

Mercury, Risk & Justice

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Executive Summary

Already one in six U.S. women of childbearing age has blood mercury levels that pose a risk to a developing fetus. Yet despite repeated calls for a “culture of life,” the Bush Administration has proposed a weakened plan to control mercury, a potent neurotoxin, from coal-fired utilities.¹ An empirical assessment reveals, however, that the Administration’s plan will actually exacerbate mercury levels for some areas of the country, including the Great Lakes region. Notably, this burden will be shouldered disproportionately by Native Americans, Asian-Americans, other communities of color and low-income communities in this and other regions of the country who eat large amounts of mercury-contaminated fish.² Although there are technologically proven and legally required methods of reducing mercury emissions, the Bush Administration would give power plants a reprieve and allow them to trade pollution credits. As a result, some plants’ emissions would spike while others decrease. Those people who rely on fish as a major part of their diet, especially subsistence fishers and their families, would be warned to reduce their fish intake or to stop eating fish altogether. This approach effectively shifts the burden of addressing mercury pollution from the polluting industries to the people who depend on fish for food.

Background – Mercury in the Environment, Health Effects and Exposure Levels

Mercury is highly toxic to humans, and exposure to even small amounts of methylmercury can lead to irreversible neurological damage.³ Children and the developing fetus are particularly sensitive. Adverse

effects range from cerebral palsy, blindness, and deafness to more subtle but critical effects such as poor attention span, fine motor function, language and visual-spatial abilities.⁴ Thus it is alarming that *15.7 percent of childbearing women in the United States have blood mercury levels that pose a risk to a developing fetus.*⁵ The Environmental Protection Agency (EPA) estimates that there are 630,000 children born annually with unsafe blood mercury levels based on the reference dose set by the agency.⁶

Because humans are exposed to methylmercury primarily through fish consumption, groups that eat the most fish are disproportionately at risk. A typical U.S. citizen consumes 17.5 g/day of fish.⁷ But in the Great Lakes region, average consumers eat 42 g/day of fish⁸ and consumers in the Great Lakes Indian Fish and Wildlife Commission member tribes eat 189.6 g/day⁹ (see Table 1). Given that many fish in the Great Lakes region are highly contaminated with mercury,¹⁰ the resulting methylmercury exposure to an average Native American woman is *more than ten times the EPA’s reference dose*, the amount that can be ingested over a lifetime without adverse health effects.¹¹ It is not surprising then that in a recent study, *31.5 percent of women who identified themselves as “other,” including Native Americans and those of Asian origin, had mercury blood levels that pose a risk to a developing fetus.*¹² Other groups are also at risk – the Centers for Disease

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Table 1
METHYLMERCURY EXPOSURE VIA FISH CONSUMPTION

Population	Fish Consumption Rate (g/day)	Current Methylmercury Exposure: Average Woman (microgram/kg bodyweight/day)	Methylmercury Exposure if Mercury Deposition Reduced 60%: Average Woman (microgram/kg bodyweight/day)	Difference (microgram /kg bodyweight/day)
United States General Population	17.5	0.1050	0.042	0.063
Great Lakes Fish Consumers	42	0.2520	0.1008	0.1512
GLIFWC Tribal Fish Consumers	189.6	1.1376	0.45504	0.68256

Control found that Black and Mexican-American children had significantly higher blood mercury levels than their non-Hispanic White counterparts.¹³

Clearly, reduction of mercury levels is needed to safeguard human health around the country, and especially in the Great Lakes region. Because the biggest unregulated source of mercury emissions is coal-fired utilities, this would be the obvious place to maximize reductions of mercury emissions. Unfortunately, the Bush plan uses tools that will instead delay emissions reductions and actually increase and concentrate them in certain areas.

Proposed Bush Plan for Mercury Control: Delayed and Diminished Results

The Clean Air Act requires that mercury emissions from coal-fired utilities be regulated as a hazardous air pollutant; enacting regulations have been in the works for years.¹⁴ While the Clean Air Act requires effective, technology-based controls (referred

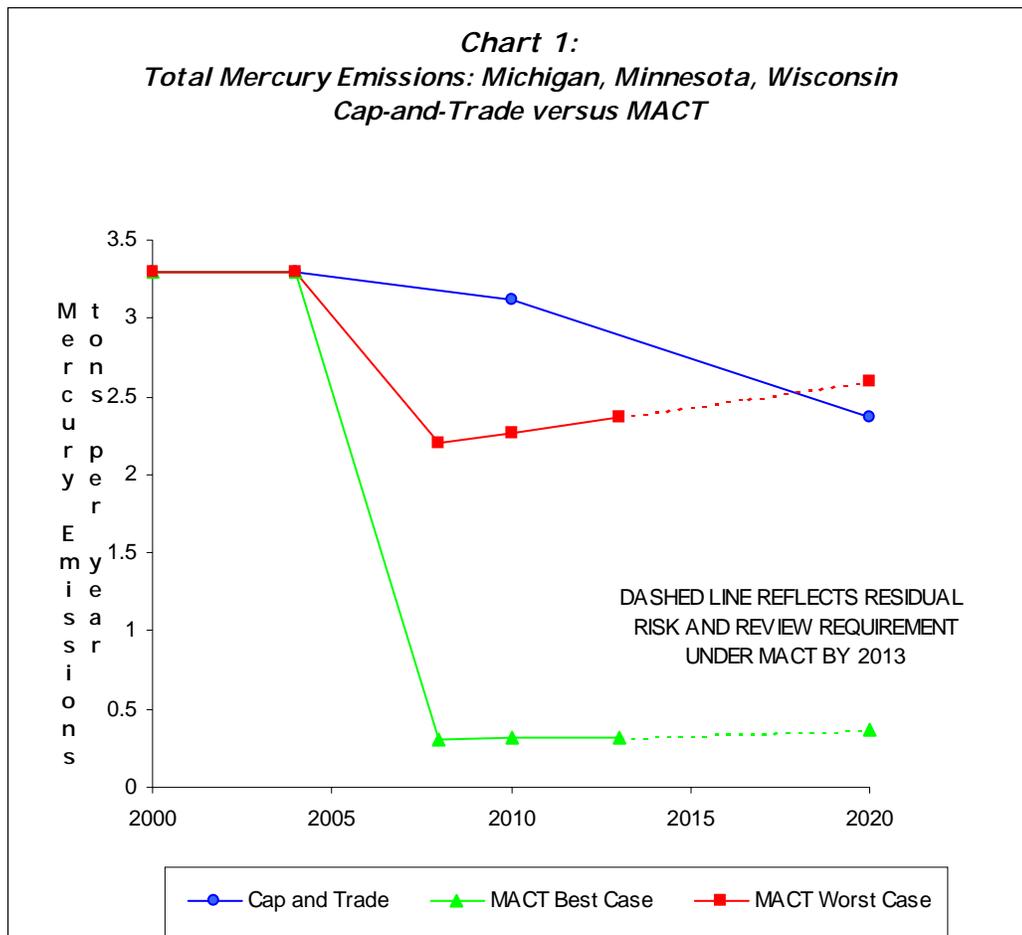
to as “maximum achievable control technology” or MACT) at the pollutant source, the Bush Administration has instead proposed a regulatory scheme called “cap-and-trade.” Cap-and-trade is a market-based tool that sets a limit on emissions and then allows polluters to trade pollution allowances up to the established cap. This tool is favored by free market advocates because it does not impose uniform controls across industries, allowing plants instead to find the economically preferable level of control, either through reducing emissions or buying emission credits from another source. Whereas MACT requirements were projected to reduce mercury emissions by 90 percent by 2007,¹⁵ EPA models show that the cap and trade plan would reduce emissions by 61 percent by 2020,¹⁶ thus producing delayed and diminished results.

In theory, cap-and-trade promises the same level of emissions reductions at lower cost. In practice, under the Administration’s plan, this is far from the case. In the Great Lakes region, a comparison of cap-and-trade to a “best case” and “worst case” MACT¹⁷

shows that cap-and-trade utterly fails to deliver emissions reductions that are protective of the environment and public health (see chart 1). In fact,

can result when trades are made that concentrate emissions in one area, or in an area that is more vulnerable to mercury deposition. Indeed, although EPA claims that there will be no “local or regional hot spots” under its proposed national cap-and-trade program, the evidence provided by EPA’s own models for the upper Great Lakes suggests otherwise, imposing a disproportionate burden on members of the fishing tribes of this area who are among the most highly exposed to the resulting methylmercury contamination.

Specifically, EPA predicts that under a cap-and-trade program, regional mercury emissions will fall by just 26.59 percent by 2020 (compared to 61 percent nationwide). Locally, however, mercury



in 2010 a cap-and-trade approach would permit *eleven times* the mercury emissions in the upper Great Lakes states than a MACT best-case scenario, and even after the application of a final cap in 2020 the cap-and-trade would still allow *six times* as much mercury as would the best case MACT.

Toxic Hotspots Created under Cap and Trade in the Great Lakes Area

Not only will cap-and-trade allow more mercury emissions than the technology-based approach, but cap-and-trade will also exacerbate fish contamination because it creates “hot spots” of mercury deposition and exposure. A cap-and-trade program for mercury is dangerous in this way because there is no control on where trades can be made, and thus toxic hot spots

emissions will *increase at 20 out of 44 sources in the region* (see Table 2). Further, in 2020, emissions are projected to be higher under cap-and-trade than under MACT best case *for every source in the upper Great Lakes states of Michigan, Minnesota, and Wisconsin but one*.¹⁸ At all but six of these sources, moreover, emissions under cap-and-trade are at least double the level achieved by application of MACT best case; for several sources, emissions permitted under cap-and-trade are an order of magnitude greater.

Adding insult to injury, given that the Great Lakes region is 23 percent waterbodies compared to a national average of 7 percent,¹⁹ increased mercury deposited in this region is more likely to fall on a lake or other waterbody where it has a relatively rapid impact on fish compared to mercury falling on land.²⁰

Finally, some lakes in the region are “mercury sensitive” meaning that any additional mercury

deposition will more quickly become bioavailable for uptake by fish.²¹

*Table 2
MERCURY EMISSIONS UNDER CAP-AND-TRADE
FACILITIES WITH INCREASED EMISSIONS
1999-2020*

Plant	State	Percent Increase in Emissions 1999-2020
Monroe Power Plant	MI	11.8
Presque Isle	MI	22.7
J.B. Sims	MI	52.3
Belle River Power Plant	MI	67.9
Endicott	MI	98.8
TES Filer City Station	MI	506.8
Marysville Power Plant	MI	833.8
Riverside Generating Plant	MN	11.7
Hoot Lake	MN	20.4
Allen S. King Generating Plant	MN	77.2
Black Dog Generating Plant	MN	78.8
High Bridge Generating Plant	MN	117.5
Silver Lake	MN	484.9
Minnesota Valley	MN	14,900.0
Port Washington	WI	3.6
Rock River	WI	19.6
Pulliam	WI	26.4
Blount Street	WI	410.9
Alma	WI	470.7
Bay Front Plant Generating	WI	1,205.0

Under the cap-and-trade program, these factors – increased local mercury emissions, a high waterbody to land ratio, and mercury sensitive waters – converge with the above- average fish consumption rates for Great Lakes residents and the very high rates of many Great Lakes tribes to create an environmental injustice.²² Thus while cap-and- trade will benefit coal-fired utilities who will receive a reprieve from installing mercury reducing technology, this reprieve will adversely affect the health of fishing tribes and other communities who depend on fish.

***Administration’s Solution:
Risk Avoidance – Eat Less Fish***

Having opted for a regulatory approach that does little to reduce mercury contamination – indeed, an approach that may permit localized instances of increased contamination – EPA shifts the burden to those who are at risk to take steps to shield themselves from the contamination, namely, to reduce or eliminate their intake of fish. Instead of actually reducing the emission of mercury to protective levels, EPA proposes to rely on advisories to protect anyone eating a large amount of fish. EPA thus moves to make fish consumption advisories a permanent feature, rather than a stop-gap measure as in the past. EPA’s strategy here is an example of the current Administration’s embrace of regulatory approaches that favor risk avoidance over risk reduction.²³ In fact, EPA appears satisfied with a rule that reduces the risks of mercury contamination for only a fraction of

the U.S. population, but leaves fishing tribes and indigenous peoples, other communities of color and low-income communities who depend on fish – as well as a large swath of the general population (women of childbearing age and children up to age 20) – to undertake avoidance measures to protect themselves from the mercury that remains. This is problematic both from an environmental justice perspective and because risk avoidance measures are often ineffective²⁴ and treat only the symptoms of a serious problem.

Conclusion

EPA's proposed rule is deeply troubling from the perspective of environmental justice. While delivering a boon to coal-fired utilities, it does so only by severely taxing the fishing tribes and other groups who depend on fish. Perhaps most disconcerting, the rule visits its harms on an entire generation of children, given methylmercury's neurodevelopment impacts.

As the analysis above demonstrates, there is a real concern that local and regional hot spots will be permitted under the cap-and-trade approach, at least

in Michigan, Minnesota, and Wisconsin. Importantly, any hot spots in this region would coincide with a general population that consumes relatively large amounts of fish and with several subpopulations, including the various Ojibwe and other fishing tribes that consume at the very highest level. Women and children in these groups would thus be placed at particular risk.

Finally, EPA's embrace of risk avoidance in the form of fish consumption advisories is especially disquieting. Having opted to do little to reduce mercury contamination – indeed to tolerate localized instances of increased contamination – EPA recognizes that many people who eat fish will be exposed under the proposed rule to methylmercury levels that are not safe. Rather than view this as a call for more meaningful regulatory efforts, EPA shifts the burden to those who are at risk to take steps to shield themselves from contamination by altering their fish consumption practices. Instead, we have a proposed rule that seeks to employ a pet tool, cap-and-trade, which is ill suited for the job at hand, and to do so in a manner that works a grave injustice for many.

About the Author

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End Notes

- 1) U.S. EPA, Proposed National Emissions Standards for Hazardous Air Pollutants; and, in the Alternative, Proposed Standards for Performance for New and Existing Stationary Sources: Electric Utility Steam-Generating Units; Proposed Rule, 69 Fed. Reg. 4652 (Jan. 30, 2004).
- 2) NATIONAL ENVIRONMENTAL JUSTICE ADVISORY COUNCIL, FISH CONSUMPTION AND ENVIRONMENTAL JUSTICE 90-127 (November, 2002) available at www.epa.gov/compliance/resources/publications/ej/fish_consump_report_1102.pdf.
- 3) NATIONAL RESEARCH COUNCIL, TOXICOLOGICAL EFFECTS OF METHYLMERCURY 175-81 (2000). . Mercury that is emitted into the air gets deposited to water bodies, where is it converted to methylmercury. Methylmercury is highly bioavailable and is readily taken up by fish. Methylmercury is the form of mercury that is most toxic to humans. *Id.*
- 4) *Id.*
- 5) Kathryn R. Mahaffey, et al., *Blood Organic Mercury and Dietary Mercury Intake: National Health and Nutrition Examination Survey, 1999 and 2000*, 112 ENVTL. HEALTH PERSPECTIVES 562 (2004); Kathryn R. Mahaffey, “Methylmercury: Epidemiology Update,” Presentation to the National Forum on Contaminants in Fish, San Diego, CA (2004) (PowerPoint slides on file with author).
- 6) Guy Gugliotta, *Mercury Threat to Fetus Raised: EPA Revises Risk Estimates*, WASH. POST, A3 (Feb. 6, 2004).
- 7) This value reflects the 90th percentile value for consumption of freshwater and estuarine fish by all adults (both those that consume fish and those that do not consume fish) in the general U.S. population, taken from the U.S.D.A.’s Continuing Survey of Food Intake for Individuals for the years 1994 to 1996. This number is used by the EPA as a default for setting water quality standards. U.S. EPA, *Methodology for Deriving Ambient Water Quality Criteria for Protection of Human Health* 4-25 to 4-27 (Oct. 2000).
- 8) This value reflects average consumption for fish consumers among residents in the Great Lakes basin, as demonstrated by a variety of studies of this subpopulation. Christopher T. De Rosa and Heraline E. Hicks, *Sentinel Human Health Indicators: A Model for Assessing Human Health Status of Vulnerable Communities*, 7 HUMAN AND ECOLOGICAL RISK ASSESSMENT 1419, 1426 (2001).
- 9) Note that this value reflects the low value in the range (189.6 g/day to 393.8 g/day) of average walleye consumption during the spring for fish consumers among tribal spearers surveyed by the Great Lakes Indian Fish and Wildlife Commission in 1993. Great Lakes Indian Fish and Wildlife Commission (GLIFWC), *1993 Survey of Tribal Spearers* (1993).
- 10) 100 percent of Lakes Superior, Michigan, Huron and Erie are under mercury advisories for fish, and statewide mercury advisories have been issued by Minnesota, Wisconsin, and Michigan. See U.S. EPA, OFFICE OF WATER, UPDATE: NATIONAL LISTING OF FISH AND WILDLIFE ADVISORIES 4 (2004) available at <http://www.epa.gov/waterscience/fish/>. [hereinafter EPA, FISH ADVISORIES].
- 11) These figures assume that the average woman weighs 65 kg. Note that this assumption may have the effect of overstating actual consumption rates for women in each of these three groups, inasmuch as it is coupled with fish consumption data gathered for both men and women and data suggest that, in general, women consume fish at lower rates than men. On the other hand, women who are pregnant and women who are breastfeeding – subpopulations of particular concern, given methylmercury’s health endpoints – may consume at higher rates, given their greater caloric needs during these periods. These figures were derived by solving for $\mu\text{g}/\text{kg}$ bodyweight/day, assuming one of the three fish consumption rates, a 65 kg bodyweight, and an average fish tissue methylmercury concentration of 0.39 ppm or 390 μg methylmercury/kg fish.
- 12) Mahaffey, et al., *supra* note 5 at 565.
- 13) CENTERS FOR DISEASE CONTROL, SECOND NATIONAL REPORT ON HUMAN EXPOSURE TO ENVIRONMENTAL CHEMICALS 19 (2003) available at <http://www.cdc.gov/nceh/dls/ner.htm>.
- 14) 42 U.S.C. §7412.
- 15) See, e.g., Clear the Air, *The Bush Administration Air Pollution Plan: More Mercury Pollution, Higher Health Risks*, available at <http://cta.policy.net/proactive/newsroom/release.vtml?id=24640>; Natural Resources Defense Council, *EPA’s Mercury Proposal: More Toxic Pollution for a Longer Time* (Dec. 5, 2003) available at <http://www.nrdc.org/media/pressreleases/031205.asp>; accord See Lisa Heinzerling and Rena I. Steinzor, *A Perfect Storm: Mercury and the Bush Administration*, 34 ENVTL. L. REP. 10297 (2004); Lisa Heinzerling and Rena I. Steinzor, *A Perfect Storm: Mercury and the Bush Administration, Part II*, 34 ENVTL. L. REP. 10485 (2004) at 10488-89, 10494 (citing an EPA presentation to the Edison Electric Institute, U.S. EPA, *Discussion of Multipollutant Strategy, Meeting with Edison Electric Institute* (Sept. 18, 2001)).
- 16) Unless noted, all projections of emissions under EPA’s proposed cap-and-trade approach are based on EPA’s IPM data. The EPA parsed this data for two years, 2010 and 2020, in addition to offering current emissions data, based on 1999 emissions from coal-fired utilities. The parsed 2010 and 2020 data are available at <http://www.epa.gov/airmarkets/epa-ipm/results2003.html>; the 1999 data are available at <http://www.epa.gov/ttn/atw/combust/utilttox/rawdata1.xls>.
- 17) The best and worst case MACT are calculated using EPA data and represent a 94.78 percent and a 60-70 percent mercury removal, respectively. See U.S. EPA, Office of Research and Development, *Control of Mercury Emissions from Coal-Fired Electric Utility Boilers* 15 (undated paper) available at <http://www.epa.gov/ttn/atw/utility/hgwhitepaperfinal.pdf>.
- 18) This source is the High Bridge Generating Plant, located in Minnesota. Note that throughout the term “source” is used interchangeably with the term “facility;” to the extent that data were provided in the various EPA databases by unit rather than by

facility, these data were summed to provide totals for each facility. Note further that for the comparisons of cap-and-trade versus MACT-based approaches, the universe of sources in MI, MN and WI is 44, given the lack of complete data for the Conners Creek Power Plant. For the comparisons of cap-and-trade to current emissions, the universe of sources for 1999 is 44, while the universe for 2010 and 2020 is 45 due to the presence of the Conners Creek Power Plant.

19) U.S. Census Bureau, *Statistical Abstract of the United States* (2003) available at <http://www.census.gov/prod/www/statistical-abstract-03.html>.

20) Lisa M. Pinsker, *In Search of the Mercury Solution* GEOTIMES (Aug. 2003) available at http://www.geotimes.org/aug03/feature_mercury.html.

21) See, e.g., 69 Fed. Reg. at 4701 (discussing the potential for the formation of local or regional “hot spots” as the result of its cap-

and-trade proposal, the EPA notes that “the ecosystems in some regions (e.g., the lakes regions of the Upper Midwest), may be more sensitive to Hg deposition”).

22) Note that EPA has attempted to explain why there is not a threat of hot spots, but this faulty reasoning is analyzed in detail in the full article.

23) See, Catherine A. O’Neill, *Risk Avoidance, Cultural Discrimination, and Environmental Justice for Indigenous Peoples*, 30 *ECOLOGY L. Q* 1 (2003).

24) For an extensive discussion of fish consumption advisories’ effectiveness, see NATIONAL ENVIRONMENTAL JUSTICE ADVISORY COUNCIL, *FISH CONSUMPTION AND ENVIRONMENTAL JUSTICE* *supra* note 2 at 90-127; John Tilden, et al., *Health Advisories for Consumers of Great Lakes Sport-Fish: Is the Message Being Received?*, 105 *Envtl. Health Perspective* 1360 (1997).

About the Center for Progressive Regulation

Founded in 2002, the Center for Progressive Regulation is a nonprofit research and educational organization of university-affiliated academics with expertise in the legal, economic, and scientific issues related to regulation of health, safety, and the environment. CPR supports regulatory action to protect health, safety, and the environment, and rejects the conservative view that government’s only function is to increase the economic efficiency of private markets. Through research and commentary, CPR seeks to inform policy debates, critique anti-regulatory research, enhance public understanding of the issues, and open the regulatory process to public scrutiny. Direct media inquiries to Matthew Freeman at mfreeman@progressiveregulation.org. For general information, email info@progressiveregulation.org. Visit CPR’s website at www.progressiveregulation.org. The Center for Progressive Regulation is grateful to the Deer Creek Foundation for its generous support of this project and CPR’s work in general.



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