercury Spills & Releases

Year	# of Spills	Cost
2002	1	$89,000

Utah's Mercury Actions

Utah Department of Environmental Quality
Contact: Sonja F. Wallace ◆ phone: 801-536-4477 ◆ fax: 801-536-4457 ◆ swallace@utah.gov

Laws & Policies to Reduce Mercury Use & Releases

Mercury Products

- ✓ Voluntary mercury collection programs for elemental mercury, mercury waste, and mercury-containing products.
- ✓ State Department of Health has a purchasing preference for mercury-free vaccines

Auto Switches

- ✓ Voluntary removal of mercury switches (light switches) from end-of-life passenger cars & trucks.
- ✓ Progress measured through number of switches collected.
- ✓ Completing a case study of a company that removes all vehicle switches and developing an informational poster for distribution to salvage companies.

Biggest Challenge: Lack of knowledge, disposal costs, & apathy.

Top Intrastate Mercury Sources

U.S. EPA TRI data

1 → mining
2 → metal manufacturing
3 → coal-fired power plants

Mercury Monitoring

- ✓ Monitor: stack emissions; ambient air; product and elemental collections; waterbody sediments; and wildlife for mercury.

Public Outreach Efforts

Topics: monitoring, disposal, cleanup, & health effects

Outreach Tools: factsheets, videos, reports, posters, media events, & phone hotlines

Fish Consumption Advisory

- ♦ Fish consumption advisories for: Gulock Reservoir and Mill Creek

Vermont's Mercury Actions

Vermont Agency of Natural Resources ◆ www.mercvt.org
Contacts: Gary Gulka ◆ phone: 802-241-3626 ◆ fax: 802-241-3273 ◆ gary.gulka@state.vt.us
Karen Knaebel ◆ phone: 802-241-3455 ◆ fax: 802-241-3273 ◆ karen.knaebel@state.vt.us

Top Mercury Sources
State Estimate

1 → on-road mobile sources
2 → residential heating
3 → industrial boilers

Mercury TMDL Status

- 0 TMDLs completed
- 0 watershed cleanup plans in lieu of TMDLs

Mercury Strategies & Outcome Measures

In 1998, the Vermont Legislature established an Advisory Committee on Mercury Pollution, which must annually report to the Legislature on mercury contamination in the environment, health risks posed, and methods and programs to reduce those risks.

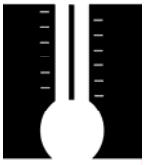
Outcome measures used to quantify progress include:

- ✓ Ambient air quality improvement
- ✓ Total amount of mercury collected
- ✓ Reduction in the number of fishing advisories/impaired waters
- ✓ Mercury deposition reductions
- ✓ Waterbody sediment reductions
- ✓ Number of dentists that have installed amalgam separators
- ✓ Number of schools that have conducted mercury cleanup
- ✓ Wildlife monitoring
- ✓ Reduction in amount of mercury in fish tissue

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ Vermont regulates mercury releases from industrial boilers.



Mercury Products

- ✓ Requires labeling for all mercury-containing products, except products containing button cell batteries.[1]
- ✓ Bans the sale of mercury-containing novelties, thermometers, thermostats, dairy manometers, instruments, measuring devices, neon signs, relays, switches, and elemental mercury.[1]
- ✓ Bans the use or purchase of mercury by schools.[1]
- ✓ Bans the disposal of mercury-containing products into the solid waste stream, and requires that mercury-containing products be separated from solid waste for management as hazardous waste. Solid waste management districts are required to develop collection plans.[1]

Vehicle Switches

- ✓ Voluntary removal of mercury switches (hood and trunk lights) from end-of-life passenger and commercial vehicles.
- ✓ Passed legislation requiring a study of switch collection program options, cost, & feasibility.[4]
- ✓ Progress is quantified by measuring the number of vehicle switches and pounds of mercury collected.
- ✓ Factsheets and phone assistance for auto switch removal are provided.

Biggest Challenge: Lack of mandate.

Vermont's Mercury Actions, continued

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling. Tested fish from 73 lakes and 22 river sites so far.
- ✓ Also monitor: ambient air, deposition, waterbody sediment, and wildlife.

Public Outreach Efforts

Topics: sources, monitoring, disposal, cleanup, health effects, research, & reduction progress

Outreach Tools: website,[3] factsheets, reports, posters, brochures, press releases, business training, public service announcements, media events, & phone hotlines

Languages: English, Spanish, Vietnamese, French, Serbo-Croatian, & Russian

Targeted Constituencies: women of child-bearing age, pregnant women, children, sport-fishermen, & general public

Unique Outreach: Video & video game under development for 5th–8th grade audience. Conducting a survey of parents of newborns.

Fish Consumption Advisory

Statewide Fish Consumption Advisory Due to Mercury Contamination[2]

- More stringent guidelines are provided for specific waterbodies
- 7,099 river miles under advisory
- 230,901 lake acres under advisory
- 810 lakes and ponds under advisory

Citations

1. 10 V.S.A Chapter 164. Available online at: www.leg.state.vt.us/statutes/sections.cfm?Title=10&Chapter=164
2. Available at: www.healthyvermonters.info/hp/fish/fish.shtml
3. See www.mercvt.org
4. 10 V.S.A Chapter 164. Available online at: www.leg.state.vt.us/statutes/sections.cfm?Title=10&Chapter=164

Virginia's Mercury Actions

Virginia Department of Environmental Quality ◆ www.deq.virginia.gov
Contacts: Tom Griffin ◆ phone: 804-698-4545 ◆ fax: 804-698-4533 ◆ rtgriffin@deq.virginia.gov
Alan Pollock ◆ phone: 804-698-4002 ◆ aepollock@deq.virginia.gov aepollock@deq.virginia.gov

Mercury Strategies & Outcome Measures

Virginia is interested in developing an overall mercury action plan. Virginia's Mercury Advisory Committee and the South River Science Team of the TMDL program work on mercury issues.

Outcome measures used to quantify progress include:

- ✓ Air emission reductions
- ✓ Ambient air quality improvement
- ✓ Wastewater discharge reduction
- ✓ Mercury deposition reduction
- ✓ Waterbody sediment reduction
- ✓ Number of organizations & hospitals adopting mercury-free purchasing specifications
- ✓ Number of mercury-containing devices collected
- ✓ Total amount of mercury collected
- ✓ Reduction in fish tissue mercury levels
- ✓ Reduction in the number of fish consumption advisories/impaired waters

Top Intrastate Mercury Sources

State Estimate

1 → coal-fired power plants
2 → electric arc furnaces
3 → industrial boilers

Fish Consumption Advisory

Waterbody-Specific Fish Consumption Advisory Due to Mercury Contamination[2]

- 792 lake acres under advisory
- 307 river miles under advisory
- 2 lakes and ponds are under a more stringent advisory

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ Adopted federal regulations on mercury releases from electric arc furnaces, industrial boilers, sewage sludge incinerators, wastewater treatment facilities, chlor-alkali plants, hazardous waste, municipal waste incinerators, and medical waste incinerators. State regulations on mercury releases from mining.

Mercury Products

- ✓ Limits on mercury in packaging.[1]
- ✓ Voluntary mercury collection programs for elemental mercury, mercury waste, and mercury-containing products. Recycling of collected mercury is voluntary. A few localities accept mercury & mercury-containing materials as part of household hazardous waste collection.
- ✓ Partnering with the VA Dental Association to encourage proper mercury and amalgam management.
- ✓ Working with EPA Region 3 states to develop an initiative to encourage fluorescent lamp recycling. Virginia will be a pilot state.

Virginia's Mercury Actions, continued

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling. Tested fish tissue from 80–100 sites each year, rotating through each river basin in the state every 3 to 5 years. Filet composites of 5–10 individuals of 3 to 5 species of fish are tested. Sampled 762 sites between 1993 and 2004.
- ✓ Also monitor: wastewater discharge & waterbody sediments.
- ✓ Virginia participates in the National Mercury Deposition Network.
- ✓ VA DEQ is assisting the U.S. Fish and Wildlife Service to assess potential mercury risks to wildlife in the Great Dismal Swamp National Wildlife Refuge. DEQ collected samples of forage fish and is having them analyzed for mercury to help perform an environmental risk assessment for bald eagles and other fish consuming wildlife. This study was prompted by the detection of elevated levels of mercury in edible filets of game fish in waters bordering this National Wildlife Refuge.

Public Outreach Efforts

Topics: sources, monitoring, health effects, auto switch disposal & recycling, research, & reduction progress

Outreach Tools: websites, factsheets, reports, workshops, posters, press releases, & media events

Targeted Constituencies: women of child-bearing age, pregnant women, young children, & sport-fishermen

Unique Outreach: Bilingual English and Spanish fish consumption advisory signs are posted at public access points along the South River, South Fork Shenandoah River, and Shenandoah River in areas that are subject to fish consumption advisories due to mercury contamination.

Documented Mercury Spills & Releases

Year	# of Spills	Cost
2000	4	unknown
2001	3	unknown
2002	3	unknown
2003	10	unknown

Vehicle Switches

- ✓ Voluntary removal of mercury switches (hood lights, trunk lights, & ABS sensor) from end-of-life passenger cars and trucks.
- ✓ Partnering with the Virginia Automotive Recyclers Association, Virginia provides free collection, shipping, and recycling to the first 50 salvage facilities.
- ✓ Progress measured by number of switches collected.

Biggest Challenge: Staff time of the facilities to remove the switches.

Mercury TMDL Status

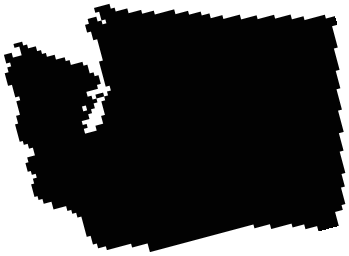
- Currently drafting TMDL for the South River.
- 0 watershed cleanup plans in lieu of TMDLs.

Citations

1. 2004 Reduction of Heavy Metals in Packaging Act Virginia Code VAC 10.1-1425.20 and 10.1-1425.21
2. Available at: www.vdh.virginia.gov/hhcontrol/fishing_advisories.htm

Washington's Mercury Actions

Washington Department of Ecology ◆ www.ecy.wa.gov/programs/eap/pbt/mercuryplan.html
Contact: Maria Victoria Peeler ◆ phone: 360-407-6704 ◆ fax: 360-407-6715 ◆ peel461@ecy.wa.gov



Mercury TMDL Status

- 1 TMDL completed (Bellingham Bay Sediments)

Top Intrastate Mercury Sources

State Estimate

1 → broken mercury-containing products and spills
2 → coal-fired power plants
3 → wastewater treatment

Fish Consumption Advisory

Statewide Fish Consumption Advisory Due to Mercury Contamination[3]

Mercury Strategies & Outcome Measures

Washington has an overall mercury action plan.[1] Major elements of the plan include: small business, household, medical, and dental mercury waste management; limiting mercury discharges to water; reduction of mercury use in products; technical assistance for industries; recycling; and public outreach and education. The state has statutes and policies relating to the mercury action plan.

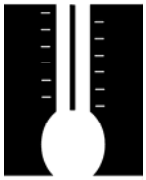
Outcome measures used to quantify progress include:

- ✓ Wastewater discharge reductions
- ✓ Total amount of mercury collected
- ✓ Number of mercury-containing devices collected
- ✓ Reduction in number of fishing advisories/impaired waters
- ✓ Number of dentists that have installed separators
- ✓ Number of schools that have conducted mercury cleanup
- ✓ Reduction in amount of mercury in fish tissue
- ✓ Number of organizations adopting mercury-free purchasing

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from wastewater treatment, chlor-alkali plants, hazardous waste, municipal solid waste incinerators.



Mercury Products

- ✓ Washington requires labeling for mercury lamps as part of the 2002 Mercury Education and Reduction Act.[2]
- ✓ State government is required to purchase only low mercury or mercury-free products.
- ✓ Sale of mercury-containing novelties, thermometers, thermostats, manometers, and automobiles with mercury switches is prohibited.[2]
- ✓ Schools are not allowed to purchase, use, or possess elemental mercury.[2]
- ✓ Voluntary collection and recycling programs for mercury-containing products, elemental mercury, & mercury waste.
- ✓ Collected mercury goes to retort facilities.
- ✓ Funding provided to local governments for mercury lamp recycling. Either the state or county pays for thermostat collection bins, and King County provides a rebate for recycled thermostats.
- ✓ Department of Ecology sent a letter to US EPA in 2004 highlighting the need for a national mercury repository (required by legislation passed in 2003).

Washington's Mercury Actions, continued

Public Outreach Efforts

Topics: sources, monitoring, disposal, cleanup, health effects, research, & reduction progress

Outreach Tools: website[4], factsheets, reports, brochures, workshops, emails, press releases, business training, citizen training, & phone hotlines

Languages: Spanish, Korean, Hmong, Vietnamese, Cambodian, Mandarin, Somalian, & Arabic

Targeted Constituencies: women of child-bearing age, pregnant women, subsistence fishers, sport-fishermen, HVAC business owners, & school administrators

Unique Outreach: Mercury education and outreach plan was mandated by legislation.[2]

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling. Tested fish from 50 waterbodies so far.
- ✓ Also monitor: wastewater discharges, waterbody sediments, surface waters, canned tuna sampling, & hair sampling.
- ✓ Washington participates in the National Mercury Deposition Network.

Vehicle Switches

- ✓ Washington prohibits the sale of automobiles with mercury switches and the replacement of mercury switches.[2]
- ✓ Voluntary removal of mercury switches (hood, trunk, and vanity lights, and ABS sensor) from end-of-life passenger and commercial cars, trucks, motorcycles, and RVs.
- ✓ Universal waste regulations cover the management of collected switches as well as all other mercury-added products.
- ✓ Washington provides factsheets, workshops, and business training related to auto switches.

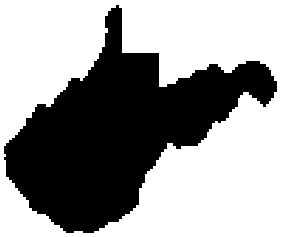
Biggest Challenge: Identification of vehicles with ABS sensors, and difficulty of removal. Also, many vehicles do not pass through a vehicle recycler before crushing and shredding. Additionally, crushed vehicles are imported from out of state for shredding.

Citations

1. Mercury reduction strategy online at: www.ecy.wa.gov/programs/eap/pbt/hgreductionstrategy.html
2. Chapter 70.95M RCW . Online at: www.leg.wa.gov/RCW/index.cfm?fuseaction=chapterdigest&chapter=70.95M
3. Advisory online at: www.doh.wa.gov/ehp/oehas/EHA_fish_adv.htm
4. www.mercurymess.org

West Virginia's Mercury Actions

West Virginia Department of Environmental Protection ◆ www.wvdep.org
Contact: Patrick Campbell ◆ phone: 304-926-0495 ◆ fax: 304-926-0496 ◆ pcampbell@wvdep.org



Fish Consumption Advisory

Statewide Fish Consumption Advisory Due to Mercury Contamination[1]

- Additional guidelines are provided for specific waterbodies
- 12, 296 lake acres under advisory
- 396 river miles under advisory
- 8 lakes and ponds under advisory

Top Intrastate Mercury Sources

State Estimate

1 → coal-fired power plants
2 → chlor-alkali plants
3 → industrial boilers

Documented Mercury Spills & Releases

Year	# of Spills	Cost
2000	2	$1,974
2001	4	$4,418
2002	3	$4,492
2003	2	$1,329

Mercury Strategies & Outcome Measures

Outcome measures used to quantify progress in reducing mercury pollution include:

- ✓ Air emission reductions
- ✓ Total amount of mercury collected

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from wastewater treatment facilities.
- ✓ Water discharges regulated through application of state water quality standards to NPDES permits

Mercury Products

- ✓ Voluntary collection of elemental mercury and mercury-containing products
- ✓ West Virginia provides support for the collection programs, through emergency response services. In February 2005 emergency response personnel were asked for assistance in disposing over 216 pounds of mercury found in a rural

Mercury Monitoring

- ✓ Tested fish from 66 waterbodies.
- ✓ Also monitor: wastewater discharges (thru NPDES self-monitoring requirements).

Public Outreach Efforts

Topics: health effects

Outreach Tools: website,[1] factsheets, brochures

Targeted Constituencies: pregnant women, & sport-fishermen

Unique Outreach: Brochures in obstetrician offices, & advisories printed in fishing regulations

Vehicle Switches

- ✓ Mailings to all salvage yard operations to encourage voluntary recycling of automotive mercury switches.

Mercury TMDL Status

- 0 TMDLs completed
- 0 watershed cleanup plans in lieu of TMDLs

Citations

1. Advisory available online at: www.wvdhhr.org/fish/current.asp

Wisconsin's Mercury Actions

Wisconsin Department of Natural Resources ◆ http://dnr.wi.gov/org/caer/cea/mercury/
Contact: Jon Heinrich ◆ phone: 608-267-7547 ◆ fax: 608-267-0560 ◆ jon.heinrich@dnr.state.wi.us

Mercury Strategies & Outcome Measures

Wisconsin has an overall mercury action plan. Major elements of the plan include: small business, household, medical, and dental mercury waste management; mercury emission limits; limitation of mercury discharges into water; reduction of mercury use in consumer products; technical assistance for industries; mercury recycling; and public outreach and education programs to reduce exposure. The state has statutes, regulations and policies relating to the mercury action plan. The WDNR has a Mercury Team comprised of key agencies including Health and Family Services, Agriculture, and Trade and Consumer Protection.

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations on mercury releases from coal-fired power plants and wastewater treatment facilities.

Mercury Products

- ✓ Community Mercury Reduction Programs involving 20 communities focusing on medical, dental, school, HVAC thermostat, auto switch, and dairy farming products.
- ✓ Voluntary mercury collection programs for elemental mercury, mercury waste, and mercury-containing products. Mandatory recycling of collected mercury. All mercury-containing products are classified as universal wastes or are conditionally exempt from hazardous waste rules with the condition that waste be recycled. All public and private mercury collection sites are permitted and inspected by the WDNR.
- ✓ Local clean sweeps and specific mercury reduction pilot programs receive state or federal grants that subsidize mercury collection and recycling.

Vehicle Switches

- ✓ Voluntary removal of mercury switches (hood & trunk lights) from end-of-life passenger cars and trucks.
- ✓ Progress is quantified by pounds of mercury waste collected and number of auto dismantlers and scrap yards participating.
- ✓ Cooperative effort between WDNR and Auto and Scrap Recyclers trade association: by participating in mercury auto switch removal and recycling, the auto recyclers satisfy the mercury recovery component of required stormwater management plan. Auto dismantlers are voluntarily included as part of Storm Water Permit requirements.
- ✓ Collection buckets, spill kits, and instructions provided to participating yards by WDNR. Designated consolidation sites were provided proper collection bins and spill kits. Sites must be approved by WDNR. Mercury recycling vendors must be licensed. Records are maintained at each consolidation site and by the recycling vendor who must report to WDNR.
- ✓ A Great Lakes National Program Office grant funded a mercury collection project from 2001–June 2005 that included educational outreach and free recycling.

Biggest Challenge: Improving participation of scrap yards and funding.

Wisconsin's Mercury Actions, continued

Fish Consumption Advisory

Statewide Fish Consumption Advisory Due to Mercury Contamination

- 57,000 river miles under advisory
- 15,000 lakes and ponds under advisory

Mercury Monitoring

- ✓ On-going fish tissue testing and sampling. Tested fish from more than 810 water bodies' so far.
- ✓ Also monitor: emissions, ambient air, wastewater discharge, mercury deposition, water body sediment, & wildlife.
- ✓ Wisconsin participates in the National Mercury Deposition Network.
- ✓ Development of an atmospheric modeling system for the Great Lakes Region.

Public Outreach Efforts

Topics: sources, monitoring, disposal, cleanup, health effects, research, & reduction progress

Outreach Tools: factsheets, reports, posters, brochures, press releases, & phone hotlines

Languages: Fish consumption advisory and public health advice in Spanish and Hmong

Targeted Constituencies: women of child-bearing age, pregnant women, subsistence fishers, sport-fishermen, & the general population

Top Intrastate Mercury Sources

State Estimate

1 → coal-fired power plants
2 → dental amalgam
3 → broken mercury-containing products & spills

Citations

1. Available at: http://dnr.wi.gov/org/water/fhp/fish/pages/consumption/index.shtml

Wyoming's Mercury Actions

Wyoming Department of Environmental Quality
Contact: John Corra ◆ phone: 307-777-7937 ◆ fax: 307-777-7682 ◆ jcorra@state.wy.us

Laws & Policies to Reduce Mercury Use & Releases

Industrial Releases

- ✓ State regulations for hazardous waste include mercury and mercury-containing wastes and air emission controls for coal-fired power plants.
- ✓ State conducts an initial screening for mercury concentrations in coalbed natural gas discharges.

Mercury Products

- ✓ Voluntary collection and recycling programs for elemental mercury, mercury waste, and mercury-containing products
- ✓ Wyoming DEQ partners with Hospitals for a Healthy Environment for collection and proper disposal of mercury-containing medical equipment.

Top Intrastate Mercury Sources

State Estimate

1 → coal-fired power plants
2 → historic gold mining
3 → industrial boilers that burn oil or coal

Mercury Monitoring

- ✓ Monitor stack emissions for mercury
- ✓ Monitor fish tissues for mercury
- ✓ Wyoming is in the process of developing a fish consumption advisory program

Public Outreach Efforts

Topics: sources of mercury, proper collection and handling techniques, & clean-up procedures

Outreach Tools: factsheets, brochures, reports, and responses to telephone & email queries

Unique Outreach: Seminars are conducted to reduce mercury waste streams from medical and dental facilities.

Vehicle Switches

- ✓ Information and consulting support are provided for proper collection, handling, and disposal of mercury switches from auto salvage operations.

This Page Intentionally Left Blank.

Appendices

Appendix A: Intrastate Mercury Sources

Top Three Anthropogenic Intrastate Sources of Mercury Releases Reported by the States

State	Alaska	Arizona	California	Colorado	Connecticut	Delaware	Florida	Hawaii	Illinois	Indiana	Kansas	Kentucky	Louisiana	Maine
Coal-Fired Electric Power Plants	1	2	2	2	3	2	2		1	1	1	1	2	
Electric Arc Furnaces				3						3			3	
Industrial Boilers			1			3		1	2					1*
Steel Recycling Facilities														
Sewage Sludge Incinerators	3				2									
Wastewater Treatment											3			
Chlor-alkali Plants						1						3	1	
Hazardous Waste														
Municipal Solid Waste Incinerators					1*		1	2						3
Medical Waste Incinerators							3							
Mining	2	1		1										
Cement Kilns		3							3	2	2	2		
Broken Mercury-Containing Products & Spills														2
Others			3					3						
Comments			3 = petroleum manufacturing		1 = municipal waste combustors			3 = refineries						* = and residential combustion

Appendix A: Intrastate Mercury Sources

State	Coal-Fired Electric Power Plants	Electric Arc Furnaces	Industrial Boilers	Steel Recycling Facilities	Sewage Sludge Incinerators	Wastewater Treatment	Chlor-alkali Plants	Hazardous Waste	Municipal Solid Waste Incinerators	Medical Waste Incinerators	Mining	Cement Kilns	Broken Mercury-Containing Products & Spills	Others	Comments
Maryland	1								3		2				
Massachusetts					3*	3*			1					2	2 = residential /commercial boilers; 3*=wastewater treatment including sewagesludge incinerators
Michigan	1													2,3	2=volatilization during solid waste collection and processing; 3=steel manufacturing
Minnesota	1	3									2				
Missouri	1											2		3	3 = lead smelters
Montana	1										2			3	3 = petroleum refineries
Nebraska	1	3										2			
Nevada	2										1	3			
New Hampshire	3		1						2						
New Jersey	2													1,3	1 = iron and steel manufacturing; 3 = use and disposal of various products
New York	1				3				2						
North Carolina	1	2												3	3 = other coal burning industries
North Dakota	1													2,3	2 = petroleum refinery; 3 = other manufacturing
Oklahoma	1													2	2 = petroleum refining

Appendix A: Intrastate Mercury Sources

State	Coal-Fired Electric Power Plants	Electric Arc Furnaces	Industrial Boilers	Steel Recycling Facilities	Sewage Sludge Incinerators	Wastewater Treatment	Chlor-alkali Plants	Hazardous Waste	Municipal Solid Waste Incinerators	Medical Waste Incinerators	Mining	Cement Kilns	Broken Mercury-Containing Products & Spills	Others	Comments
Oregon	2										1				
Pennsylvania	1								3			2			
Rhode Island					1	2							3		
South Carolina	1		3									2			
South Dakota	1		3									2			
Tennessee	1						2	3							
Texas	1	3*												2	2 = alumina production; 3 = steel works, blast furnaces, and rolling mills
Utah	3										1			2	2 = metal manufacturing
Vermont			3											1,2	1 = on-road mobile sources; 2 = residential heating
Virginia	1	2	3												
Washington	2					3							1		
West Virginia	1		3				2								
Wisconsin	1												3	2	2 = dental amalgam
Wyoming	1		3								2				

Appendix B: States Regulating Mercury From Coal-Fired Power Plants[1]

State	Coal-Fired Power Plant Law
Connecticut	In 2003, the Connecticut General Assembly passed legislation that requires each coal-burning power plant to reduce its mercury air pollution by 90% by 2008. Under the law, if a plant installs and properly maintains the best available control technology and still fails to meet the new emissions rate, it can request an alternative emissions rate from the Department of Environmental Protection.[2]
Illinois	Multi-pollutant legislation adopted in 2001 required the Illinois Environmental Protection Agency to release a report in September 2004 proposing multi-pollutant reduction targets and compliance timelines.[3]
Massachusetts	In 2004, the Massachusetts Department of Environmental Protection finalized a rule that requires coal-burning power plants to capture 85 percent of their mercury air pollution by 2008 and 95% by 2012.[4]
Minnesota	In 1999, the Minnesota Legislature passed a law requiring the Minnesota Pollution Control Agency to solicit voluntary reduction agreements from sources that emit more than 50 pounds of mercury annually.[5] The law sets a state goal of reducing releases of mercury into the air and water by 70% from 1990 levels by 2006. A 2002 progress report found that virtually no reductions in mercury pollution occurred under the voluntary initiative.[6] Progress under the law is due to be assessed again in October 2005. Xcel Energy's MERP project will upgrade a coal-fired plant with technology to reduce mercury emissions.
New Hampshire	Pursuant to the 2002 Clean Power Act, New Hampshire's Department of Environmental Services must implement an integrated, multi-pollutant strategy to reduce air emissions from coal-fired power plants.[7] A bill that would establish an initial emissions cap of 50 pounds/year by 2009 (62% reduction), and a Phase II cap of 24 pounds/year by 2013 (82% reduction) has passed the Senate and is under consideration by the New Hampshire House of Representatives.[8]

[1] Information for this appendix provided by National Wildlife Federation
[2] CT Public Act 03-72. Available at: http://www.cga.ct.gov/2003/act/Pa/2003PA-00072-R00HB-06048-PA.htm
[3] 415 ILCS 5/9.10 Available at: http://www.ilga.gov/legislation/ilcs/documents/041500050k9.10.htm
[4] Massachusetts Emissions Standards for Power Plants, 310 CMR 7.29. Available at: www.mass.gov/dep/bwp/daqc/files/regs/hgreg.pdf
[5] Minn. Stat. § 116.915 (1999). Available at: http://ww2.revisor.leg.state.mn.us:8181/SEARCH/BASIS/mnstat/public/www/DDD/116.915/116915
[6] Minnesota Pollution Control Agency, 2002. "Evaluating Voluntary Agreements" from Mercury Reduction Program Progress to the Minnesota Legislature.
[7] N.H. Rev. Stat. Ann. Ch. 125-O (2002). Available at: http://gencourt.state.nh.us/legislation/2002/HB0284.html
[8] SB128 http://www.gencourt.state.nh.us/legislation/2005/sb0128.html

Appendix B: States Regulating Mercury From Coal-Fired Power Plants[1]

State	Coal-Fired Power Plant Law
New Jersey	In 2004, the New Jersey Department of Environmental Protection adopted a rule requiring coal-burning power plants to reduce 90% of their mercury air pollution by the end of 2007. The rules allow for some flexibility, giving plants the option of meeting the new emission standards in 2012 if they also make major reductions in their emissions of sulfur dioxide, nitrogen oxides, and fine particulates.[9]
North Carolina	In 2002, North Carolina adopted the Clean Smokestacks Act, which imposes nitrogen oxides (NO_x) and sulfur dioxide (SO_2) limits on coal-burning power plants. A 55% reduction in mercury emissions is estimated to result as a co-benefit. The North Carolina State Department of Environmental & Natural Resources is required to submit a report to the legislature in 2005 on whether mercury-specific controls should be adopted after full implementation of NO_x and SO_2 controls.[10]
Pennsylvania	In January 2005, the Pennsylvania Environmental Quality Board voted to accept for internal review, a citizen petition requesting that the state regulate mercury emissions from coal-burning power plants, requiring the Department of Environmental Protection (DEP) to complete a report evaluating the petition.[11] On May 18, 2005, DEP released a report recommending that state regulations be established.
Wisconsin	In 2004, the Wisconsin legislature gave final approval to a rule that requires in-state coal-burning power plants to reduce their mercury air pollution by 40% by 2010 and 75% by 2015. Under the rule, the Wisconsin Department of Natural Resources (DNR) may enter into a multi-pollutant reduction agreement with a major electric utility as an alternative to complying with the initial 40% reduction level. The rule also required DNR to revise the state's rule within 18 months of a federal standard so that the state's standard is no stricter than the federal standard.[12]

[9] N.J.A.C. 7:27 Available at: www.nj.gov/dep/rules/adoptions/mercury_rule7-27.pdf

[10] See http://daq.state.nc.us/news/leg/cleanstacks.shtml

[11] See http://www.dep.state.pa.us/dep/subject/eqb/Mercury%20Emissions/Mercury_Ltr_Petition1.pdf

[12] Wisconsin Natural Resources Board, 2004. Authorizing Statutes ss. 227.11(2) (a) and 285.11 (9). Available at: http://dnr.wi.gov/org/aw/air/reg/mercury/AM-27-01signed.pdf.

Appendix C: States Reducing Chlor-Alkali Plants' Mercury Pollution[1]

The U.S. chlor-alkali industry consumes significantly more mercury than it reports having released. In 2000, the nine chlor-alkali plants reported consuming 79 tons of mercury and releasing 14 tons of mercury. It is not uncommon for elemental mercury to vaporize and escape from within chlor-alkali plants during routine operations through unmonitored ventilation systems and other leaks. In 2000, these unmonitored releases, known as fugitive emissions, totaled approximately 59 tons of mercury.

In April 2005, the Delaware Department of Natural Resources and Environmental Control and the U.S. EPA signed an agreement with Occidental Chemical Corporation (OxyChem) in which the company will voluntarily measure and reduce fugitive mercury emissions at its Delaware City plant.

In Ohio, in lieu of making the facility pay fines for violating its wastewater discharge permit, the Ohio Environmental Protection Agency negotiated an agreement under which the Ashta Chemicals chlor-alkali plant will install pollution controls, which are estimated to remove 148,475 grams of mercury from the air. The agreement also requires the plant to collect and treat storm water runoff from the site, preventing the discharge of 30 grams of mercury into the water annually.

Aside from assessing and preventing mercury releases, ensuring the safe disposal of mercury when chlor-alkali plants convert to mercury-free manufacturing processes or when they shut down has emerged as an issue of concern for states. Until recently, owners of retiring chlor-alkali plants expected to sell their mercury. However, recognizing the need to prevent unhealthy re-releases of mercury into the environment, states are beginning to look at alternative solutions. In Maine, when the HoltraChem chlor-alkali plant closed its doors, the state government, private industry, and environmental organizations worked collaboratively to craft a memorandum of understanding to ensure that the plant's 80 metric tons of mercury be safely stored for at least 5 years, rather than re-enter commerce.

Developing incentives for chlor-alkali plants to convert to mercury-free manufacturing processes and designing better mercury pollution control technologies are critical to addressing the problems posed by these toxic facilities.

[1] Information for this appendix provided by National Wildlife Federation.

Appendix D: ECOS Resolutions and QSC Publications

ECOS Resolutions

United States Mercury Stockpile Sales. Resolution 96-2. Opposes future U. S. mercury stockpile sales and calls for a permanent halt to sales. Available at: http://www.ecos.org/files/1607_file_Resolution_96_2.pdf.

Need for Articulation of a National Vision for Mercury. Resolution 01-01. Requests that the federal government articulate a national vision of substantially reducing discharges of mercury into the environment and that EPA work with the States and others to develop strategies and initiatives to achieve this goal. Available at: http://www.ecos.org/files/565_file_Resolution_01_1_REV_4_7_04.pdf.

Mercury Retirement and Stockpiling. Resolution 01-03. Recognizes that long-term storage of mercury is a federal responsibility, asks the federal government to create and implement a plan to manage long-term mercury storage, and requests that large consumers of mercury be included in the development of the plan. Available at: http://www.ecos.org/files/568_file_Copy_of_Resolution_01_3.pdf.

Mercury Stewardship. Resolution 03-03. Endorses the four Quicksilver Caucus Stewardship Workgroup documents and encourages the EPA and other federal agencies to utilize the information in the documents. Available at: http://www.ecos.org/files/579_file_Resolution_03_3.pdf.

The Need for a National Mercury Reduction Strategy as an Option for Atmospheric Mercury Total Maximum Daily Loads (TMDLs). Resolution 03-07. Calls upon EPA to create a national mercury reduction strategy and recommends that EPA develop an implementation plan for the strategy that may be used in lieu of a TMDL. Available at: http://www.ecos.org/files/583_file_Resolution_03_7.pdf.

Regarding a Mercury Emissions Rule. Resolution 04-2. Urges EPA to modify its existing proposed mercury emissions rule to require the most aggressive mercury reductions achievable, in as early a timeframe possible in concert with the earliest of other air pollutant emission reduction schedules, and in such a way that would preclude the creation of localized, adverse health or environmental impacts. Available at: http://www.ecos.org/files/573_file_Resolution_04_2.pdf.

Need for Nationwide Mercury Switch Removal Strategy that Provides Flexibility to the States. Resolution 04-7. Encourages EPA to develop a national switch removal program that provides flexibility for States to maintain and to continue to develop, and implement their own switch removal strategies or programs. Available at: http://www.ecos.org/files/1117_file_Copy_of_Resolution_04_7.pdf.

Need for State EPA Approach for Reducing Mercury on the Environment. Resolution 05-3. Requests that US EPA form a workgroup co-chaired by the EPA and Quicksilver Caucus, to discuss and recommend an implementation strategy and action plan for reducing mercury nationally. Available at: http://www.ecos.org/files/1450_file_Copy_of_Resolution_05_3.pdf.

QSC Documents

Mercury Stewardship—Best Management Practices provides practical guidelines for those engaged in interim or longer term storage of elemental mercury.

Mercury Stewardship—Storage of Mercury describes and evaluates a range of elemental mercury interim storage options that could be used until a permanent treatment or storage solution is identified.

Mercury Stewardship—Market Commodity Review summarizes economic, supply and demand data to provide a picture of the mercury commodity market.

Mercury Stewardship—Market Policy Options summarizes data on domestic and global supply and demand, identifies areas of uncertainty, and where able to do so, provides qualitative conclusions about the impacts of alternate scenarios for the storage or sale of the U.S. mercury stockpile.

Removing Mercury Switches from Vehicles—A Pollution Prevention Opportunity for States provides information on possible solutions for the problem of mercury in vehicles by describing approaches states have taken to address the issue.

Appendix E: Voluntary Manufacturer Take-Back Program[1]

Because manufacturers do not include the costs of contamination or disposal in their production costs, there is limited incentive for them to eliminate the use of mercury-containing products. To date, the only industry that has set up a national mercury-product take-back program is the thermostat-manufacturing industry. Honeywell, General Electric, and White-Rodgers established the Thermostat Recycling Corporation to organize the collection of all brands of used, wall-mounted mercury-switch thermostats so that the mercury can be purified for re-use. The program, which focuses on collecting thermostats from HVAC contractors, has experienced limited success. In 2001, this voluntary program resulted in the collection of 48,215 thermostats and processed 402 pounds of mercury. To put the success of this program into perspective, trade data indicate that approximately 9 million residential replacement thermostats were sold in 2002. A stakeholder process is currently underway to improve this program, based on voluntary initiatives undertaken by the manufacturers.

[1] Information for this appendix provided by National Wildlife Federation.

Appendix F: State Dental Amalgam Laws[1]

Dentists are the third largest user of mercury in the United States, consuming more than 40 metric tons of mercury in 2001 alone.[2] Dental offices are the largest single contributor of mercury in wastewater.[3] Mercury dental amalgam is frequently rinsed down the drain, usually to a municipal wastewater system (or septic system), deposited in biomedical waste containers destined for waste incineration, or placed in trash disposed in a municipal waste landfill or incinerator, and ultimately released into the environment.

Although dental uses and releases remain largely unregulated, several state and local governments recently adopted laws or formal legal agreements requiring dental mercury-release reduction.

State	Mercury Dental Amalgam Law
California	Proposition 65 requires that dentists provide patients with notice about the potential harmful effects of mercury dental amalgam. The City of San Francisco requires that all dental offices install dental amalgam separators.
Connecticut	State law prohibits the sale of products containing more than 250 parts per million of mercury. CT DEP developed best-management practices for dentists.
Maine	State law requires mandatory pollution prevention plans for dental offices. The law also requires dentists using mercury or a mercury amalgam in any dental procedure to display a poster adopted by the Department of Human Services Bureau of Health in the public waiting area of that dentist's office and to provide each patient with a copy of the brochure adopted by the bureau. Dentists are also required to maintain records on waste mercury amalgam for at least 3 years.
Massachusetts	In collaboration with the Massachusetts Dental Society, MA DEP is implementing a voluntary program to encourage the early installation of mercury amalgam separators in dental offices prior to finalization of regulations requiring mandatory installation that DEP will be adopting in 2006. Over the past 12 months, 74% of Massachusetts dentists who generate mercury amalgam wastes have joined in this effort, reducing mercury inputs into wastewater by several hundred pounds.
New Hampshire	State law requires dentists and the New Hampshire Department of Health and Human Services to provide information on restorative dental materials, and requires the Department of Environmental Services to adopt rules for the disposal of mercury amalgam waste in an environmentally-appropriate manner.
Minnesota	A Memorandum of Agreement between the Metropolitan Council Environmental Services (MCES-POTW) and the Minnesota Dental Association encourages the installation and maintenance of dental amalgam separators in dental offices in the MCES service area and statewide.
New York	State law prohibits dentists from using or possessing elemental mercury unless it is contained in appropriate pre-encapsulated capsules specifically designed for the mixing of dental amalgam. The law also requires all dentists to recycle any elemental mercury, including any pre-encapsulated mercury capsule waste, and dental amalgam waste generated in their dental practices in accordance with rules and regulations established by the commissioner.

1. Information for this appendix provided by National Wildlife Federation.
2. Bender, Michael T. *Dentist the Menace? The Uncontrolled Release of Dental Mercury* (June 2002).
3. *Ibid.*

ECOS 05.005