Fishing for Trouble

How Toxic Mercury Contaminates Our Waterways and Threatens Recreational Fishing

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Acknowledgements

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Executive Summary

Our environment, and now our food supply, is becoming increasingly contaminated with mercury, an extremely dangerous toxic chemical. When mercury is ingested in its organic form, methylmercury, it can lead to neurological damage, especially in children. Health impacts of exposure to mercury include attention and language deficits, impaired memory, inability to process and recall information, and impaired visual and motor function. The Centers for Disease Control and Prevention estimated in its January 2003 study that 8% of American women of childbearing age have elevated levels of mercury in their bodies from eating contaminated fish. This means that approximately 322,000 newborns are at risk of neurological problems due to exposure *in utero*.

Mercury Contamination is a Widespread and Growing Concern

Currently, 43 states have advisories in effect for mercury-contaminated fish, warning the general population or sensitive subpopulations to reduce or avoid consumption, compared to only 27 states in 1993 and 39 states in 1997. This is nearly a 60% increase in 10 years. An analysis of EPA data from December 31, 2001 to December 31, 2002 found that:

- State agencies have 2,148 active mercury advisories in effect for at least 12,111,733 acres of lakes (including statewide advisories), or almost 30% of all lake acres; 453,101 miles of river (including statewide advisories), or almost 13% of all river miles; 15,639 miles of coastal areas (not including statewide advisories); 2,333 miles of our Great Lake coasts and tributaries; and 166,534 acres of bayou.

- 19 states (Connecticut, Florida, Illinois, Indiana, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, North Dakota, New Hampshire, New Jersey, Ohio, Pennsylvania, Rhode Island, Vermont, and Wisconsin) have issued statewide advisories for all of their inland freshwater lakes and/or rivers for at least one species of fish. Illinois, Florida, and Rhode Island have added, and North Carolina has rescinded, statewide advisories for inland waterways in the last year.

- 11 states (Alabama, Florida, Georgia, Louisiana, Maine, Massachusetts, Mississippi, North Carolina, Rhode Island, South Carolina, and Texas) have issued statewide advisories for their entire coastal areas for at least one species of fish, with Rhode Island being the most recent state to issue such advisories.

- States have issued mercury advisories covering a greater area than ever before. Since 2001, the number of river miles under advisory for mercury has increased by 9% (up from 414,973 miles in 2001), and the number of lake acres under advisory for mercury has increased by 19% (up from 10,179,247 acres in 2001).

Recreational Fishing at Risk

Fish consumption advisories for mercury cover a larger geographic area than ever before, putting recreational fishing in jeopardy. Fish consumption advisories cause many anglers to reduce the number of days they fish, choose other locations to fish, and take fewer overall fishing trips. Thus, not only does mercury threaten the health of those who eat the fish caught, but a damaged recreational fishing industry could take its toll on national and state economies.

Even a small dent in the recreational industry could mean large economic losses. According to the American Sportfishing Association and the National Fish and Wildlife Service, in 2001, recreational

fishing:

- Generated more than $35.6 billion in expenditures;
- Generated more than $116 billion in total economic output;
- Supported more than one million jobs;
- Created more than $30.1 billion in household income (wages and salaries);
- Added more than $1.9 billion in sales tax revenues;
- Added more than $470 million in state income tax revenues; and
- Generated more than $4.88 billion in federal income tax revenues.

Five of the top ten states with the most lake acres under mercury advisory, Minnesota, Wisconsin, Florida, Michigan, and Texas, are also in the top ten for the amount of money spent towards recreational fishing. In addition, two of the ten states with the largest number of river miles under advisory, Florida and Ohio, are also in the top ten for spending on fishing. In fact, nine of the 19 states with statewide mercury advisories covering all of their inland lakes or rivers, Florida, Illinois, Michigan, Minnesota, Missouri, New Jersey, Ohio, Pennsylvania, and Wisconsin, also fall in the top twenty states for expenditures on recreational fishing. Of all the money spent on fishing, more than $27.8 billion was spent in states that have active fish consumption advisories for mercury.

Addressing the Problem at the Source

To protect public health, preserve a critical part of our diet and ensure the survival of an important American pastime, we need to dramatically reduce the mercury released into our environment.

Much of the mercury that ends up on our dinner tables comes from smokestacks of power plants, waste incinerators, and other industrial sources. Power plants are responsible for nearly one-third of man-made mercury emissions, comprising the largest industrial source of mercury entering our air. To date, EPA has regulated mercury emissions from other sources such as incinerators, but has failed to do so for power plants.

Under the Clean Air Act, EPA is under court order to propose emission standards for power plants for hazardous air pollutants, including mercury, by the end of this year. These standards would go into effect by January 2008. The standards, known as "maximum achievable control technology" (MACT) standards, must reflect the emission rates currently being achieved by the lowest-emitting sources. Proven technology demonstrates that power plants can reduce mercury emissions by 90% using technologies that exist today, bringing national mercury emissions down from nearly 50 tons per year to only five tons per year.

Unfortunately, EPA has postponed conducting an analysis of possible emissions reduction scenarios under its upcoming MACT rule and is instead focusing on its analysis of a proposed weakening of the Clean Air Act to allow higher emissions of mercury from power plants. The Bush administration's so-called "Clear Skies Initiative" would repeal the Clean Air Act section that applies to mercury from power plants, replacing this provision with a national emissions limit that would delay ultimate reductions until 2018. Even then, it would allow power plants to emit three times more mercury than would be allowed under a strict interpretation of current law.

We urge the following policies to address the health hazards posed by mercury in our environment:

1) U.S. EPA should faithfully implement the Clean Air Act to reduce mercury emissions from power plants by at least 90% from existing levels; and

2) The Bush administration should abandon its so-called "Clear Skies" air pollution plan.

Introduction

Fishing is an important source of food in the United States. Health professionals routinely urge people to eat fish as part of a healthy, well-balanced diet. Additionally, across the country, fish are a source of free food for low-income populations. Populations such as certain Native American tribes and Asian Americans eat fish as a substantial part of their diet.[1]

But is all this fish really good for people? This was a question that Dr. Jane Hightower, a researcher from the California Pacific Medical Center, sought to answer when she surveyed her patients over the course of a year. She tested the mercury levels of those who reported eating more than two servings of fish a week. What she discovered was startling. Nine out of ten people had high mercury levels.[2] Of a group of 89 patients, 63 had blood mercury levels at more than twice the level recommended by the Environmental Protection Agency (EPA), 19 had blood mercury levels four times the level considered safe, and four had ten times that level.[3]

Mercury levels this high have been known to cause serious neurological problems—especially for children who consume mercury-contaminated fish, or who are exposed by their mothers' fish consumption *in utero*. These health problems were prevalent in many of Hightower's patients. A seven-year-old boy who ate canned tuna, fresh tuna, and mackerel regularly from the age of three was found to have hair mercury levels 15 times the EPA recommended level. After he started eating fish, he showed a severe decline in mental development. According to his mother, he quit socializing with others, was no longer able to express complete thoughts, and could not remember the names of his classmates.[4]

This report details the growing threat of mercury contamination to public health, with a primary focus on the chief route of human exposure, fish consumption. It discusses how mercury accumulates in fish to levels that can cause serious health problems, similar to those Dr. Hightower's patients faced.
Mercury-contaminated fish in our waterways make it difficult to enjoy the nutritional and recreational value of fish – without also having to worry about the risks of mercury exposure.

To deal with this problem, states have increasingly issued fish consumption advisories. This report finds that states have issued mercury advisories covering a greater geographic area than ever before. This widespread mercury contamination threatens public health and puts recreational fishing—a multi-billion dollar industry—in jeopardy.

Finally, this report concludes that we need to address mercury contamination at its source—emissions from dirty, coal-fired power plants. The Bush administration must act to reduce mercury pollution by implementing the Clean Air Act and abandoning its so-called "Clear Skies" plan, which will allow more mercury pollution—not less—to contaminate our waterways.

The Growing Threat of Mercury Contamination

Mercury Accumulation in Fish

When power plants and other facilities burn coal for electricity, they emit mercury from their smokestacks into the air. Rain then washes some of this mercury out of the air onto land and into waterways, where certain microorganisms convert it into methylmercury, a form that is especially toxic for humans and wildlife.

Methylmercury is a persistent bioaccumulative toxin. Fish absorb this form of mercury as it passes over their gills and they feed on the organisms. As larger fish eat smaller fish, mercury concentrations increase, or bio-accumulate. Fish at the top of the aquatic food chain have mercury levels at approximately 1 to 10 million times greater than the levels in the surrounding waters.[5] This is why larger, older predator fish have the highest concentrations of mercury.

Mercury from smokestacks not only contaminates nearby waterbodies, but also those far from the source. Once emitted, mercury can remain in the atmosphere for up to one year. When the mercury comes into contact with oxidizing chemicals such as ozone, it becomes water-soluble. It is in this form that it is deposited as rain or snow. It can then be re-emitted (volatized) from waterbodies and deposited elsewhere. This continuous re-emission makes mercury pollution a local, regional, and global problem.

The principal way that people are exposed to mercury is through fish consumption.[6] Mercury also can pass through the placenta and expose developing fetuses. Infants can ingest mercury from breast milk when mothers have eaten contaminated fish.

Mercury is found in the filet portion of the fish (the muscle). Thus, skinning or trimming the fat from the fish does not reduce the mercury content. The only way to avoid mercury when eating fish is to avoid mercury-contaminated fish.

Fish Consumption Advisories: Mercury Levels Unsafe for Humans

To address the public health threats posed by mercury pollution, state and tribal health departments – as well as the Food and Drug Administration (FDA), which has federal jurisdiction for commercially bought and sold fish – have, for years, issued fish consumption advisories. In addition to mercury, fish advisories are issued for other contaminants, such as PCBs. Advisories involve a complex assessment taking into consideration the level of contamination in a fish species, the size of the fish, how often an individual eats that particular species, and the health risk posed by consumption.

The fish consumption advisory approach

EPA does not issue fish consumption advisories; rather, states are left with the responsibility. State systems for issuing fish consumption advisories vary widely from state to state, resulting in a situation that is confusing for consumers and often inadequately protects the health of a growing fetus or child. Many states do not monitor their waterbodies. Many states use inadequately low thresholds to determine whether an advisory should be issued. Finally, the advice that states give their consumers about how much fish should be consumed varies widely. Recent surveys have shown that nearly all states inadequately protect the health of sensitive subpopulations from mercury exposure.[7]

EPA does issue guidance to the states on the criteria to use in developing advisories. Part of this guidance includes a reference dose, which is the level below which EPA does not expect adverse health effects to occur over a lifetime of exposure. The EPA reference dose-level is set at 0.1 micrograms of mercury per kilogram of body weight per day; EPA set this threshold to protect populations, such as fetuses, that are sensitive to mercury's effects. EPA recommends that the typical consumer eat less than 10 grams of fish and shellfish per day (which is one small serving of less than three ounces per week, or a

half can of tuna) with mercury concentrations between 0.10 and 0.15 parts per million (ppm)[a] to stay well below the reference dose.[8] At 0.10 to 0.15 ppm, the average person should eat no more than one to two large servings (at approximately eight ounces each) per week of fish to stay within safe limits.[b] At larger portions, or at higher contamination levels, consumption must be further reduced.[9] EPA recommends that pregnant women, women who could become pregnant, women nursing, and young children limit consumption to one meal per week (of eight ounces of uncooked fish for adults, which amounts to 1 1/3 cans of tuna, or a half can for a young child at an assumed three ounce serving size).

Mercury concentrations greater than one part per million, or the "action level," in fish are supposed to trigger the FDA (see sidebar) to issue a commercial fish advisory to warn people to stop or limit consumption.[c] The agency has issued an advisory for pregnant women and women of childbearing age not to eat shark, swordfish, king mackerel, and tilefish due to the high levels of mercury.

Mercury contamination and exposure in freshwater fish

State health officials are growing increasingly concerned about the safety of consuming the fish in our nation's lakes and rivers. This is because mercury levels in the fish in these waterways are high enough to make the fish unsafe to eat or at least unsafe enough to limit consumption. Table A on page 9 represents the results of mercury analysis for freshwater fish collected from 43 states.[10] The upper end concentrations found were all well above the FDA action level of one part per million. At these levels, EPA would recommend no consumption of these fish.[d]

These high levels of mercury can lead to unsafe levels of exposure for the estimated 69% of anglers who consume their catch.[11] While not all recreational anglers consume fish contaminated with mercury at levels that exceed the reference dose,[e] some fall into patterns of fish consumption

Problems with the FDA approach to commercial fish advisories

There are a number of problems with the FDA's approach for issuing fish consumption advisories.

• The FDA action levels, in contrast to the EPA approach, incorporate a "tolerable daily intake" level, which is five times higher than EPA's reference dose and is based on the impacts to a healthy adult male. Recent news reports have indicated that FDA plans to lower its advisory action levels to be in harmony with EPA's reference dose. FDA has disputed these reports and has not taken any such regulatory action.

• Historically, it has been difficult for people to avoid commercially-sold fish that is contaminated with high levels of mercury. FDA has not issued advisories for fish, such as tuna, which have high levels of mercury contamination. Also, FDA advisories are rarely posted in grocery stores or fish markets where they might be seen. It was only in 2003 that California grocery store chains, including Safeway, Whole Foods, and Trader Joe's, began posting warnings at fish counters advising women and children to not eat swordfish and shark and to limit consumption of fresh tuna, in response to a complaint by the Attorney General for failure to comply with a proposition mandating such warnings. On May 13, 2003, Wild Oats Markets, a leading chain of natural food stores, pledged to be the first grocer outside of California to post warnings at seafood counters.

• Last, the Agency does not provide information on how extensive contamination is. The FDA ceased its mercury-sampling program in 1998, and today federal agencies conduct only limited testing of fish for mercury.

On July 26, 2002, an independent food safety committee recommended that FDA start to warn pregnant women and children to limit their consumption of canned tuna, due to mercury contamination. The committee also advised FDA to test seafood and warn sensitive populations not to consume fish above the FDA's action level.

[a] A "part per million" is a unit of measurement for mercury and other contaminants in fish. It is the equivalent to one mg/kg.

[b] Consumption limit (kg/day) = Reference Dose (mg/kg/day) * Average body weight (kg) / fish mercury levels (mg/kg). This formula assumed average bodyweight of 70 kg and used 0.1 microgram/kg/day as the reference dose. See EPA, Volume Two, 3d edition, Nov. 2000, National Guidance for Assessing Chemical Contaminant Data for Use In Fish Advisories.

[c] In addition, FDA can go beyond this and prevent the fish from being sold commercially.

[d] Less than 0.5 meals per month. *See U.S. EPA June 2001. Mercury Update. Impact on Fish Advisories.*

[e] Studies estimate the percentage of anglers that exceed advisory limits ranges from 0% to 57%. See Paul Jakus *et al*, "The Benefits and Costs of Fish Consumption Advisories for Mercury." October 2002.

that increase the risk of exposure because they maintain:

- *Daily fish consumption over a short period of time.* Recreational anglers, who spend their vacation fishing over a relatively short period of time and eat fish daily, have higher mercury exposure;[12]

- *Relatively continuous exposure.* Subsistence anglers who rely on the catch as a primary food source may be continuously exposed to mercury depending on the type of fish and where it is caught; or

- *Regular and frequent consumption*. Frequent consumption of fish can add up to high exposure levels because the body excretes mercury slowly.

Mercury contamination and exposure in commercially-sold fish

Unsafe levels of mercury also likely exist in much of the commercial fish supply. For example, testing by the state of Florida in 2000 found that approximately 1 in 12 samples of canned tuna sold were near or at FDA action levels.[13]

As can be seen in Table B on page 9, many of the fish sold in markets and served in restaurants without FDA warnings contain mercury at levels that, based on the EPA's reference dose, would strongly suggest people limit their consumption.[14] These consumption limitations do not even take into consideration the fact that more than half of all women weigh less than what EPA assumes the average person does. For these women, eating the same amount of fish results in higher mercury exposure. This is particularly disturbing for pregnant women attempting to avoid fetal mercury exposure.

Similarly, a recent independent analysis found that consuming between one six ounce fish meal (approximately one can of tuna) per pregnancy and one six ounce meal per month during pregnancy of 10 species of fresh and saltwater fish presented an unacceptable risk of dangerous levels of mercury exposure. The study found that following the FDA's recommended limits of 12 ounces (approximately 2 cans of tuna) per week could expose more than one quarter of all pregnancies, or approximately one million newborns, to a potentially harmful dose of mercury.[15]

Mercury Contamination in Fish Can Cause Serious Health Problems

The mercury contaminating the fish we eat or catch is a highly toxic chemical that can cause severe neurological and developmental problems to those exposed.[f] The primary route of exposure at lower levels is through contaminated food.[16]

Children and infants are at higher risk of mercury poisoning because their nervous systems continue to develop until about age 14.[17] Mercury's effects on the central nervous system are comparable to those of lead.[18] Health effects linked to prenatal mercury exposure include: [19, 20]

- attention and language deficits
- impaired memory
- inability to process and recall information
- impaired visual and motor function

A Centers for Disease Control and Prevention (CDC) report in January 2003 found that 1 in 12 women of childbearing age has mercury levels above EPA's safe health threshold.[21] Nationally, this translates into nearly 4.9 million women of childbearing age with elevated levels of mercury from eating contaminated fish. This results in approximately 322,000 newborns starting life each year with increased risk of neurological impairment from exposure *in utero*.[22]

[f] At acute, high levels, such as through occupational exposure, mercury may result in other problems such as central nervous system damage, kidney damage and failure, cardiovascular collapse, shock, and even death.

Table A. Average Mercury Concentrations in Popular Freshwater Fish

PPM	Fish species
.0005-**8.94**	Largemouth Bass
.005-**3.34**	Small Mouth Bass
.005-**2.14**	Yellow Perch
.014-**2.81**	Eastern Chain Pickerel
.005-**2**	Lake Trout
.005-**16**	Walleye
.005-**4.4**	Northern Pike

Note: This table represents the range of average mercury concentrations measured in 43 states. Mercury levels that trigger mercury advisories vary from state to state.

Source: EPA, 2001

Table B. Sampling of Commercially-Sold Fish Without FDA Advisories and Hypothetical Recommended Consumption Limits (for average male)

Fish Species	(PPM)	Average (PPM)	Hypothetical Recommended Fish Meals Per Month°
Grouper (Mycteroperca)	0.05-1.35	0.43	No more than two
Tuna (fresh or frozen)	ND-1.30	0.32	No more than three
*Lobster Northern (American)	0.05-1.31	0.31	No more than three
Grouper (Epinephelus)	0.19-0.33	0.27	No more than three
*Halibut	0.02-0.63	0.23	No more than four
*Sablefish	ND-0.70	0.22	No more than four
*Pollock	ND-0.78	0.20	No more than four
*Tuna (canned)	ND-0.75	0.17	No more than five
*Crab Blue	0.02-0.50	0.17	No more than five
*Crab Dungeness	0.02-0.48	0.18	No more than five

°Based on EPA reference dose. See footnote b for formula. Assumed average fish-meal size is eight ounces (one can of tuna is 6 ounces), average human weight is 70 kg, and a month is 30.44 days.
* Indicates popularly consumed fish

Source: FDA, 2001

Report Findings: A Growing Number of Waterways Under Advisory

Currently, 43 states[g] have issued advisories for mercury-contaminated fish, warning the general population or sensitive subpopulations to reduce or avoid consumption. This demonstrates nearly a 60% increase over the 27 states with active advisories in 1993.

Based on our analysis of active advisories in 2002, this translates into 2,148 mercury advisories in effect for at least:

- 12,111,733 acres of lakes (including statewide advisories), or almost 30% of all lake acres;
- 453,101 miles of river (including statewide advisories), or almost 13% of all river miles;
- 15,639 miles of coastal areas (not including statewide advisories);
- 2,333 miles of our Great Lake coasts and tributaries; and
- 166,534 acres of bayou.

See Table E for a state-by-state breakdown of river miles and lake acres under mercury advisory. Refer to Appendix E for a detailed breakdown of advisories by state.

Statewide Advisories

Nineteen (19) states, Connecticut, Florida, Illinois, Indiana, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, North Dakota, New Hampshire, New Jersey, Ohio, Pennsylvania, Rhode Island, Vermont, and Wisconsin, have issued statewide advisories for all of their inland freshwater lakes and/or rivers for at least one species of fish. Illinois, Florida, and Rhode Island have added, and North Carolina has rescinded, statewide advisories for inland waterways in the last year.

[g] We dropped Utah from the count of states with mercury advisories because of data irregularities.

Eleven (11) states, Alabama, Florida, Georgia, Louisiana, Maine, Massachusetts, Mississippi, North Carolina, Rhode Island, South Carolina,

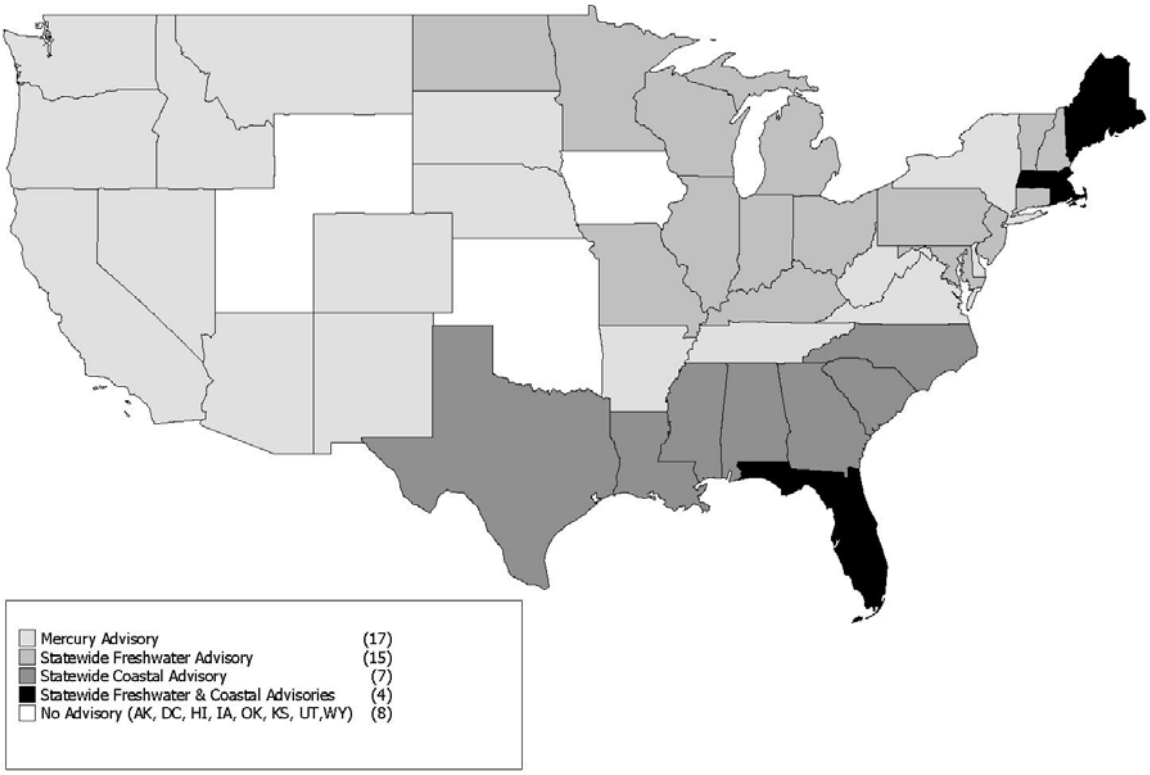
Table C. States with Most River Miles Under Mercury Advisory

State	Total River Miles Under Advisory
KY	89,431
PA	53,962
FL	51,858
MO	51,015
IN	35,673
IL	32,190
ME	31,672
OH	29,113
MD	17,000
ND	11,868

Table D. States with Most Lake Acres Under Mercury Advisory

State	Total Lake Acres Under Advisory
MN	3,290,101
FL	2,085,120
ME	986,776
WI	982,163
MI	887,019
MT	638,440
ND	632,016
TX	329,784
IL	309,340
MO	288,315

Fish Consumption Advisories for Mercury



and Texas, also have issued statewide advisories for their entire coastal areas for at least one species of fish, with Rhode Island being the most recent state to issue such advisories. See Appendix A for a list of all statewide mercury advisories active in 2002.

Breadth of Advisories on the Rise

States have issued mercury advisories covering a greater area than ever before. Since 2001, the number of river miles under advisory for mercury has increased by 9% (up from 414,973 in 2001), and the number of lake acres under advisory for mercury has increased by 19% (up from 10,179,247 in 2001).

While the increase in the breadth and number of advisories does not necessarily indicate an increase in mercury levels, the upward trend in the number of advisories and advisory miles and acres illustrates how, generally, mercury contamination is a widespread problem in our nation's waterways.

Safe Eating Guidelines

States are now also increasingly issuing "no restriction" advisories, or "Safe Eating Guidelines." These are issued when states have tested fish and are letting people know that some fish species, or size of species, are safe to eat for some or all segments of the population. There are now Safe Eating Guidelines covering more than four million acres of lakes. Most of this is due to Minnesota's issuance of a Safe Eating Guideline advisory statewide for all panfish for the general population.[h] This is good news for people's health and recreational fishing, as it indicates that there are certain waterbodies in which states have found that certain fish are safe for the general population.

[h] For the most part, "no restriction" advisories coexist with active advisories, as each applies to different populations, certain species, and/or species of varying sizes. For example, Minnesota has a fish consumption advisory in place for sensitive subpopulations for walleye 15-25 inches in size caught in Albert Lea Lake; the state issued a "no restriction" advisory for the same lake for walleye 5-15 inches in size.

Table E. State-by-State Mercury Advisory Totals and Money Spent in State on Recreational Fishing

State	# of Mercury Advisories	Total Lake Acres Under Advisory	Total River Miles Under Advisory	Total Statewide Lake Acres Under Advisory	Total Statewide River Miles Under Advisory	Total Dollars Spent on Recreational Fishing in State
AL	11	6	126			$723,467,000
AR	20	3,659	260			$445,778,000
AZ	5	140				$336,293,000
CA	13	64,024	40			$2,029,581,000
CO	8	17,258				$645,891,000
CT	11	Statewide	Statewide	64,973	5,830	$224,139,000
DE	5	81				$69,956,000
FL	65	Statewide	Statewide	2,085,120	51,858	$4,083,409,000
GA	122	25,866	2,209			$543,504,000
ID	4	17,983	Unknown			$310,872,000
IL	4	Statewide	Statewide	309,340	32,190	$598,376,000
IN	155	47,806	Statewide		35,673	$518,863,000
KY	2	Statewide	Statewide	228,385	89,431	$544,660,000
LA	29	19,166	471			$703,373,000
MA	99	Statewide	Statewide	151,173	8,229	$464,991,000
MD	2	Statewide	Statewide	77,965	17,000	$480,185,000
ME	4	Statewide	Statewide	986,776	31,672	$250,939,000
MI	85	Statewide	508	887,019		$838,558,000
MN	984	Statewide	4,143	3,290,101		$1,284,522,000
MO	1	Statewide	Statewide	288,315	51,015	$745,514,000
MS	11	15,371	228			$210,697,000
MT	25	638,440	34			$292,050,000
NC	2					$1,118,028,000
ND	1	Statewide	Statewide	632,016	11,868	$159,023,000
NE	17	3,349	62			$146,359,000
NH	7	Statewide	Statewide	163,012	10,881	$164,634,000
NJ	86	Statewide	Statewide	24,000	6,450	$699,826,000
NM	26	29,519	93			$176,476,000
NV	2	23	549			$216,721,000
NY	32	59,228	Unknown			$1,073,019,000
OH	35	Statewide	Statewide	188,461	29,113	$761,619,000
OR	12	16,058	460			$601,780,000
PA	76	Statewide	Statewide	161,445	53,962	$580,351,000
RI	7	Statewide	Statewide	17,328	1,106	$105,649,000
SC	62	45,804	1,683			$558,731,000
SD	2	10,000				$182,480,000
TN	2		6			$480,221,000
TX	13	329,784	2			$1,950,902,000
VA	3		183			$517,802,000
VT	9	Statewide	Statewide	228,383	5,264	$92,536,000
WA	3	2,193				$853,761,000
WI	85	Statewide	192	982,163		$1,005,149,000
WV	1		310			$102,281,000

Total Advisories	2,148
Total Lake Acres (Including Statewide Advisories)	12,111,733 (30%)
Total River Miles (Including Statewide Advisories)	453,101 (13%)
Total Dollars Spent on Recreational Fishing in States with Mercury Advisories	$27,892,966,000

Mercury Contamination Threatens the Recreational Fishing Industry

Mercury contamination is a threat to recreational fishing—a vital piece of our national and state economies. Recreational fishing is a multi-billion dollar industry. In 2001, the most recent year for which the data is available, approximately 34.1 million Americans took a total of 437 million fishing trips and spent 557 million days fishing. In 2001, recreational fishing in America:

- Generated more than $35.6 billion in spending on food, lodging, and transportation for fishing trips; fishing and auxiliary equipment; and other items; [23]
- Generated more than $116 billion in total economic output; [24]
- Supported more than one million jobs;[25]
- Created more than $30.1 billion in household income (salaries and wages);[26]
- Added more than $1.9 billion in sales tax revenues;[27]
- Added more than $470 million in state income tax revenues;[28] and
- Generated $4.88 billion in federal income tax revenues.[29]

Studies indicate that due to existing fish consumption advisories, 37% of those polled in one area took fewer fishing trips,[30] 30% in another area fished for fewer days,[31] and between 26%[32] and 31%[33] changed fishing sites in these two areas. Another study indicates that 36% of the people would change their fishing site if it contained a fish consumption advisory.[34] Thus, as mercury pollution increases, detrimental impacts to our national and state economies can be anticipated.

Even a small dent in the recreational industry could mean large economic losses. Of all the money spent on fishing, more than $27.8 billion was spent in states that have issued fish consumption advisories due to mercury. Two of the ten states with the largest number of river miles under advisory, Florida and Ohio, are also in the top ten for spending on fishing (Table F). Five of the top ten states with the most lake acres (including statewide) under mercury advisory, Minnesota, Florida, Michigan, Texas, and Wisconsin, are also in the top ten for money spent towards recreational fishing.[35] In fact, nine of the 19 states with statewide mercury advisories covering all of their inland lakes or rivers, Florida, Illinois, Michigan, Minnesota, Missouri, New Jersey, Ohio, Pennsylvania, and Wisconsin, also fall in the top twenty states for expenditures on recreational fishing.

Table F. 20 States Receiving Most Economic Value from Recreational Fishing

State	Money Spent on Recreational Fishing
FL	$4,083,409,000
CA	$2,029,581,000
TX	$1,950,902,000
MN	$1,284,522,000
NC	$1,118,028,000
NY	$1,073,019,000
WI	$1,005,149,000
WA	$853,761,000
MI	$838,558,000
OH	$761,619,000
MO	$745,514,000
AL	$723,467,000
LA	$703,373,000
NJ	$699,826,000
CO	$645,891,000
OR	$601,780,000
IL	$598,376,000
AK	$537,355,000
PA	$580,351,000
SC	$558,731,000

See Appendix B for a complete listing of states and total spending on recreational fishing.

Addressing the Problem at the Source

Sources of Mercury Pollution

Mercury that endangers our health and jeopardizes recreational fishing comes from a number of sources. As an element of the earth's crust, it is emitted by natural sources such as volcanoes and forest fires. It also is released from manmade activities such as the combustion of fossil fuels and mercury-containing wastes, manufacturing, and the roasting and smelting of ore. Because mercury never degrades, the amount of mercury in the environment comes from the combination of past and current mercury disposal and emissions.

EPA estimates that roughly 60% of the total mercury deposited in the U.S. comes from U.S. anthropogenic air emission sources.[36] Power plants account for approximately 30% of all U.S. anthropogenic emissions.[37] Coal-fired power plants account for most of the mercury emissions from the utility sector, releasing approximately 43 tons of mercury emissions in 1999.[38] Table G shows the ten states with the highest mercury emissions from coal-fired power plants.[39] Table H shows the ten power plants in the country with the highest mercury emissions.[40] See Appendix C for total mercury emissions for every state. See Appendix D for emissions by power plants within each state.

Table G. States with the Most Mercury Emissions from Power Plants (1999)

State	Tons	Pounds
Texas	5.023	10,045
Pennsylvania	4.979	9,959
Ohio	3.555	7,109
Illinois	2.995	5,989
West Virginia	2.466	4,932
Alabama	2.4657	4,931
Indiana	2.442	4,884
Kentucky	1.74	3,480
Michigan	1.541	3,083
North Carolina	1.538	3,076

Source: EPA. Analysis by U.S. PIRG.

Power Plant Emission Reductions – Achievable Today

Dramatic progress on controlling mercury from power plants can be made using existing technologies. In 1999, EPA presented documents showing that an overall emission reduction of 90% is not only feasible, but could be the likely outcome of the regulatory process.[41] This was confirmed by the Department of Energy and the coal industry itself in its "Clean Coal Technology Roadmap," which described a 90% reduction capability for a typical coal plant in use today.[42]

Nearly a dozen full-scale power plants are testing mercury-specific control technologies for coal-burning power plants. While many of the projects are still in their infancy, a few have completed tests that demonstrate that effective mercury control is possible at all plants regardless of the coal burned.

Table H. Power Plants with the Highest Mercury Emissions

Plant	State	Tons	Pounds
Monticello	TX	1.0487	2,097
Homer City	PA	0.926	1,852
Keystone	PA	0.9257	1,851
Miller	AL	0.7945	1,589
Martin Lake	TX	0.6828	1,366
Montour	PA	0.6093	1,219
Scherer	GA	0.6016	1,203
Powerton	IL	0.5636	1,127
Four Corners	NM	0.5258	1,052
San Juan	NM	0.5208	1,042

Source: EPA. Analysis and conversion into pounds by U.S. PIRG.

Not only is controlling mercury feasible, but the costs are relatively low. In a 1997 report to Congress, EPA estimated that a 90% reduction target would cost coal-fired power plants a total of $5 billion annually. Two years later, in its multi-pollutant benefit report, the estimate for a 70-90% reduction was revised downward to $2.7 billion. Now it is estimated that costs could be as low as $360 million for specific mercury control options.[43] This amounts to a fraction of the $250 billion-plus the utility industry generates in revenue each year.

Cutting Mercury Emissions from Coal-Burning Power Plants: It's Time for EPA to Act

After years of delay, the Environmental Protection Agency could act as early as this year to deliver 90% reductions in mercury pollution from power plants through stringent implementation of the existing Clean Air Act.

The electric and coal industries have been wildly successful in avoiding mercury regulations. The 1990 Clean Air Act amendments required EPA to conduct additional studies on mercury pollution from power plants before regulating mercury emissions.

EPA has completed two major reports for Congress. The first report, released in 1997, found that between 1% and 3% of women of childbearing age eat sufficient amounts of fish to be at risk from mercury exposure.[44] This number has been revised upward in subsequent studies.[45] In 1998, a second report established a plausible link between coal-fired power-plant mercury emissions and the mercury found in soil, water, air, and fish.[46]

The electric and coal industries have consistently argued that more scientific research is needed before reductions should be required. To counter the growing pressure to regulate the industry, utilities have argued that there are still uncertainties about the toxicological effects of mercury. In 1998, due to heavy industry pressure, Congress inserted language into the EPA appropriations bill directing the Agency to postpone regulation until another study was conducted on the health impacts of mercury.

The result was a 2000 report completed by the National Research Council that verified previous EPA findings on the toxicological impacts of mercury. These reports prompted a 2000 EPA announcement that mercury regulation was warranted.

Since that time, EPA has been meeting with state, industry, and environmental community stakeholders, who have been providing input to EPA as it drafts regulations. According to the Clean Air Act, the agency must issue "maximum achievable control technology" (MACT) standards for each coal-fired power plant, with compliance due by the end of 2007. This means that the standard must be set at a level being achieved by the best-controlled sources. Given the acknowledged availability of technologies that can achieve a 90% reduction, the legal standard should be set at that level. This would result in nationwide emission levels of about five tons per year, while ensuring that every coal-burning power plant in every community would meet stringent emission limits.

The Bush Administration's Air Pollution Plan Promises Higher Mercury Emissions

Unfortunately, the Bush administration's air pollution plan would eliminate the current regulatory system. The administration's so-called "Clear Skies" plan proposes a radical new regime for mercury control, one that will result in less progress and more contamination for a much longer time.

Instead of plant-by-plant controls at levels achievable with the most aggressive control technology, the Bush administration proposes to cap mercury at 26 tons in 2010 and 15 tons in 2018. This is three times the power-plant mercury pollution that would be allowed under implementation of current law and is a delay of ten years from the current law's mandated timeline. In the end, the Bush plan will allow 264 more tons of mercury emissions by 2018 than would the current regulatory approach. See Table I.

Another important difference between the

Table I. Increase in Mercury Emissions in Bush Administration Plan over Current Clean Air Programs

Existing Clean Air Act ***(with 90% reductions)***[47]	5 tons per year by 2008[48]
Bush Administration Air Pollution Plan	2010-2018 21 tons/yr more mercury
Increase allowed by Bush Plan over Clean Air Act programs	After 2018 10 tons/yr more mercury
% Increase allowed by Bush Plan over existing Clean Air Act programs.	2010-2018 520% as much mercury After 2018 300% as much mercury
Delay allowed by Bush Plan over existing Clean Air Act programs	Up to 10 year delay

current law and the Bush proposal is that the administration would allow emissions trading for mercury, an unprecedented move since there has never before been a trading program for a pollutant that is a persistent bioaccumulative toxin. An emissions-trading approach could result in the development of toxic hot spots in communities where power plant owners purchase credits rather than reduce emissions.

In defending its proposal, EPA disavows its earlier statements on what is likely to occur under the Clean Air Act.[49] Essentially, EPA justifies weakening the law by arguing that it does not intend to faithfully implement the current law.

Conclusion and Recommendations

Once mercury is in the food supply, it puts all of our health at risk, but especially sensitive subpopulations such as children, pregnant women, and those who consume large amounts of fish—such as recreational anglers. The increasing number and breadth of mercury advisories indicates the vast extent of the mercury contamination problem. In addition to compromising public health, this pollution is a threat to recreational fishing—a vital piece of our national and state economies.

Efforts to strengthen, not weaken, mercury protections—especially from mercury's largest unregulated source, power plants—are needed. These efforts will ensure that all Americans, including recreational fishers, are protected form mercury:

1) U.S. EPA should faithfully implement the Clean Air Act to reduce mercury emissions from power plants by at least 90% from existing levels; and

2) The Bush administration should abandon its so-called "Clear Skies" proposal.

Methodology

This section details the methodology used to derive this report's data on fish advisories for mercury contamination, contained primarily in Table E and Appendix E. This data details the number of states that have issued mercury advisories, the number of advisories per state, and the number of acres or miles of a particular type of waterbody that are under advisory per state. While the EPA does the same analysis for advisories and areas under advisory, nationwide, the agency does not do a similar calculation by state. The data in this report does not necessarily mirror similar data calculations by the states, which may use different data and methodologies. This data is intended to be a general reference for the extent of mercury contamination and should not be relied upon for advice for fish consumption. People should consult EPA and their state department of health to determine how much fish, if any, can be safely consumed.

Data Source and Parameters: EPA provided us with data on active mercury fish consumption advisories for specific species in all waterbodies between December 31, 2001 and December 31, 2002. Excluded from the summary data in Table E and Appendix E, but provided by the EPA, are advisories issued by territories, such as American Samoa. In a separate data set, EPA provided data on active "no restriction" advisories and statewide advisories.

Geographic Area of Waterbodies Under Fish Consumption Advisory by State: This report follows EPA in using the geographic area for each mercury advisory as a proxy for extent of mercury contamination. To determine the number of miles/acres/square miles under advisory for each type of waterbody in each state, we grouped the data by state and water body type, as classified by EPA, and totaled the area covered by a fish consumption advisory for each waterbody type. Often, a fish consumption advisory for a specific waterbody may contain consumption advice for different fish species of varying sizes. To avoid double counting the acreage or mileage of a waterbody under advisory, we only included a specific waterbody once in our calculations, regardless of the number of species or variations under advisory for that particular waterbody.

Number of EPA Advisories by State: EPA counts the number of advisories per state by counting the number of waterbodies, or in some cases waterbody types (e.g. all lakes), that have advisories that apply to them. We obtained EPA's counts by submitting a query at EPA's website for the "National Listing of Fish and Wildlife Advisories," accessed at http://map1.epa.gov/scripts/.esrimap?name=Listing&Cmd=Map. While EPA continues to calculate this number, it no longer uses it as the primary measure of the geographic extent of mercury contamination. This is because a water-body specific advisory can be issued to cover a single water body and an entire type of water body (e.g. all lakes). Thus, an "advisory" can represent grossly different geographic areas and should not be used as a proxy for extent of contamination.

Statewide Advisories: Statewide advisories are issued for specific water body types (e.g. all lakes) or apply to the entire state for specific fish species and species for specific sizes. For states with lakes and/or rivers under statewide advisory, EPA provided us with data for each state's total lake acres and/or river miles under advisory.

Data Gaps and Limitations. There are several important gaps in the data EPA provided.

- For a number of advisories, states failed to include data on the acreage or number of miles of a water body under advisory. Thus, assuming that EPA's data is accurate, the calculation for geographic area under advisory by state is an underestimate of the true geographic area under advisory.

- Some of the EPA data for advisories is missing units (e.g. acres or miles). For purposes of the summary data in this report, we assumed that if a state listed its other advisories for a specific water body type (e.g. lakes) using specific units (e.g. acres), that the state used the same unit for that type of water body

across the state.

- We chose to eliminate the results for Utah due to data irregularities.

Comparing states. The major limitation for any proxy for mercury-contamination extent based on mercury consumption advisories is that there is no uniform testing across states for mercury contamination or uniform standards for issuing advisories. Some states are far more precautionary than others for the standard they use for fish contamination, the amount of monitoring of fish within water bodies, and the amount of testing done before a fish advisory is issued. Due to this limitation, comparisons between states of breadth of advisories should be avoided.

Appendix A. Active Statewide Fish Consumption Advisories for Mercury Pollution (2002)

State	Advisory	Advisory Extent	Advisory Type	Year Issued	Species	Species Size	Restriction/ Population Covered
AL	Statewide: Gulf Of Mexico Coastal And Estuarine Waters	Statewide	Coastal	1996	mackerel-king	< 39"	Restricted Consumption - General pop.
AL	Statewide: Gulf Of Mexico Coastal And Estuarine Waters	Statewide	Coastal	1996	mackerel-king	> 39"	No Consumption - General pop.
CT	Statewide: All Rivers And Lakes	Statewide: All freshwater rivers and lakes	Statewide	1996	all fish except trout		Restricted Consumption - General pop.
CT	Statewide: All Rivers And Lakes	Statewide: All freshwater rivers and lakes	Statewide	1996	all fish except trout		Restricted Consumption - Subpop.(s)
CT	Statewide: All Rivers And Lakes	Statewide: All freshwater rivers and lakes	Statewide	1996	trout	> 15"	Restricted Consumption - Subpop.(s)
FL	Statewide: All Coastal Waters	Statewide	Coastal	1993	amberjack-greater		Restricted Consumption - General pop.
FL	Statewide: All Coastal Waters	Statewide	Coastal	1993	bluefish		Restricted Consumption - General pop.
FL	Statewide: All Coastal Waters	Statewide	Coastal	1993	cobia		Restricted Consumption - General pop.
FL	Statewide: All Coastal Waters	Statewide	Coastal	1993	jack-crevalle		Restricted Consumption - General pop.
FL	Statewide: All Coastal Waters	Statewide	Coastal	1993	mackerel-king	> 39"	No Consumption - General pop.
FL	Statewide: All Coastal Waters	Statewide	Coastal	1993	mackerel-king	33-39"	Restricted Consumption - General pop.
FL	Statewide: All Coastal Waters	Statewide	Coastal	1993	sea trout-spotted	> 20"	Restricted Consumption - General pop.
FL	Statewide: All Coastal Waters	Statewide	Coastal	1993	shark	< 43"	Restricted Consumption - General pop.
FL	Statewide: All Coastal Waters	Statewide	Coastal	1993	shark	< 43"	Restricted Consumption - Subpop.(s)
FL	Statewide: All Coastal Waters	Statewide	Coastal	1993	shark	> 43"	No Consumption - General pop.
FL	Statewide: All Coastal Waters	Statewide	Coastal	1993	tunny-little		Restricted Consumption - General pop.
FL	Statewide: All Fresh Waters	Statewide	Statewide	2002	bass-largemouth		Restricted Consumption - Subpop.(s)
FL	Statewide: All Fresh Waters	Statewide	Statewide	2002	bass-largemouth		Restricted Consumption - General pop.
FL	Statewide: All Fresh Waters	Statewide	Statewide	2002	bowfin		Restricted Consumption - Subpop.(s)
FL	Statewide: All Fresh Waters	Statewide	Statewide	2002	bowfin		Restricted Consumption - General pop.

State	Advisory	Advisory Extent	Advisory Type	Year Issued	Species	Species Size	Restriction/ Population Covered
FL	Statewide: All Fresh Waters	Statewide	Statewide	2002	gar		Restricted Consumption - General pop.
FL	Statewide: All Fresh Waters	Statewide	Statewide	2002	gar		Restricted Consumption - Subpop.(s)
GA	Statewide: All Coastal And Estuarine Waters	Statewide	Coastal	2000	mackerel-king	> 39"	No Consumption - General pop.
GA	Statewide: All Coastal And Estuarine Waters	Statewide	Coastal	2000	mackerel-king	33-39"	Restricted Consumption - Subpop.(s)
GA	Statewide: All Coastal And Estuarine Waters	Statewide	Coastal	2000	mackerel-king	33-39"	Restricted Consumption - General pop.
IL	Statewide	Statewide: All rivers and lakes	Statewide	2002	all fish		Restricted Consumption - Subpop.(s)
IN	Statewide: All Rivers	Statewide: All freshwater rivers and streams	Statewide	1996	carp-common	> 15"	No Consumption - Subpop.(s)
IN	Statewide: All Rivers	Statewide: All freshwater rivers and streams	Statewide	1996	carp-common	> 25"	No Consumption - General pop.
IN	Statewide: All Rivers	Statewide: All freshwater rivers and streams	Statewide	1996	carp-common	15-25"	Restricted Consumption - General pop.
KY	Statewide: All Rivers And Lakes	Statewide	Statewide	2000	all fish		Restricted Consumption - Subpop.(s)
LA	Gulf of Mexico	Statewide: Gulf of Mexico waters off all coastal parishes.	Coastal	1997	mackerel-king	< or = 39"	Restricted Consumption - Subpop.(s)
LA	Gulf of Mexico	Statewide: Gulf of Mexico waters off all coastal parishes.	Coastal	1997	mackerel-king	< or = 39"	Restricted Consumption - General pop.
LA	Gulf of Mexico	Statewide: Gulf of Mexico waters off all coastal parishes.	Coastal	1997	mackerel-king	> 39"	No Consumption - General pop.
LA	Gulf of Mexico	Statewide: Gulf of Mexico waters off all coastal parishes.	Coastal	1997	mackerel-king	>39"	No Consumption - Subpop.(s)
MA	Statewide: All Coastal And Estuarine Waters	Statewide	Coastal	1994	mackerel-king		No Consumption - Subpop.(s)
MA	Statewide: All Coastal And Estuarine Waters	Statewide	Coastal	1994	shark		No Consumption - Subpop.(s)
MA	Statewide: All Coastal And Estuarine Waters	Statewide	Coastal	1994	swordfish		No Consumption - Subpop.(s)
MA	Statewide: All Coastal And Estuarine Waters	Statewide	Coastal	1994	tilefish		No Consumption - Subpop.(s)
MA	Statewide: All Coastal And Estuarine Waters	Statewide	Coastal	1994	tuna		No Consumption - Subpop.(s)
MA	Statewide: All Rivers And Lakes	Statewide	Statewide	1996	all fish		No Consumption - Subpop.(s)
MD	Statewide: Lakes and Impoundments	Statewide: All lakes and impoundments that are publicly accessible. Refer to state advisory for some exceptions.	Statewide	2001	bass-largemouth		Restricted Consumption - General pop.
MD	Statewide: Lakes and Impoundments	same as above	Statewide	2001	bass-smallmouth		Restricted Consumption - General pop.

State	Advisory	Advisory Extent	Advisory Type	Year Issued	Species	Species Size	Restriction/ Population Covered
MD	Statewide: Lakes and Impoundments	same as above	Statewide	2001	sunfish-bluegill		Restricted Consumption - General pop.
MD	Statewide: Rivers and Streams	Statewide: All rivers and streams	Statewide	2001	bass-largemouth		Restricted Consumption - General pop.
MD	Statewide: Rivers and Streams	Statewide: All rivers and streams	Statewide	2001	bass-smallmouth		Restricted Consumption - General pop.
ME	All waters	Statewide: All fresh waters, lakes, ponds, rivers, and streams.	Statewide	1994	all other fish		Restricted Consumption - General pop.
ME	All waters	Statewide: All fresh waters, lakes, ponds, rivers, and streams.	Statewide	1994	all other fish		No Consumption - Subpop.(s)
ME	All waters	Statewide: All fresh waters, lakes, ponds, rivers, and streams.	Statewide	1994	salmon-Atlantic-landlocked		Restricted Consumption - General pop.
ME	All waters	Statewide: All fresh waters, lakes, ponds, rivers, and streams.	Statewide	1994	salmon-Atlantic-landlocked		Restricted Consumption - Subpop.(s)
ME	All waters	Statewide: All fresh waters, lakes, ponds, rivers, and streams.	Statewide	1994	trout-brook		Restricted Consumption - General pop.
ME	All waters	Statewide: All fresh waters, lakes, ponds, rivers, and streams.	Statewide	1994	trout-brook		Restricted Consumption - Subpop.(s)
ME	Statewide: All Coastal And Estuarine Waters	Statewide	Coastal	1994	bass-striped		Restricted Consumption - Subpop.(s)
ME	Statewide: All Coastal And Estuarine Waters	Statewide	Coastal	1994	bass-striped		Restricted Consumption - General pop.
ME	Statewide: All Coastal And Estuarine Waters	Statewide	Coastal	1994	bluefish		Restricted Consumption - General pop.
ME	Tribal Statewide - coastal waters	Tribal Statewide - coastal waters	Statewide	2002	all other fish		Restricted Consumption - General pop.
ME	Tribal Statewide - coastal waters	Tribal Statewide - coastal waters	Statewide	2002	shellfish-lobster-american (hepatopancreas/tomalley)		No Consumption - General pop.
ME	Tribal Statewide - freshwater	Tribal Statewide - freshwaters	Statewide	2002	all freshwater fish		Restricted Consumption - General pop.
ME	Tribal Statewide - freshwater	Tribal Statewide - freshwaters	Statewide	2002	all other fish		No Consumption - Subpop.(s)
ME	Tribal Statewide - freshwater	Tribal Statewide - freshwaters	Statewide	2002	salmon-Atlantic-landlocked		Restricted Consumption - Subpop.(s)
ME	Tribal Statewide - freshwater	Tribal Statewide - freshwaters	Statewide	2002	trout-brook		Restricted Consumption - Subpop.(s)
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	bass-largemouth		Restricted Consumption - General pop.
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	bass-largemouth		Restricted Consumption - Subpop.(s)
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	bass-rock	> 9"	Restricted Consumption - Subpop.(s)
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	bass-rock	> 9"	Restricted Consumption - General pop.
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	bass-smallmouth		Restricted Consumption - General pop.

State	Advisory	Advisory Extent	Advisory Type	Year Issued	Species	Species Size	Restriction/ Population Covered
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	bass-smallmouth		Restricted Consumption - Subpop.(s)
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	crappie-black	> 9"	Restricted Consumption - Subpop.(s)
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	crappie-black	> 9"	Restricted Consumption - General pop.
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	crappie-white	> 9"	Restricted Consumption - General pop.
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	crappie-white	> 9"	Restricted Consumption - Subpop.(s)
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	muskellunge		Restricted Consumption - General pop.
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	muskellunge		Restricted Consumption - Subpop.(s)
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	perch-yellow	> 9"	Restricted Consumption - General pop.
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	perch-yellow	> 9"	Restricted Consumption - Subpop.(s)
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	pike-northern		Restricted Consumption - General pop.
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	pike-northern		Restricted Consumption - Subpop.(s)
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	walleye		Restricted Consumption - General pop.
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	walleye		Restricted Consumption - Subpop.(s)
MN	Statewide: All Lakes (Unmonitored)	Statewide	Statewide	1999	all other fish		Restricted Consumption - General pop.
MN	Statewide: All Lakes (Unmonitored)	Statewide	Statewide	1999	all other fish	< 20"	Restricted Consumption - Subpop.(s)
MN	Statewide: All Lakes (Unmonitored)	Statewide	Statewide	1999	all other fish	> 20"	No Consumption - Subpop.(s)
MN	Statewide: All Lakes (Unmonitored)	Statewide	Statewide	1999	all panfish		Restricted Consumption - Subpop.(s)
MO	Statewide	Statewide: All waters	Statewide	2001	bass-largemouth	> 12"	No Consumption - Subpop.(s)
MS	Statewide: Gulf Of Mexico Coastal And Estuarine Waters	Statewide	Coastal	1998	mackerel-king	> 39"	No Consumption - General pop.
MS	Statewide: Gulf Of Mexico Coastal And Estuarine Waters	Statewide	Coastal	1998	mackerel-king	33-39"	Restricted Consumption - General pop.
NC	Statewide: All Coastal And Estuarine Waters	Statewide: Atlantic Ocean	Coastal	2000	mackerel-king	All sizes	No Consumption - Subpop.(s)
NC	Statewide: All Coastal And Estuarine Waters	Statewide: Atlantic Ocean	Coastal	2000	mackerel-king	All sizes	Restricted Consumption - General pop.

State	Advisory	Advisory Extent	Advisory Type	Year Issued	Species	Species Size	Restriction/ Population Covered
NC	Statewide: All Coastal And Estuarine Waters	Statewide: Atlantic Ocean	Coastal	2000	shark		Restricted Consumption - General pop.
NC	Statewide: All Coastal And Estuarine Waters	Statewide: Atlantic Ocean	Coastal	2000	shark		No Consumption - Subpop.(s)
ND	Statewide: All lakes and rivers	Statewide: All lakes and rivers. Please see state website for more specific information on meal frequency recommendations for specific populations.	Statewide	2001	bass-largemouth	< 16 in	Restricted Consumption - General pop.
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	bass-largemouth	<16 in	Restricted Consumption - Subpop.(s)
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	bass-largemouth	>16 in	No Consumption - Subpop.(s)
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	bass-largemouth	>16 in	Restricted Consumption - General pop.
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	bass-smallmouth	< 16 in	Restricted Consumption - General pop.
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	bass-smallmouth	<16 in	Restricted Consumption - Subpop.(s)
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	bass-smallmouth	>16 in	Restricted Consumption - General pop.
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	bass-smallmouth	>16 in	No Consumption - Subpop.(s)
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	bass-white	<12 in	Restricted Consumption - Subpop.(s)
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	bass-white	<12 in	Restricted Consumption - General pop.
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	bass-white	>12 in	Restricted Consumption - General pop.
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	bass-white	>12 in	No Consumption - Subpop.(s)
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	catfish-channel	<22 in	Restricted Consumption - Subpop.(s)
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	catfish-channel	<22 in	Restricted Consumption - General pop.
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	catfish-channel	>22 in	Restricted Consumption - Subpop.(s)
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	catfish-channel	>22 in	Restricted Consumption - General pop.
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	perch-yellow	<11 in	Restricted Consumption - Subpop.(s)
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	perch-yellow	<11 in	Restricted Consumption - General pop.
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	perch-yellow	>11 in	Restricted Consumption - Subpop.(s)

State	Advisory	Advisory Extent	Advisory Type	Year Issued	Species	Species Size	Restriction/ Population Covered
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	perch-yellow	>11 in	Restricted Consumption - General pop.
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	pike-northern	<28 in	Restricted Consumption - General pop.
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	pike-northern	<28 in	Restricted Consumption - Subpop.(s)
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	pike-northern	>28 in	Restricted Consumption - General pop.
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	pike-northern	>28 in	Restricted Consumption - Subpop.(s)
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	salmon-chinook	<19 in	Restricted Consumption - Subpop.(s)
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	salmon-chinook	<19 in	Restricted Consumption - General pop.
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	salmon-chinook	>19 in	Restricted Consumption - General pop.
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	salmon-chinook	>19 in	Restricted Consumption - Subpop.(s)
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	walleye	<22 in	Restricted Consumption - Subpop.(s)
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	walleye	<22 in	Restricted Consumption - General pop.
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	walleye	>22 in	Restricted Consumption - General pop.
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	walleye	>22 in	Restricted Consumption - Subpop.(s)
NH	Statewide: All inland freshwaters	Statewide: Inland lakes and rivers. Revised September 2001.	Statewide	1995	all freshwater fish		Restricted Consumption - General pop.
NH	Statewide: All inland freshwaters	Statewide: Inland lakes and rivers. Revised September 2001.	Statewide	1995	all freshwater fish		Restricted Consumption - Subpop.(s)
NH	Statewide: All inland freshwaters	Statewide: Inland lakes and rivers. Revised September 2001.	Statewide	1995	bass	> 12"	No Consumption - General pop.
NH	Statewide: All inland freshwaters	Statewide: Inland lakes and rivers. Revised September 2001.	Statewide	1995	pickerel	> 12"	No Consumption - General pop.
NJ	Statewide: All Rivers And Lakes	Statewide: All freshwater bodies (lakes and river except those with specific advisories)	Statewide	1995	bass-largemouth		Restricted Consumption - Subpop.(s)
NJ	Statewide: All Rivers And Lakes	Statewide: All freshwater bodies (lakes and river except those with specific advisories)	Statewide	1995	bass-largemouth		Restricted Consumption - General pop.
NJ	Statewide: All Rivers And Lakes	Statewide: All freshwater bodies (lakes and river except those with specific advisories)	Statewide	1995	bass-smallmouth		Restricted Consumption - Subpop.(s)
NJ	Statewide: All Rivers And Lakes	Statewide: All freshwater bodies (lakes and river except those with specific advisories)	Statewide	1995	bass-smallmouth		Restricted Consumption - General pop.

State	Advisory	Advisory Extent	Advisory Type	Year Issued	Species	Species Size	Restriction/ Population Covered
NJ	Statewide: All Rivers And Lakes	Statewide: All freshwater bodies (lakes and river except those with specific advisories)	Statewide	1995	bullhead-brown		Restricted Consumption - Subpop.(s)
NJ	Statewide: All Rivers And Lakes	Statewide: All freshwater bodies (lakes and river except those with specific advisories)	Statewide	1995	bullhead-yellow		Restricted Consumption - Subpop.(s)
NJ	Statewide: All Rivers And Lakes	Statewide: All freshwater bodies (lakes and river except those with specific advisories)	Statewide	1995	pickerel-chain		Restricted Consumption - General pop.
NJ	Statewide: All Rivers And Lakes	Statewide: All freshwater bodies (lakes and river except those with specific advisories)	Statewide	1995	pickerel-chain		Restricted Consumption - Subpop.(s)
NJ	Statewide: All Rivers And Lakes	Statewide: All freshwater bodies (lakes and river except those with specific advisories)	Statewide	1995	sunfish		Restricted Consumption - Subpop.(s)
OH	Statewide: All Rivers And Lakes	Statewide	Statewide	1997	all fish		Restricted Consumption - Subpop.(s)
PA	Statewide: All freshwaters	Statewide: All freshwaters	Statewide	2001	all fish		Restricted Consumption - General pop.
RI	Statewide: All Coastal and Estuarine Waters	Statewide	Coastal	2002	bass-striped		No Consumption - Subpop.(s)
RI	Statewide: All Coastal and Estuarine Waters	Statewide	Coastal	2002	bluefish		No Consumption - Subpop.(s)
RI	Statewide: All Coastal and Estuarine Waters	Statewide	Coastal	2002	shark		No Consumption - Subpop.(s)
RI	Statewide: All Coastal and Estuarine Waters	Statewide	Coastal	1993	shark		No Consumption - Subpop.(s)
RI	Statewide: All Coastal and Estuarine Waters	Statewide	Coastal	2002	swordfish		No Consumption - Subpop.(s)
RI	Statewide: All Coastal and Estuarine Waters	Statewide	Coastal	2002	swordfish		No Consumption - Subpop.(s)
RI	Statewide: All Rivers and Lakes	Statewide	Statewide	2002	all fish		Restricted Consumption - General pop.
RI	Statewide: All Rivers and Lakes	Statewide	Statewide	2002	all fish		No Consumption - Subpop.(s)
SC	Statewide: All Coastal And Estuarine Waters	Statewide	Coastal	2000	mackerel-king	> 39"	No Consumption - General pop.
SC	Statewide: All Coastal And Estuarine Waters	Statewide	Coastal	2000	mackerel-king	>39in	No Consumption - Subpop.(s)
SC	Statewide: All Coastal And Estuarine Waters	Statewide	Coastal	2000	mackerel-king	33-39"	Restricted Consumption - Subpop.(s)
SC	Statewide: All Coastal And Estuarine Waters	Statewide	Coastal	2000	mackerel-king	33-39"	Restricted Consumption - General pop.

State	Advisory	Advisory Extent	Advisory Type	Year Issued	Species	Species Size	Restriction/ Population Covered
TX	Gulf Of Mexico	Statewide: All waters off the Texas coast (Jefferson, Chambers, Galveston, Brazoria, Matagorda, Calhoun, Refugio, Aransas, San Paticio, Nueces, Kleberg, Kenedy, Willacy, and Camerson counties).	Coastal	1997	mackerel-king	> 43"	No Consumption - General pop.
TX	Gulf Of Mexico	same as above	Coastal	1997	mackerel-king	37-43"	Restricted Consumption - Subpop.(s)
TX	Gulf Of Mexico	same as above	Coastal	1997	mackerel-king	37-43"	Restricted Consumption - General pop.
VT	Statewide: All Waters	Statewide	Statewide	1995	all fish except bullhead and sunfish-pumpkinseed		Restricted Consumption - Subpop.(s)
VT	Statewide: All Waters	Statewide	Statewide	1995	all fish except bullhead and sunfish-pumpkinseed		Restricted Consumption - General pop.
VT	Statewide: All Waters	Statewide	Statewide	1995	walleye		No Consumption - Subpop.(s)
WI	Statewide - All lakes	Statewide: All lakes	Statewide	2000	all fish		Restricted Consumption - Subpop.(s)
WI	Statewide - All lakes	Statewide: All lakes	Statewide	2000	all other fish		Restricted Consumption - General pop.

Appendix B. Money Spent on Recreational Fishing in Each State (2001)[50]

Rank	State	Money Spent on Recreational Fishing
1	FL	$4,083,409,000
2	CA	$2,029,581,000
3	TX	$1,950,902,000
4	MN	$1,284,522,000
5	NC	$1,118,028,000
6	NY	$1,073,019,000
7	WI	$1,005,149,000
8	WA	$853,761,000
9	MI	$838,558,000
10	OH	$761,619,000
11	MO	$745,514,000
12	AL	$723,467,000
13	LA	$703,373,000
14	NJ	$699,826,000
15	CO	$645,891,000
16	OR	$601,780,000
17	IL	$598,376,000
18	AK	$537,355,000
19	PA	$580,351,000
20	SC	$558,731,000
21	KY	$544,660,000
22	GA	$543,504,000
23	IN	$518,863,000
24	VA	$517,802,000
25	TN	$480,221,000

Rank	State	Money Spent on Recreational Fishing
26	MD	$480,185,000
27	OK	$476,019,000
28	MA	$464,991,000
29	AR	$445,778,000
30	UT	$392,617,000
31	IA	$335,878,000
32	AZ	$336,293,000
33	ID	$310,872,000
34	MT	$292,050,000
35	ME	$250,939,000
36	CT	$224,139,000
37	NV	$216,721,000
38	WY	$211,530,000
39	MS	$210,697,000
40	KS	$192,629,000
41	SD	$182,480,000
42	NM	$176,476,000
43	NH	$164,634,000
44	ND	$159,023,000
45	NE	$146,359,000
46	HI	$107,002,000
47	RI	$105,649,000
48	WV	$102,281,000
49	VT	$92,536,000
50	DE	$69,956,000

Appendix C. Mercury Emissions from Power Plants: by State (1999)[51]

Rank	State	Tons	Pounds
1	Texas	5.023	10,046
2	Pennsylvania	4.979	9,958
3	Ohio	3.555	7,110
4	Illinois	2.995	5,990
5	West Virginia	2.466	4,932
6	Alabama	2.4657	4,931
7	Indiana	2.442	4,884
8	Kentucky	1.74	3,480
9	Michigan	1.541	3,082
10	North Carolina	1.538	3,076
11	Georgia	1.489	2,978
12	Missouri	1.372	2,744
13	Wisconsin	1.132	2,264
14	Tennessee	1.125	2,250
15	New Mexico	1.09	2,180
16	North Dakota	1.024	2,048
17	Iowa	0.975	1,950
18	Florida	0.961	1,922
19	Wyoming	0.914	1,828
20	Maryland	0.91	1,820
21	Oklahoma	0.861	1,722
22	Kansas	0.825	1,650
23	Virginia	0.633	1,266
24	Minnesota	0.632	1,264
25	Arizona	0.627	1,254
26	South Carolina	0.534	1,068
27	New York	0.514	1,028
28	Arkansas	0.506	1,012
29	Louisiana	0.503	1,006
30	Montana	0.471	942
31	Nebraska	0.417	834
32	Mississippi	0.34	680
33	Washington	0.265	530
34	Colorado	0.255	510
35	Nevada	0.165	330
36	Massachusetts	0.146	292
37	Utah	0.142	284
38	Delaware	0.104	208
39	New Jersey	0.098	196
40	Oregon	0.084	168
41	South Dakota	0.056	112
42	Connecticut	0.036	72
43	New Hampshire	0.018	36
44	Hawaii	0.008	16
45	Alaska	0.007	14
46	California	0.004	8
47	Maine	0.002	4
48	Idaho	0	0
48	Rhode Island	0	0
48	Vermont	0	0

Appendix D. Mercury Emissions by Power Plant (1999)[52]

EMISSIONS OF MERCURY BY PLANT
(Based upon plant reported fuel use and mercury tests)

PLANT	STATE	PLANT TONS	STATE TONS
Monticello	TX	1.04870	5.023
Martin Lake	TX	0.68280	5.023
Limestone	TX	0.48300	5.023
Big Brown	TX	0.43450	5.023
Pirkey	TX	0.40620	5.023
Sam Seymour	TX	0.38640	5.023
J.T. Deely	TX	0.25090	5.023
W A Parish	TX	0.25080	5.023
Welsh	TX	0.21940	5.023
Sandow	TX	0.14470	5.023
Harrington Station	TX	0.14190	5.023
Gibbons Creek	TX	0.13210	5.023
J.K. Spruce	TX	0.12040	5.023
Oklaunion	TX	0.08839	5.023
Tolk Station	TX	0.08001	5.023
Coleto Creek	TX	0.07194	5.023
San Miguel	TX	0.06693	5.023
TNP-One	TX	0.01329	5.023
Homer City	PA	0.92600	4.979
Keystone	PA	0.92570	4.979
Montour	PA	0.60930	4.979
Bruce Mansfield	PA	0.50400	4.979
Shawville	PA	0.46400	4.979
Conemaugh	PA	0.24730	4.979
Brunner Island	PA	0.21820	4.979
Hatfield's Ferry	PA	0.20700	4.979

EMISSIONS OF MERCURY BY PLANT
(Based upon plant reported fuel use and mercury tests)

PLANT	STATE	PLANT TONS	STATE TONS
Armstrong	PA	0.15340	4.979
Cheswick	PA	0.11860	4.979
Sunbury	PA	0.11810	4.979
New Castle	PA	0.10430	4.979
Portland	PA	0.06577	4.979
Johnsonburg Mill	PA	0.04678	4.979
Titus	PA	0.03822	4.979
Cambria CoGen	PA	0.03499	4.979
Colver Power Project	PA	0.03459	4.979
Elrama	PA	0.02900	4.979
Seward	PA	0.02633	4.979
Martins Creek	PA	0.02603	4.979
Hunlock Power Station	PA	0.02580	4.979
Eddystone	PA	0.02231	4.979
Mitchell (PA)	PA	0.01515	4.979
AES BV Partners Beaver Valley	PA	0.01497	4.979
Cromby Generating Station	PA	0.00086	4.979
Northampton Generating Company L.P.	PA	0.00048	4.979
Scrubgrass Generating Company L.P.	PA	0.00043	4.979
St. Nicholas Cogeneration Project	PA	0.00032	4.979
John B. Rich Memorial Power Station	PA	0.00031	4.979
Ebensburg Power Company	PA	0.00028	4.979
Panther Creek Energy Facility	PA	0.00023	4.979
Kline Township Cogen Facility	PA	0.00023	4.979
Wheelabrator Frackville Energy Company Inc	PA	0.00020	4.979
Foster Wheeler Mt. Carmel Inc	PA	0.00018	4.979

EMISSIONS OF MERCURY BY PLANT
(Based upon plant reported fuel use and mercury tests)

PLANT	STATE	PLANT TONS	STATE TONS
Piney Creek Project	PA	0.00009	4.979
Conesville	OH	0.44960	3.555
J. M. Stuart	OH	0.32740	3.555
Cardinal	OH	0.31470	3.555
Eastlake	OH	0.29050	3.555
W. H. Sammis	OH	0.27610	3.555
Kyger Creek	OH	0.25620	3.555
Gen J. M. Gavin	OH	0.25040	3.555
Avon Lake	OH	0.20480	3.555
Walter C. Beckjord	OH	0.19770	3.555
Miami Fort Station	OH	0.19660	3.555
Muskingum River	OH	0.15820	3.555
Bay Shore	OH	0.13120	3.555
Killen	OH	0.09550	3.555
W. H. Zimmer Station	OH	0.08767	3.555
Niles	OH	0.07993	3.555
Richard H. Gorsuch	OH	0.06684	3.555
R. E. Burger	OH	0.06274	3.555
Ashtabula	OH	0.05633	3.555
Picway	OH	0.02940	3.555
O. H. Hutchings	OH	0.01889	3.555
Lake Shore	OH	0.00304	3.555
Hamilton	OH	0.00078	3.555
Toronto	OH	Did not operate or did not burn coal	3.555

EMISSIONS OF MERCURY BY PLANT
(Based upon plant reported fuel use and mercury tests)

PLANT	STATE	PLANT TONS	STATE TONS
Gorge	OH	Did not operate or did not burn coal	3.555
Edgewater (OH)	OH	Did not operate or did not burn coal	3.555
Acme	OH	Did not operate or did not burn coal	3.555
Powerton	IL	0.56360	2.995
Joliet 29	IL	0.43240	2.995
Waukegan	IL	0.30410	2.995
Joppa Steam	IL	0.29650	2.995
Will County	IL	0.22910	2.995
Kincaid Generation L.L.C.	IL	0.16740	2.995
Baldwin	IL	0.15610	2.995
Joliet 9	IL	0.14020	2.995
Newton	IL	0.13050	2.995
Crawford	IL	0.10980	2.995
Fisk	IL	0.08198	2.995
E. D. Edwards	IL	0.07538	2.995
Coffeen	IL	0.06648	2.995
Wood River	IL	0.03472	2.995
Southern Illinois Power Cooperative	IL	0.03294	2.995
Havana	IL	0.02968	2.995
Hennepin	IL	0.02797	2.995
Dallman	IL	0.02792	2.995
Meredosia	IL	0.02587	2.995
Duck Creek	IL	0.01735	2.995

EMISSIONS OF MERCURY BY PLANT
(Based upon plant reported fuel use and mercury tests)

PLANT	STATE	PLANT TONS	STATE TONS
Grand Tower	IL	0.01609	2.995
Vermilion	IL	0.01203	2.995
Hutsonville	IL	0.01192	2.995
Lakeside	IL	0.00449	2.995
Mt. Storm Power Station	WV	0.48820	2.466
John E Amos	WV	0.48270	2.466
Philip Sporn	WV	0.27560	2.466
Fort Martin	WV	0.22510	2.466
Mitchell (WV)	WV	0.22490	2.466
Mountaineer	WV	0.20690	2.466
Harrison	WV	0.15190	2.466
Kammer	WV	0.13900	2.466
Pleasants	WV	0.07108	2.466
Kanawha River	WV	0.06479	2.466
Albright	WV	0.05935	2.466
Willow Island	WV	0.04950	2.466
Rivesville	WV	0.01808	2.466
Morgantown Energy Facility	WV	0.00873	2.466
Grant Town Power Plant	WV	0.00015	2.466
North Branch Power Station	WV	0.00005	2.466
Miller	AL	0.79450	2.4657
Gorgas	AL	0.45320	2.4657
Gaston	AL	0.43950	2.4657
Barry	AL	0.23290	2.4657
Widows Creek Fossil Plant	AL	0.20250	2.4657
Colbert Fossil Plant	AL	0.11480	2.4657

EMISSIONS OF MERCURY BY PLANT
(Based upon plant reported fuel use and mercury tests)

PLANT	STATE	PLANT TONS	STATE TONS
Greene County	AL	0.10260	2.4657
Charles R. Lowman	AL	0.07636	2.4657
Gadsden	AL	0.04922	2.4657
Rockport	IN	0.51020	2.442
Gibson Generating Station	IN	0.29840	2.442
Clifty Creek	IN	0.26370	2.442
R.M. Schahfer	IN	0.20700	2.442
Tanners Creek	IN	0.14770	2.442
R. Gallagher Station	IN	0.12070	2.442
Petersburg	IN	0.11280	2.442
Cayuga (IN)	IN	0.10560	2.442
Wabash River Generating Station	IN	0.09986	2.442
Warrick Power Plant	IN	0.08365	2.442
E. W. Stout	IN	0.07829	2.442
State Line	IN	0.06536	2.442
Merom	IN	0.05859	2.442
Michigan City	IN	0.05654	2.442
Dean H. Mitchell	IN	0.05431	2.442
Bailly	IN	0.03271	2.442
Frank E. Ratts	IN	0.03080	2.442
H.T. Pritchard	IN	0.02654	2.442
F. B. Culley	IN	0.02581	2.442
A. B. Brown	IN	0.02306	2.442
Whitewater Valley	IN	0.02067	2.442
Edwardsport	IN	0.01142	2.442
Noblesville	IN	0.00805	2.442

EMISSIONS OF MERCURY BY PLANT
(Based upon plant reported fuel use and mercury tests)

PLANT	STATE	PLANT TONS	STATE TONS
Paradise Fossil Plant	KY	0.28760	1.740
Big Sandy	KY	0.27950	1.740
Ghent	KY	0.23420	1.740
H.L. Spurlock	KY	0.16620	1.740
East Bend Station	KY	0.12620	1.740
Coleman	KY	0.12570	1.740
E. W. Brown	KY	0.10820	1.740
Mill Creek	KY	0.08919	1.740
Cooper	KY	0.07041	1.740
Trimble County	KY	0.04850	1.740
Elmer Smith	KY	0.03622	1.740
Shawnee Fossil Plant	KY	0.03209	1.740
Green River	KY	0.02748	1.740
R. D. Green	KY	0.02140	1.740
Cane Run	KY	0.02115	1.740
Dale	KY	0.01878	1.740
HMP&L Station 2	KY	0.01581	1.740
D. B. Wilson	KY	0.01487	1.740
Robert Reid	KY	0.00966	1.740
Tyrone	KY	0.00394	1.740
Pineville	KY	0.00190	1.740
Henderson 1	KY	0.00082	1.740
Monroe Power Plant	MI	0.40520	1.541
J.H. Campbell	MI	0.25510	1.541
St Clair Power Plant	MI	0.12300	1.541
Belle River Power Plant	MI	0.12140	1.541

EMISSIONS OF MERCURY BY PLANT
(Based upon plant reported fuel use and mercury tests)

PLANT	STATE	PLANT TONS	STATE TONS
Dan E. Karn	MI	0.10700	1.541
Trenton Channel Power Plant	MI	0.09905	1.541
Eckert Station	MI	0.07791	1.541
River Rouge Power Plant	MI	0.06977	1.541
J.R. Whiting	MI	0.06369	1.541
J.C. Weadock	MI	0.06099	1.541
B.C. Cobb	MI	0.06033	1.541
Presque Isle	MI	0.04410	1.541
Erikcson	MI	0.02535	1.541
Shiras	MI	0.01012	1.541
Harbor Beach Power Plant	MI	0.00452	1.541
James De Young	MI	0.00343	1.541
Endicott	MI	0.00322	1.541
J. B. Sims	MI	0.00302	1.541
Marysville Power Plant	MI	0.00218	1.541
TES Filer City Station	MI	0.00117	1.541
Conners Creek Power Plant	MI	Did not operate or did not burn coal in 1999	1.541
Roxboro	NC	0.39850	1.538
Belews Creek	NC	0.26000	1.538
Marshall	NC	0.22740	1.538
Mayo	NC	0.11460	1.538
G.G. Allen	NC	0.10900	1.538
L V Sutton	NC	0.08250	1.538
Asheville	NC	0.06935	1.538

EMISSIONS OF MERCURY BY PLANT
(Based upon plant reported fuel use and mercury tests)

PLANT	STATE	PLANT TONS	STATE TONS
Cliffside	NC	0.05194	1.538
Lee	NC	0.05095	1.538
Buck	NC	0.04674	1.538
Cape Fear	NC	0.04455	1.538
Riverbend	NC	0.03769	1.538
W H Weatherspoon	NC	0.01875	1.538
Dan River	NC	0.01622	1.538
Tobaccoville Utility Plant	NC	0.00468	1.538
Cogentrix of Richmond Inc	NC	0.00293	1.538
Dwayne Collier Battle Cogeneration Facility	NC	0.00175	1.538
Westmoreland-LG&E Partners Roanoke Valley I	NC	0.00046	1.538
Westmoreland-LG&E Partners Roanoke Valley II	NC	0.00016	1.538
Scherer	GA	0.60160	1.489
Bowen	GA	0.34140	1.489
Wansley	GA	0.17570	1.489
Harllee Branch	GA	0.15050	1.489
Yates	GA	0.08250	1.489
Hammond	GA	0.04705	1.489
Jack McDonough	GA	0.03338	1.489
McIntosh	GA	0.02010	1.489
Kraft	GA	0.01668	1.489
Mitchell (GA)	GA	0.01315	1.489
Arkwright	GA	0.00663	1.489
Labadie	MO	0.32990	1.372
Rush Island	MO	0.25900	1.372
Thomas Hill	MO	0.13870	1.372

EMISSIONS OF MERCURY BY PLANT
(Based upon plant reported fuel use and mercury tests)

PLANT	STATE	PLANT TONS	STATE TONS
New Madrid	MO	0.12690	1.372
Sioux	MO	0.10150	1.372
Iatan	MO	0.09554	1.372
Meramec	MO	0.06332	1.372
Sibley	MO	0.05539	1.372
Montrose	MO	0.05205	1.372
Sikeston	MO	0.04382	1.372
Asbury	MO	0.03170	1.372
James River Power Station	MO	0.02669	1.372
Southwest Power Station	MO	0.02472	1.372
Hawthorn	MO	0.00888	1.372
Lake Road Plant	MO	0.00792	1.372
Blue Valley	MO	0.00436	1.372
Chamois	MO	0.00170	1.372
Pleasant Prairie	WI	0.40840	1.132
Columbia	WI	0.16130	1.132
South Oak Creek	WI	0.13540	1.132
Edgewater (WI)	WI	0.10310	1.132
Weston	WI	0.07967	1.132
J P Madgett	WI	0.05879	1.132
Pulliam	WI	0.03850	1.132
Nelson Dewey	WI	0.03654	1.132
Genoa	WI	0.03229	1.132
Port Washington	WI	0.02779	1.132
Valley	WI	0.02756	1.132
Rock River	WI	0.01010	1.132

EMISSIONS OF MERCURY BY PLANT
(Based upon plant reported fuel use and mercury tests)

PLANT	STATE	PLANT TONS	STATE TONS
Alma	WI	0.00778	1.132
Blount Street	WI	0.00321	1.132
Bay Front Plant Generating	WI	0.00141	1.132
Kingston Fossil Plant	TN	0.26710	1.125
Johnsonville Fossil Plant	TN	0.21710	1.125
Gallatin Fossil Plant	TN	0.18720	1.125
Bull Run Fossil Plant	TN	0.13350	1.125
Cumberland Fossil Plant	TN	0.13330	1.125
John Sevier Fossil Plant	TN	0.13010	1.125
Allen Fossil Plant	TN	0.05685	1.125
Four Corners	NM	0.52580	1.090
San Juan	NM	0.52080	1.090
Escalante	NM	0.04346	1.090
Coal Creek	ND	0.25620	1.024
Milton R. Young	ND	0.22370	1.024
Antelope Valley Station	ND	0.18800	1.024
Leland Olds Station	ND	0.15500	1.024
Coyote	ND	0.13020	1.024
Stanton Station	ND	0.05642	1.024
R.M. Heskett Station	ND	0.01477	1.024
George Neal North	IA	0.20140	0.975
Council Bluffs	IA	0.15150	0.975
George Neal South	IA	0.14510	0.975
Louisa	IA	0.14030	0.975
Muscatine	IA	0.07081	0.975
Lansing	IA	0.06392	0.975

EMISSIONS OF MERCURY BY PLANT
(Based upon plant reported fuel use and mercury tests)

PLANT	STATE	PLANT TONS	STATE TONS
Ottumwa	IA	0.05817	0.975
Prairie Creek	IA	0.02984	0.975
Milton L. Kapp	IA	0.02665	0.975
Burlington	IA	0.02585	0.975
Sutherland	IA	0.01700	0.975
Riverside	IA	0.01655	0.975
Dubuque	IA	0.01043	0.975
Ames	IA	0.00895	0.975
Fair Station	IA	0.00593	0.975
Streeter Station	IA	0.00159	0.975
Earl F. Wisdom	IA	0.00067	0.975
Crystal River	FL	0.27590	0.961
F.J. Gannon	FL	0.15010	0.961
Crist	FL	0.10990	0.961
Big Bend	FL	0.08245	0.961
Lansing Smith	FL	0.07360	0.961
St. Johns River Power Park	FL	0.06413	0.961
Seminole	FL	0.05718	0.961
Stanton Energy	FL	0.05439	0.961
Polk Power	FL	0.04626	0.961
C.D. McIntosh Jr.	FL	0.01884	0.961
Deerhaven	FL	0.01284	0.961
Cedar Bay Generating Company L.P.	FL	0.00715	0.961
Scholz	FL	0.00713	0.961
Indiantown Cogeneration Facility	FL	0.00063	0.961
Central Power and Lime, Inc.	FL	0.00023	0.961

EMISSIONS OF MERCURY BY PLANT
(Based upon plant reported fuel use and mercury tests)

PLANT	STATE	PLANT TONS	STATE TONS
Jim Bridger	WY	0.30800	0.914
Laramie River Station	WY	0.24790	0.914
Dave Johnston	WY	0.15400	0.914
Wyodak	WY	0.09117	0.914
Naughton	WY	0.08889	0.914
Neil Simpson 2	WY	0.02408	0.914
Brandon Shores	MD	0.26660	0.910
Chalk Point	MD	0.19850	0.910
Morgantown	MD	0.19320	0.910
Dickerson	MD	0.15360	0.910
H.A. Wagner	MD	0.06498	0.910
C.P. Crane	MD	0.01853	0.910
R. Paul Smith	MD	0.01468	0.910
AES Shady Point, Inc.	OK	0.20530	0.861
Muskogee	OK	0.19960	0.861
Sooner	OK	0.14320	0.861
GRDA	OK	0.14140	0.861
Northeastern	OK	0.09401	0.861
Hugo	OK	0.07747	0.861
Jeffrey Energy Center	KS	0.42520	0.825
La Cygne	KS	0.20690	0.825
Lawrence	KS	0.07326	0.825
Tecumseh	KS	0.03211	0.825
Holcomb	KS	0.03154	0.825
Nearman Creek	KS	0.02508	0.825
Quindaro	KS	0.02156	0.825

EMISSIONS OF MERCURY BY PLANT
(Based upon plant reported fuel use and mercury tests)

PLANT	STATE	PLANT TONS	STATE TONS
Riverton	KS	0.00934	0.825
Kaw	KS	Did not operate or did not burn coal in 1999	0.825
Chesterfield Power Station	VA	0.18380	0.633
Chesapeake Energy Center	VA	0.09142	0.633
Clinch River	VA	0.07851	0.633
Possum Point Power Station	VA	0.06480	0.633
Bremo Power Station	VA	0.06347	0.633
Yorktown Power Station	VA	0.05738	0.633
Glen Lyn	VA	0.04352	0.633
Potomac River	VA	0.04175	0.633
Clover Power Station	VA	0.00572	0.633
SEI - Birchwood Power Facility	VA	0.00143	0.633
AES Warrior Run	VA	0.00078	0.633
Mecklenburg Cogeneration Facility	VA	0.00028	0.633
LG&E - Westmoreland Southampton	VA	0.00009	0.633
LG&E - Westmoreland Altavista	VA	0.00007	0.633
LG&E - Westmoreland Hopewell	VA	0.00003	0.633
Sherburne County Generating Plant	MN	0.29070	0.632
Clay Boswell	MN	0.16890	0.632
Allen S. King Generating Plant	MN	0.05123	0.632
Riverside Generating Plant	MN	0.03339	0.632
Black Dog Generating Plant	MN	0.02680	0.632
Hoot Lake	MN	0.02184	0.632
High Bridge Generating Plant	MN	0.02087	0.632

EMISSIONS OF MERCURY BY PLANT
(Based upon plant reported fuel use and mercury tests)

PLANT	STATE	PLANT TONS	STATE TONS
Laskin Energy Center	MN	0.01131	0.632
NE Station	MN	0.00470	0.632
Silver Lake	MN	0.00269	0.632
Minnesota Valley	MN	0.00003	0.632
Springerville	AZ	0.16080	0.627
Navajo	AZ	0.15170	0.627
Cholla	AZ	0.12800	0.627
Coronado	AZ	0.12500	0.627
Apache Station	AZ	0.06037	0.627
Irvington	AZ	0.00131	0.627
Wateree	SC	0.12210	0.534
Winyah Generating Station	SC	0.08894	0.534
Williams	SC	0.05363	0.534
Jefferies Generating Station	SC	0.05353	0.534
Cross Generating Station	SC	0.05265	0.534
Urquhart	SC	0.03952	0.534
W. S. Lee	SC	0.03296	0.534
Grainger Generating Station	SC	0.02792	0.534
H B Robinson	SC	0.02708	0.534
Canadys Steam	SC	0.02706	0.534
McMeekin	SC	0.00716	0.534
Cope	SC	0.00118	0.534
Dunkirk	NY	0.10410	0.514
C. R. Huntley	NY	0.09225	0.514
Danskammer	NY	0.06127	0.514
AES Cayuga (NY) (formerly NYSEG Milliken)	NY	0.05040	0.514

EMISSIONS OF MERCURY BY PLANT
(Based upon plant reported fuel use and mercury tests)

PLANT	STATE	PLANT TONS	STATE TONS
Rochester 7	NY	0.03972	0.514
AES Sommerset (NY) (formerly NYSEG Kintigh)	NY	0.03763	0.514
AES Greenidge (formerly NYSEG Greenidge)	NY	0.03075	0.514
AES Hickling (formerly NGE Generation Hickling)	NY	0.02711	0.514
AES Westover (formerly NYSEG Goudey Station)	NY	0.02423	0.514
Lovett	NY	0.02029	0.514
Rochester 3	NY	0.01275	0.514
AES Jennison (formerly NGE Generation Jennison)	NY	0.01031	0.514
Fort Drum H.T.W. Cogeneration Facility	NY	0.00291	0.514
White Bluff	AR	0.24870	0.506
Independence	AR	0.18730	0.506
Flint Creek	AR	0.06997	0.506
Big Cajun 2	LA	0.26810	0.503
R.S. Nelson	LA	0.10650	0.503
Dolet Hills Power Station	LA	0.07972	0.503
Rodemacher Power Station Unit #2	LA	0.04896	0.503
Colstrip	MT	0.43570	0.471
J.E. Corette	MT	0.01547	0.471
Colstrip Energy Limited Partnership	MT	0.01077	0.471
Lewis & Clark	MT	0.00900	0.471
Gerald Gentlemen Station	NE	0.15290	0.417
Nebraska City	NE	0.10540	0.417
North Omaha	NE	0.08959	0.417
Sheldon	NE	0.03408	0.417
Platte	NE	0.01583	0.417
Whelan Energy Center	NE	0.01233	0.417

EMISSIONS OF MERCURY BY PLANT
(Based upon plant reported fuel use and mercury tests)

PLANT	STATE	PLANT TONS	STATE TONS
Lon Wright	NE	0.00649	0.417
Jack Watson	MS	0.13810	0.340
Victor J. Daniel	MS	0.10130	0.340
R. D. Morrow Sr. Generating plant	MS	0.10010	0.340
Centralia	WA	0.26490	0.265
Craig	CO	0.07975	0.255
Pawnee	CO	0.04875	0.255
Comanche	CO	0.04197	0.255
Rawhide	CO	0.03114	0.255
Arapahoe	CO	0.02645	0.255
Nucla	CO	0.00999	0.255
Martin Drake	CO	0.00451	0.255
Hayden	CO	0.00440	0.255
Ray D. Nixon	CO	0.00322	0.255
Cherokee	CO	0.00292	0.255
Valmont	CO	0.00114	0.255
Cameo	CO	0.00100	0.255
Mohave	NV	0.11470	0.165
Reid Gardner	NV	0.04579	0.165
North Valmy Generating Station	NV	0.00430	0.165
Tracy Generating Station - Pinon Pine Power Plant	NV	Did not operate or did not burn coal in 1999	0.165
Brayton Point	MA	0.12190	0.146
Mount Tom	MA	0.01875	0.146
Salem Harbor	MA	0.00450	0.146

EMISSIONS OF MERCURY BY PLANT
(Based upon plant reported fuel use and mercury tests)

PLANT	STATE	PLANT TONS	STATE TONS
Somerset	MA	0.00102	0.146
Huntington	UT	0.07435	0.142
Hunter	UT	0.04132	0.142
Carbon	UT	0.01982	0.142
Intermountain	UT	0.00450	0.142
Bonanza	UT	0.00157	0.142
Sunnyside Cogeneration Associates	UT	0.00005	0.142
Indian River	DE	0.07230	0.104
Edge Moor	DE	0.03126	0.104
Hudson	NJ	0.05377	0.098
B L England	NJ	0.03205	0.098
Mercer	NJ	0.00765	0.098
Deepwater	NJ	0.00196	0.098
Logan Generating Plant	NJ	0.00158	0.098
Carneys Point Generating Plant	NJ	0.00103	0.098
Boardman	OR	0.08417	0.084
Big Stone	SD	0.05564	0.056
AES Thames, Inc.	CT	0.03556	0.036
Bridgeport Harbor	CT	Did not operate or did not burn coal in 1999	0.036
Schiller	NH	0.01060	0.018
Merrimack	NH	0.00788	0.018
AES Hawaii, Inc.	HI	0.00778	0.008
Healy	AK	0.00745	0.007
Mt. Poso Cogeneration Plant	CA	0.00135	0.004

EMISSIONS OF MERCURY BY PLANT
(Based upon plant reported fuel use and mercury tests)

PLANT	STATE	PLANT TONS	STATE TONS
ACE Cogeneration Plant	CA	0.00083	0.004
Stockton Cogen Company	CA	0.00072	0.004
Port of Stockton District Energy Facility (POSDEF)	CA	0.00056	0.004
Rio Bravo Poso	CA	0.00045	0.004
Rio Bravo Jasmin	CA	0.00045	0.004
S.D. Warren Company #2	ME	0.00204	0.002

End Notes

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[26] *Id.*
[27] *Id.*
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[39] *Id.*
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[48] *Id.*
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