June 23, 2023

Via electronic transmission

U.S. Environmental Protection Agency
EPA Docket Center
Mail Code 28221T
1200 Pennsylvania Ave. NW
Washington, DC 20460
a-and-r-docket@epa.gov

Attention: Docket ID No. EPA-HQ-OAR-2018-0794

The Attorneys General of Massachusetts, Minnesota, Connecticut, Illinois, Maine, Maryland, Michigan, New Jersey, New Mexico, New York, Oregon, Pennsylvania, Rhode Island, Vermont, Washington, and Wisconsin, and the Cities of Baltimore, Chicago, and New York; ("Attorneys General and Local Governments") respectfully submit these comments on the Environmental Protection Agency's ("EPA") proposal entitled "National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units Review of the Residual Risk and Technology Review" ("Proposal").[1] The Proposal is the result of EPA's review of its 2020 "residual risk and technology review" ("2020 RTR")[2] of the current limits on power-plant hazardous air pollutant ("HAP") emissions ("Standards") promulgated as part of the 2012 Mercury and Air Toxics Standards Rule ("MATS Rule").[3]

The Attorneys General and Local Governments strongly support EPA's Proposal to strengthen certain of the Standards as part of its technology review under section 112(d)(6) of the Clean Air Act, 42 U.S.C. § 7412(d)(6).[4] Because many members of our coalition are downwind of power plants with significant HAP emissions, our residents and natural resources continue to suffer from substantial exposure to mercury and other power-plant hazardous air pollution.

---

[1] 88 Fed. Reg. 24,854 (Apr. 24, 2023).
[2] 85 Fed. Reg. 31,286, 31,314-19 (May 22, 2020).
[3] 77 Fed. Reg. 9304, 9366-76 (Feb. 16, 2012).
[4] In the Proposal, EPA is reconsidering both the section 112(f)(2) residual risk review and the section 112(d)(6) technology review completed as part of the 2020 RTR, but does not propose any revisions to the 2020 residual risk review, which found a low residual risk from HAP emissions from coal- and oil-fired power plants, under the section 112(f)(2) "ample margin of safety to protect public health" standard. 88 Fed. Reg. at 24,866. The Attorneys General and Local Governments' comments focus on the technology review component of the 2020 RTR. We note, however, that several commenters on EPA's 2022 "appropriate and necessary" finding reconsideration submitted additional information on the public health impacts of HAP emissions from coal- and oil-fired power plants that EPA should evaluate as part of its reconsideration of the 2020 RTR. *See* Comment submitted by Emmett Environmental Law & Policy Clinic on Behalf of Elsie M. Sunderland, et al., EPA–HQ–OAR–2018–0794–4954 (Apr. 12, 2022); Comments of Public Health and Environmental Organizations, EPA–HQ–OAR–2018–0794–4581, at 29-49 (Apr. 11, 2022) ("2022 NGO Comments").

Strengthening the Standards would meaningfully reduce the ongoing serious health and environmental risks posed by such pollutants, especially to people in underserved communities[5] that historically have been marginalized and environmentally overburdened.

At the same time, as EPA has recognized,[6] annual compliance costs for the industry have been significantly lower than EPA estimated in 2011, due in part to improvements and cost reductions in pollution controls.[7] Moreover, many states have for years been controlling mercury emissions under state law at reasonable cost and often under stricter standards than the MATS Rule.[8]

Accordingly, we agree with EPA that more stringent limits on emissions of mercury from lignite coal-burning units and non-mercury metals from all coal-fired units are "necessary" under section 112(d)(6)'s technology review. We also urge EPA to impose more stringent limits on mercury emissions from nonlignite coal-fired units consistent with the standards that coal-fired plants have been complying with in many of our jurisdictions for years. Finally, we ask that EPA evaluate more stringent HCl limits for acid gases, since recent analysis confirms that a lower HCl limit is likely achievable.

---

[5] As used here, "underserved communities" means "populations sharing a particular characteristic, as well as geographic communities, that have been systematically denied a full opportunity to participate in aspects of economic, social, and civic life," including "Black, Latino, and Indigenous and Native American persons, Asian Americans and Pacific Islanders and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality." *See* Executive Order 13,985 § 2, 86 Fed. Reg. 7009 (Jan. 25, 2021).

[6] 87 Fed. Reg. 7624, 7651 (Feb. 9, 2022).

[7] Barbara Morin & Paul J. Miller, Northeast States for Coordinated Air Use Mgmt. ("NESCAUM"), *It Remains "Appropriate and Necessary" to Regulate Toxic Air Emissions from Coal- and Oil-fired Electric Generating Units* 11 (Apr. 7, 2022), https://www.nescaum.org /documents /nescaum-it-remains-approp-necess-reg-air-toxics-from-coal-oil-egus-update-20220407.pdf.

[8] *See id.* at 10; Comments of the National Association of Clean Air Agencies on EPA's Proposed Supplemental Finding, Doc. ID No. EPA-HQ-OAR-2009-0234-17620, at 7 (Aug. 4, 2011) ("To our knowledge, no source has failed to comply with state deadlines for achieving [mercury] limitations, and no significant adverse impacts on electric system reliability were encountered as units were upgraded to meet state requirements."); *id.* at 6 ("Years, and in some cases decades, of experience demonstrates that [the technologies available to reduce power plant hazardous air pollutant emissions] can reliably deliver the expected performance at reasonable cost.").

DETAILED COMMENTS

I. Power-Plant HAP Emissions Are Causing Ongoing Harms Within the Jurisdictions of the Attorneys General and Local Governments That More Stringent Standards under the MATS Rule Would Address.

Many of the undersigned Attorneys General and Local Governments have for years worked to reduce the harms that power-plant HAP emissions impose on our residents and natural resources through stringent state-based emissions limits, particularly for mercury.[9] Yet because large amounts of airborne mercury and other HAPs from upwind, out-of-state plants are transported across our borders, state regulation alone has proven insufficient. As a result, we have advocated strenuously for strong federal standards under section 112(d) to curb that cross-border pollution. But while the 2012 MATS Rule has produced substantial reductions nationwide, HAP emissions from many power plants remain unacceptably high and continue to pose risks to our residents—especially those who are particularly susceptible to or highly exposed to those emissions—as well as to our natural resources.

A. The Attorneys General and Local Governments Have Long Advocated for Strong Federal Controls on Power Plant Hazardous Air Pollution.

For more than fifteen years, the Attorneys General and Local Governments have sought strong federal regulation of power-plant HAP emissions. That effort has spanned EPA's 2000 determination that regulation of power plants is "appropriate and necessary" under section 112(n)(1)(A);[10] its 2012 reaffirmation of that determination and issuance of section 112(d) emissions standards;[11] its 2016 supplemental finding supporting that determination on remand from *Michigan v. EPA*, 135 S. Ct. 2699 (2015),[12] and its purported 2020 rescission of that determination.[13] Most recently, many of the Attorneys General and Local Governments commented in support ("2022 States Comments") of EPA's proposal, finalized in February 2023, to revoke the 2020 rescission of its appropriate and necessary determination and yet again reaffirm that determination.[14] We likewise strongly support EPA's proposed reassessment of its 2020 technology review, the proposal on which EPA currently seeks comment. As discussed below, despite significant reductions in power-plant emissions of mercury and other HAPs since 2012, ongoing emissions from coal-fired power plants continue to threaten our most vulnerable residents and to contribute to mercury contamination of our natural resources.

---

[9] *See* Comments of the Attorneys General of Massachusetts et al. ("2022 States Comments"), Doc. ID No. EPA-HQ-OAR-2018-0794-4942, at 8-9 (Apr. 11, 2022). The 2022 States Comments are attached hereto as Exhibit 1.
[10] 65 Fed. Reg. 79,825 (Dec. 20, 2000).
[11] 77 Fed. Reg. at 9311, 9366-76.
[12] 81 Fed. Reg. 24,420 (Apr. 25, 2016).
[13] 85 Fed. Reg. at 31,289–90.
[14] 2022 States Comments, *supra* note 9, at 38–40.

B. More Stringent Federal Limits on Emissions from Coal-Fired Power Plants Are Necessary to Protect Our Residents and Natural Resources.

1. Power-Plant HAP Emissions Cause Serious Human Health and Environmental Harms.

Exposure to the HAPs emitted by power plants can cause a wide range of human health harms, including neurological, immunological, reproductive, and genetic injuries, and increased risk of pulmonary and cardiovascular disease, as well as significant environmental harms.[15] As described in greater detail in our 2022 States Comments, the harms caused by power-plant mercury emissions are of special concern to the Attorneys General and Local Governments.[16] Power plants were the largest domestic source of mercury emissions in 2012 when the MATS Rule was promulgated, and they remain so today,[17] contributing to the widespread mercury contamination of our inland and coastal fisheries. Despite the imposition of strict mercury emissions limits for power plants and other sources within our borders, mercury contamination remains ubiquitous in our waterbodies—and waterbodies nationwide—endangering our residents and natural resources and reducing the value of our recreational and commercial fisheries.[18] As a result, states across the Nation have been required to develop numerous "total maximum daily loads" or "TMDLs" to meet Clean Water Act obligations,[19] as well as to institute widespread fish

---

[15] David L. MacIntosh et al., Env't Health & Eng'g, Inc., *Emissions of Hazardous Air Pollutants from Coal-Fired Power Plants* 5, tbl.1, 35 (2011), https://www.lung.org/getmedia/25962184-d2fc-42f8-b5a3-8ece3257fbab/emissions-ofhazardous-air.pdf.pdf; Muhammad E. Munawer, *Human Health and Environmental Impacts of Coal Combustion and Post-Combustion Wastes*, 17 J. Sustainable Mining 87, 89, fig. 1, 93, tbl. 1 (2018), https://www.sciencedirect.com/science/article/pii/S2300396017300551; 88 Fed. Reg. at 24,857; 77 Fed. Reg. at 9310; 76 Fed. Reg. 24,976, 24,978, 24,994-95 (May 3, 2011).

[16] 2022 States Comments, *supra* note 9, at 3-4, 5-10.

[17] 88 Fed. Reg. at 24,857; 76 Fed. Reg. at 24,980, 25,002, tbl. 3.

[18] 2022 State Comments, *supra* note 9, at 7-10, 12-13.

[19] In thirteen states—Connecticut, Florida, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, North Carolina, Rhode Island, South Dakota, and Vermont—mercury contamination that has become significant enough to require the development of state- or region-wide TMDLs. *See* Conn. Dep't of Env't Prot., Me. Dep't of Env't Prot., Mass. Dep't of Env't Prot., N.H. Dep't of Env't Serv., N.Y. Dep't of Env't Conservation, R.I. Dep't of Env't Mgmt., Vt., Dep't of Env't Conservation, New England Water Pollution Control Comm'n., *Northeast Regional Mercury Total Maximum Daily Load* (2007), https://www.nescaum.org/documents/final-northeast-regional-mercury-tmdl-20071024.pdf; Conn. Dep't of Env't Prot., et al., *Final Northeast Regional Mercury Total Maximum Daily Load Final Addendum for Massachusetts (CN) 377.0)* (2012), https://www.mass.gov/doc/northeast-regional-mercury-total-maximum-daily-load-final-addendum-for-massachusetts-0/download; Fla. Dep't of Env't Prot., *Mercury TMDL for the State of Florida* (2013), https://floridadep.gov/sites /default/files/Mercury-TMDL.pdf; Mich. Dep't of Env't Quality & Env't Prot. Agency, *Michigan Statewide Mercury Total Maximum Daily Load* (2018), https://www.michigan.gov/-/media/Project/Websites/egle/Documents/Programs/WRD/SWAS/

consumption advisories to protect public health.[20] Such advisories, however, are often less effective at reducing consumption of contaminated fish by many of our most highly exposed the populations.[21] Indeed, across the Nation, tens of thousands of children are born each year with mercury levels exceeding EPA's reference dose, putting them at risk of permanent neurological damage, and millions of people are at risk of fatal heart attacks and non-fatal heart disease due to exposure to mercury through consumption of contaminated fish.[22]

The huge volumes of toxic acid gases and non-mercury metals—including lead and known carcinogens such as arsenic, chromium, and nickel—emitted by coal-fired power plants are also of great concern to the Attorneys General and Local Governments.[23] Power plants continue to be the largest domestic emissions source of many non-mercury metals, as well as the acid gas HCl.[24] Exposure to many of those non-mercury metals is associated with a wide range of serious health conditions, including adverse neurological, cardiovascular, immunological, reproductive, liver, kidney, and respiratory effects, as well as cancer.[25] And growing evidence demonstrates that exposures to mixtures of those metals can be especially dangerous.[26] Similarly, the serious pulmonary and respiratory harms caused by inhalation of the types of acid gases emitted by coal-fired power plants are also well-documented.[27]

TMDL-Other/statewide-mercury.pdf?rev=cb18141b69ba4e05a4824f3fcda96ce9 ; Minn. Pollution Control Agency, *2020 Revision to the Minnesota Statewide Mercury Total Maximum Daily Load* (2021), (Original 2007 TMDLs Attach. 1), https://attains.epa.gov/attains-public/api/documents/actions/MNPCA/MN_PRJ07770-001_2020/199356; N.J. Dep't of Env't Prot., *Total Maximum Daily Load for Mercury Impairments Based on Concentration in Fish Tissue Caused Mainly by Air Deposition to Address 122 HUC 14s Statewide* (2009), https://www.state.nj.us/dep/wms/bears/docs/TMDL%20HG%20document%20final%20version.pdf; N.C. Dep't of Env't Quality, *North Carolina Mercury TMDL* (2012), https://www.deq.nc.gov/water-quality/planning/bpu/statewide/ncmercurytmdl-epasubmit/download; S.D. Dep't of Env't and Nat. Res., *South Dakota Mercury Total Maximum Daily Load* (2015, Revised 2016), https://danr.sd.gov/Conservation/WatershedProtection/TMDL/docs/TableDocs/tmdl_statewidemercury.pdf; S.D. Dep't of Env't and Nat. Res., *2022 Addendum to the South Dakota Mercury TMDL* (2022), https://danr.sd.gov/Conservation/WatershedProtection/TMDL/docs/TableDocs/tmdl_statewideMercury2022.pdf.

[20] 2022 States Comments, *supra* note 9, at 7-8, 12-13.

[21] *Id.* at 5-6.

[22] *Id* at 4.

[23] *See* 87 Fed. Reg. at 7637, 7640; 2022 NGO Comments, *supra* note 4, Attachment 20, Raina M. Maier et al., National Institute of Environmental Health Sciences Superfund Research Centers at the University of Arizona and University of New Mexico, Prepared for Center for Applied Environmental Law and Policy, *Toxicity Review of Metals Emissions from Coal-Fired Power Plants*, at 20-23 (Mar. 2022).

[24] 88 Fed. Reg. at 24,857.

[25] *Id.* at 24,857, 77 Fed. Reg. at 9310.

[26] *See* Maier et al., *supra* note 24, at 10-11.

[27] Ruben M. L. Colunga Biancatelli *et al.*, *Age-Dependent Chronic Lung Injury and Pulmonary Fibrosis following Single Exposure to Hydrochloric Acid*, 22 Int'l J. Molecular Sci. 8833 (2021);

Further, as EPA recognizes, the health harms from power-plant HAP emissions are experienced disproportionately by certain sensitive populations, such as children, and by highly exposed populations, such as subsistence fishers and individuals living near power plants, who are disproportionately likely to be communities experiencing poverty or communities of color.[28] Thus, populations who consume higher amounts of fish, such as tribal communities and urban fishers experiencing poverty, are at greater risk for methylmercury exposure.[29] Moreover, as EPA has found, tribal communities are also more likely than the average population to reside within 10 km of the lignite-coal-burning plants subject to the MATS Rule, which are responsible for a disproportionately large share of power-plant mercury emissions.[30] In addition, communities of color and low-income populations are at greater risk from power-plant particulate matter (PM) emissions—to which most non-mercury metal HAPs are bound—because those communities are already disproportionately exposed to fine PM ($PM_{2.5}$) from other sources[31] and also experience disproportionate health impacts from that exposure.[32] Similarly,

---

Am. Thoracic Soc'y, *An Official American Thoracic Society Workshop Report: Chemical Inhalational Disasters Biology of Lung Injury, Development of Novel Therapeutics, and Medical Preparedness*, 14 Annals Am. Thoracic Soc'y 1060, 1064 (2017); Declaration of Amy B. Rosenstein submitted in support of the Joint Motion of State, Local Government and Public Health Respondent Intervenors for Remand Without Vacatur, *White Stallion v. EPA*, No. 12-1100 (D.C. Cir. Sept. 24, 2015); *See* 77 Fed. Reg. at 9363; 76 Fed. Reg. at 25,016.

[28] 88 Fed. Reg. at 24,892, 24,896; 87 Fed. Reg. at 7646–47; 77 Fed. Reg. at 9347, 9354, 9441; 76 Fed. Reg. at 24,977-78, 25,018; 65 Fed. Reg. at 79,829; EPA, *Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards* 7-26, 7-35 to 7-36, 7-40 to 7-41 (2011), Doc. ID No. EPA–HQ–OAR–2009–0234–20131.

[29] 2022 States Comments, *supra* note 9, at 5-7.

[30] 88 Fed. Reg. at 24,876, 92.

[31] Haley M. Lane, et al., *Historical Redlining Is Associated with Present-Day Air Pollution Disparities in U.S. Cities*, 9 Env't. Sci. & Tech. Letters 345 (2022), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9009174/; Bart D. Ostro, et al., *The Impact of Components of Fine Particulate Matter on Cardiovascular Mortality in Susceptible Subpopulations*, 65 Occup. Env't. Med. 750 (May 2008), https://oem.bmj.com/content/65/11/750. *See also* 88 Fed. Reg. at 24,896 ("EPA believes that $PM_{2.5}$ and ozone exposures that exist prior to this action result in disproportionate and adverse human health or environmental effects on people of color, low-income populations and/or Indigenous peoples.").

[32] Kevin P. Josey, et al., *Air Pollution and Mortality at the Intersection of Race and Social Class*, N. Engl. J. Med. (Mar. 2023), https://www.nejm.org/doi/10.1056/NEJMsa2300523; Jiawen Liu, et al., *Disparities in Air Pollution Exposure in the United States by Race/Ethnicity and Income, 1990–2010*, Env't. Health Perspectives, 129(12) (Dec. 2021), https://doi.org/10.1289/EHP8584; Abdulrahman Jbaily, et al., *Air Pollution Exposure Disparities Across U.S. Population and Income Groups*, 601 Nature 228 (Jan. 2022), https://doi.org/10.1038/s41586-021-04190-y; Timothy W. Collins, et al., *Communities of Color are Disproportionately Exposed to Long-term and Short-term PM2.5 in Metropolitan America*, 214 Env't Research 7 (2022), https://pubmed.ncbi.nlm.nih.gov/35961542/; Ihab Mikati, et al., *Disparities in Distribution of Particulate Matter Emission Sources by Race and Poverty Status*, 108(4) Am. J. Public Health 480 (Apr. 2018),

relative to adults, children face both greater exposure to HAPs—due to their higher respiratory and soil/dust ingestion rates—and greater potential harm from those HAPs—due to their rapidly developing systems and organs and immature detoxification pathways.[33] For these reasons, both airborne lead exposure and mercury exposure in utero and through fish consumption can have lifelong cognitive and detrimental socioeconomic impacts on children,[34] and inhalation of acid gases and PM to which non-mercury HAPs are bound may pose greater respiratory risks to children.[35]

2. Ongoing Power-Plant Emissions Under the Current Standards Continue to Harm Public Health and Natural Resources Within the Jurisdictions of the Attorneys General and Local Governments.

Since its promulgation in 2012, the MATS Rule has achieved, and continues to achieve, massive reductions in emissions of power-plant HAPs. Power-plant mercury emissions are estimated to have declined by 90 percent between 2010 and 2021,[36] while acid gas and non-mercury metal HAP emissions declined by 96 and 81 percent, respectively, between 2010 and 2017.[37] But, even with those substantial emissions reductions, power plants remain the Nation's largest source of HAPs, emitting 3 tons of mercury (in 2021), along with 4,831 tons of acid gases and 221 tons of non-mercury metals (in 2017).[38] Further, some of the Nation's most polluting coal-fired power plants are concentrated geographically, such as the lignite-coal-burning plants in North Dakota and Texas,[39] which increases the cumulative burden of such pollutants on

---

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5844406/; Christopher W. Tessum, et al., *PM2.5 Polluters Disproportionately and Systemically Affect People of Color in the United States* Sci. Adv. 7 (2021), https://pubmed.ncbi.nlm.nih.gov/33910895/.

[33] 76 Fed. Reg. at 25,018.

[34] Sara T.C. Orenstein et al., *Prenatal Organochlorine and Methylmercury Exposure and Memory and Learning in School-Age Children in Communities Near the New Bedford Harbor Superfund Site, Massachusetts*, 122(11) Env't Health Persp. 1253, 1256, 1257–58 (2014), https://ehp.niehs.nih.gov/doi/10.1289/ehp.1307804; Stephanie Bose-O'Reilly et al., *Mercury Exposure and Children's Health*, 40(8) Current Probs. in Pediatric & Adolescent Health Care 186, 186 (2010), https://doi.org/10.1016/j.cppeds.2010.07.002; Pub. Health & Env't, World Health Org., *Exposure to Mercury: A Major Public Health Concern* 3 (2021), https://www.who.int/publications/i/item/9789240023567; Hans Gronquvist et al., *Understanding How Low Levels of Early Lead Exposure Affect Children's Life Trajectories*, 128 J. Pol. Econ. 3376, 3423-24, 3388 n.16.

[35] 76 Fed. Reg. at 25,018; Colunga Biancatelli, et al., *supra* note 28, at 1-2, 12-13.

[36] *See* EPA, *Progress Report: Emissions Reductions: MATS Emission Trends* (2021), https://www3.epa.gov/airmarkets/progress/reports/emissions_reductions_mats.html#figure1.

[37] 87 Fed. Reg. at 7648; 84 Fed. Reg. 2670, 2689, tbl. 4.38 (Feb. 7, 2019).

[38] 87 Fed. Reg. at 7640, 7672; 84 Fed. Reg. at 2689, tbl. 4.

[39] *See* EPA, *Progress Report: Emissions Reductions: MATS State-by-State* (2021), https://www3.epa.gov/airmarkets/progress/reports/emissions_reductions_mats.html#

surrounding and downwind communities. In neighboring Minnesota, those North Dakota plants also contribute substantially to regional haze issues,[40] as do coal-fired power-plant emissions in other parts of the Nation.[41] In New York City, coal-fired power plants are a significant contributor to the approximately 30 percent of ambient $PM_{2.5}$ that comes from regional sources and that portion of the City's $PM_{2.5}$ load is estimated to contribute to approximately 600 deaths and 1,500 hospital visits and hospitalizations each year.[42]

As a result, power plant emissions continue to create significant public health and environmental harms within the jurisdictions of the Attorneys General and Local Governments and across the Nation. The burden of those ongoing harms falls disproportionately on our most sensitive and highly exposed residents, including communities of color and those experiencing poverty.[43] For example, retirements of coal-fired power plants since 2010 have disproportionately occurred in higher-income communities, leaving lower-income communities more likely to be located within 5 to 15 km of active coal-fired plants.[44] And because such

---

figure2 (individual state power plant mercury emissions for 2021 available by selecting 2021 version of map and clicking on individual states in map); Dai, et al., Env't. Sci. & Tech. Letters, *Sociodemographic Disparities in Mercury Exposure from U.S. Coal-Fired Power Plants* at D (2023), https://pubs.acs.org/doi/10.1021/acs.estlett.3c00216?ref=pdf (noting that "[m]ost active plants in 2020 emitted <5 kg of Hg to the atmosphere per year, but the highest emitting plants in North Dakota and Texas emitted >100 kg of Hg.").

[40] Minnesota Pollution Control Agency, *Minnesota's State Implementation Plan for Regional Haze* 31, Tbl. 13, 37, Tbl. 16, 53 (2022), https://www.pca.state.mn.us/sites/default/files/aq-sip2-19.pdf (North Dakota is the most significant out-of-state contributor to visibility impairment in Minnesota, largely due to its power-plant SO_2 and NO_x emissions).

[41] *See* NESCAUM, *supra* note 7, at 19–20.

[42] *See* Masha Pitiranggon, et al., *Long-term trends in local and transported $PM_{2.5}$ pollution in New York City,* 248 Atmospheric Environment, 118238 at 5 (2021) (finding that 23-30 percent of $PM_{2.5}$ in NYC in 2017 was attributable to regional sources and that sulfate was the largest component of that $PM_{2.5}$); Steffania Squizzato, et al., *A long-term source apportionment of $PM_{2.5}$ in New York State during 2005–2016*, 192 Atmospheric Environment 35, 38-39 (2018) (finding that the sulfate fraction of $PM_{2.5}$ in New York is highly correlated with variations in selenium which supports its association with coal-fired powerplants); New York City Dep't of Health, *Health Impacts of Air Pollution: Asthma Emergency Departments Visits due to Ozone*, Env't & Health Data Portal (2017) (showing a total of 5191 annual hospital visits and hospitalizations and a total of 1971 annual deaths attributable to $PM_{2.5}$ exposure), https://a816-dohbesp.nyc.gov/IndicatorPublic/beta/data-explorer/health-impacts-of-air-pollution/; Vincent Dutkiewicz, et al., *Elemental composition of $PM_{2.5}$ aerosols in Queens, New York: Evaluation of sources of fine-particle mass*, 40 Atmospheric Environment 347, 351, 355, 357-58 (2006) (finding selenium to be associated with transported coal emissions in northeastern U.S.).

[43] *See* Part I.B.1 *supra*.

[44] Dai, et al., *supra* note 40, at 10.

communities often face cumulative burdens from other sources' emissions of the same pollutants, even small contributions from coal-fired power plants are significant.[45]

In the Great Lakes Region, for example, tribal subsistence fishers—who are estimated to have three to ten times greater methylmercury exposure than the general population—face disproportionate risks from power-plant mercury emissions under the current Standards.[46] In Minnesota, many tribal communities are located downwind of the highly polluting lignite-coal-fired power plants in neighboring North Dakota, which ranked second in the Nation for power-plant mercury emissions in 2021.[47] Indeed, recent analysis shows that nearly two-thirds of sampled fish in North Dakota contained power-plant attributable methylmercury at concentrations capable of causing an exceedance of EPA's reference dose.[48] The same study found that more than half the fish sampled in the Southcentral U.S., where Texas coal-fired plants led the Nation in mercury emissions in 2021, similarly contained levels of power-plant attributable methylmercury sufficient to cause reference dose ("RfD") exceedances.[49]

Further, tribal communities in Minnesota are exposed to mercury emissions not only from those upwind power plants but also from the taconite iron ore processing industry, which contributes approximately half of Minnesota's in-state mercury inventory.[50] Due to the

---

[45] 2022 States Comments, *supra* note 9, at 34-36; *see* 87 Fed. Reg. at 7646-7647; 88 Fed. Reg. 13,956, 13,973-74 (Mar. 6, 2023).
[46] *See* 2022 States Comments, *supra* note 9, at 5; 87 Fed. Reg. at 7647; EPA, *National-Scale Mercury Risk Estimates for Cardiovascular and Neurodevelopmental Outcomes for the National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units* ("2021 TSD") 20-22, tbl. 3 (Sept. 2, 2021), Doc. ID No. EPA-HQ-OAR-2018-0794-4605, (noting that Great Lakes Tribes likely face disproportionately high risks of fatal heart attacks from power-plant methylmercury).
[47] *See* EPA, *Progress Report: Emissions Reductions: MATS State-by-State* (2021), https://www3.epa.gov/airmarkets/progress/reports/emissions_reductions_mats.html #figure2 (individual state power plant mercury emissions for 2021 available by selecting 2021 version of map and clicking on individual states in map; North Dakota's plants emitted 838 lbs. of mercury in 2021, more than 40 percent of the Nation's total); *see also* Adam Willis, *US Coal Plants Slashed Their Mercury Pollution. North Dakota Accounts for a Big Share of What Remains*, InForum (Mar. 4, 2022), https://www.inforum.com/news/north-dakota/us-coal-plants-slashed-their-mercury-pollution-north-dakota-accounts-for-a-big-share-of-what-remains?utm_ source=ourcommunity now&utm_medium=web.
[48] Dai, et al., *supra* note 40, at 12.
[49] *Id.*
[50] 2022 States Comments, *supra* note 9, at 35; Minnesota Pollution Control Agency, *Statewide Mercury TMDL Emissions Inventory* (2021), https://www.pca.state.mn.us/sites/default/files/wq-iw4-02i8.pdf (specifying draft 2019 mercury emissions of 676.3 pounds for "Ferrous Mining/Processing," out of 1395 pounds for all state sources). EPA has historically failed to set a mercury limit for the taconite ore processing industry despite Federal Clean Air Act requirements to do so by the year 2000 (85 Fed. Reg. 45476, 45,485 (Sep. 15, 2019)), and that failure is the subject of separate litigation that is currently stayed before the D.C. Circuit Court of Appeals. *Minnesota, et al. v. Wheeler*, D.C. Cir. No. 20-1392. EPA now proposes to set

cumulative effects of such mercury sources, waterbodies within those tribal areas are highly contaminated by methylmercury and ten percent of infants born in Minnesota's Lake Superior Basin—which includes several environmental justice communities—have blood mercury levels exceeding EPA's reference dose.[51] Similar cumulative exposure risks are of concern in the Southwest where tribal communities are exposed to non-mercury metals from coal-fired power plant emissions as well as from abandoned mining sources.[52]

And in the Southeast, EPA's 2021 watershed-based risk assessment indicates that under the current standards low-income Black subsistence fishers face elevated risks of fatal heart attacks from power-plant methylmercury exposures.[53] Consistent with that finding, recent demographic analysis of the communities surrounding several coal-fired power plants in North Carolina, South Carolina, and Alabama shows that, relative to each state's overall population, a disproportionate number of Black people, as well as people of color and people with low incomes, live within 5 km of the plants.[54] Further, air dispersion modeling shows that due to that proximity such individuals are exposed to the maximum impact of mercury emissions from those facilities.[55] For the same reason, those populations are also disproportionately exposed to power-plant emissions of sulfur dioxide (SO_2), the surrogate measure for power-plant acid gas emissions, and filterable PM (fPM), to which most power-plant non-mercury metals HAPs are bound,[56] which is particularly concerning given the greater cumulative exposure to $PM_{2.5}$ such populations systematically experience from other pollution sources.[57]

* * * * * *

Stronger standards under the MATS Rule are essential to addressing these serious ongoing harms, and, as discussed next, they are warranted under section 112(d)(6) by evidence

---

mercury MACT standards for new and existing taconite indurating furnaces, pursuant to sections 112(d)(2) and (3). 88 Fed. Reg. 30,923 (May 15, 2023). EPA expects that where additional controls are needed the taconite ore processing industry will use activated carbon injection ("ACI") with high efficiency venturi scrubbers, and that the standards will generate an estimated reduction of 462 pounds of mercury per year at a cost of $129 million in retrofits and annual costs of $71 million per year. *Id.*

[51] 2022 States Comments, *supra* note 9, at 35.

[52] Maier et al., *supra* note 24, at 26-27.

[53] 87 Fed. Reg. at 7647; EPA, *National-Scale Mercury Risk Estimates for Cardiovascular and Neurodevelopmental Outcomes for the National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units* 20-22, tbl. 3 (Sept. 2, 2021), Doc. ID No. EPA-HQ-OAR-2018-0794-4605.

[54] Comments of the Southern Environmental Law Center on Revocation of the 2020 Reconsideration, and Affirmation of the Appropriate and Necessary Supplemental Finding, Docket No. EPA-HQ-OAR-2018-0794, at 8-9 (Apr. 11, 2022).

[55] *Id.* at Exh. C, Dr. Ranajit Sahu, Technical Analysis in Support of SELC's Comments on EPA's Proposed Reaffirmation of the MATS Appropriate and Necessary Finding (Apr. 11, 2022) ("2023 Sahu Technical Analysis") at 2-6.

[56] *Id* at 2-6.

[57] *See id.*

that existing control technologies have proven more effective and less costly than EPA anticipated in 2011.

II. It Is Necessary Under Section 112(d)(6) for EPA to Adopt More Stringent Limits on Coal-Fired Power Plant Emissions of HAPs.

EPA has determined that improvements in both the effectiveness and the affordability of the technologies used to control HAP emissions from coal-fired power plants warrant strengthening the mercury standard for lignite-coal-fired units and the non-mercury metal fPM surrogate standard for all existing coal-fired units, as well as revising that fPM standard to require monitoring through PM continuous emission monitoring systems ("CEMS").[58] The Attorneys General and Local Governments agree that those revisions to the Standards are "necessary" pursuant to EPA's section 112(d)(6) technology review. We urge EPA to go further, however, by lowering the mercury limit for nonlignite-coal-fired units to a level comparable to the more stringent state-based standards that units within many of our borders have been meeting for years. State experience with implementing such standards has shown that coal-fired units can comply with significantly lower mercury standards using the same, readily available and affordable control technologies that have been employed nationwide since the MATS Rule went into effect.

A. EPA Is Justified in Reconsidering Its 2020 Technology Review[59] and Has the Discretion to Evaluate a Range of Relevant Factors in Doing So.

Under section 112(d)(6), at least every eight years EPA must "review, and revise as necessary" the technology-based standards established under section 112, including by "taking into account developments in practices, processes, and control technologies" since the standards were developed.[60] This "review ensures that, over time, EPA maintains source standards compliant with the law and on pace with emerging developments that create opportunities to do even better."[61] The terms "revise as necessary" and "developments" are both interpreted broadly, with reference to section 112(d)(2)'s focus on the "maximum" emissions reductions that are "achievable."[62] Thus, "developments" include "not only wholly new methods, but also

---

[58] 88 Fed. Reg. at 24,867-72.

[59] As EPA correctly states, the section 112(d)(6) requirement to review and revise the Standards based on developments in practices, processes, and technologies is independent of the section 112(f)(2) requirement to identify and address through health-based standards certain residual risks remaining despite the implementation of the Standards. 88 Fed. Reg. at 24,866 & n.17. Thus, EPA's decision not to revise its 2020 finding that more stringent standards are not required under section 112(f)(2)'s specific statutory thresholds has no bearing on its separate obligation to determine whether further emissions reductions are achievable under section 112(d)(6).

[60] 42 U.S.C. § 7412(d)(6).

[61] *Louisiana Env't Action Network v. EPA*, 955 F.3d 1088, 1093 (D.C. Cir. 2020) ("*LEAN*").

[62] *Id.* at 1097-98 ("revise as necessary" not limited to consideration of listed factors); *Nat'l Ass'n for Surface Finishing v. EPA*, 795 F.3d 1, 11 (D.C. Cir. 2015) ("developments" not limited to

technological improvements … that could result in significant additional emission reduction,"[63] and EPA may consider factors beyond the kinds of "practical and technological advances" specifically listed in section 112(d)(6).[64]

Here, EPA's 2020 technology review did little more than describe the technologies being used to control emissions under the Standards.[65] As EPA observes, that review failed to evaluate whether there had been any developments in the cost of those control technologies or in their effectiveness, such as by considering the current performance of those controls.[66] Accordingly, we agree that it is appropriate for EPA to reconsider its 2020 technology review.[67]

Further, we agree that EPA has the discretion to consider a range of factors in completing a section 112(d)(6) review,[68] including, of particular relevance here, the substantially lower emissions rates currently being achieved by most units[69] and the compliance costs that will be incurred by currently under-performing units.[70]

With regard to costs, as EPA notes, it has used a variety of metrics—including "cost-effectiveness, the total capital costs of proposed measures, annual costs, and costs compared to total revenues"—when completing technology reviews, and EPA seeks comment on how it should consider costs in the context of the MATS Rule.[71] The Attorneys General and Local Governments believe that it is appropriate to consider compliance costs in the context of the revenues, capital expenditures, and total expenditures (capital and production) of the power

---

"wholly new" developments); *Ass'n of Battery Recyclers, Inc. v. EPA*, 716 F.3d 667, 673-74 (D.C. Cir. 2013) (consideration of costs as part of section 112(d)(6) technology review permissible given that section 112(d)(2) "expressly authorizes cost consideration in other aspects of the standard-setting process").

[63] *Nat'l Ass'n for Surface Finishing*, 795 F.3d at 11 (internal quotations omitted).

[64] *LEAN*, 955 F.3d at 1098.

[65] *See* 84 Fed. Reg. at 2700; EPA, *Technology Review for the Coal- and Oil-fired EGU Source Category* ("2020 RTR Memorandum"), Doc. ID No. EPA-HQ-OAR-2018-0794-0015, at 4-10 (Jul. 2018).

[66] 88 Fed. Reg. at 24,865, 24,867; *see* 84 Fed. Reg. at 2700; 2020 RTR Memorandum at 4-10.

[67] As EPA notes, its reconsideration is of the 2020 technology review is consistent with its inherent authority to reconsider previous decisions "to the extent permitted by law and supported by a reasoned explanation." 88 Fed. Reg. at 24,859 (citing *FCC v. Fox Television Stations, Inc.*, 556 U.S. 502, 515 (2009) and *Motor Vehicle Mfrs. Ass'n v. State Farm Mutual Auto. Ins. Co.*, 463 U.S. 29, 42 (1983)). And, notably, here, EPA is permitted under section 112(d)(6) to reassess such standards more frequently than every 8 years. *See Portland Cement Ass'n v. EPA*, 665 F.3d 177, 189 (D.C. Cir. 2011).

[68] 88 Fed. Reg. at 24,863-64.

[69] *See, e.g.*, National Emissions Standards for Hazardous Air Pollutants: Ferroalloys Production, 80 Fed. Reg. 37,366, 37,380 (June 30, 2015) ("Ferroalloys Production RTR") (considering the fact that emissions were "far below" the existing surrogate PM standard for metal HAPs in evaluating whether improvements in PM controls had occurred).

[70] *See Ass'n of Battery Recyclers*, 716 F.3d at 673-74.

[71] 88 Fed. Reg. at 24,870.

sector as a whole.[72] As noted above, the determination of whether it is "necessary" to revise standards under section 112(d)(6) must be made with reference to the section 112(d)(2) mandate to impose the "maximum" emissions reductions "achievable" for the sources in the category at issue.[73] Imposing a standard that will achieve "maximum" achievable reductions certainly does not suggest that the chosen standard must provide the lowest annual cost or the lowest cost per ton of pollutant removed. It also does not suggest that EPA lacks the discretion to evaluate the impact that compliance may have on the industry as whole. And, here, where it is clear that the vast majority of units are achieving emissions rates well below the current standards—having long since absorbed the compliance costs of the control technologies that a minority of under-performing units should now employ—it is reasonable to evaluate those costs in the context of the industry's total revenues or capital expenditures.

B. The Attorneys General and Local Governments Support EPA's Proposal to Adopt an Emissions Limit of 1.2 lb/TBtu for Lignite Units and Urge EPA to Adopt a More Stringent Limit of At Least 0.65 lb/TBtu for Nonlignite Units.

The Attorneys General and Local Governments observe that compliance cost projections are often overblown at the time regulations are set and that the MATS Rule in particular has resulted in compliance costs far below initial projections. Given that experience and the evidence that most units are emitting well below the current Standards, more stringent mercury emissions standards are "necessary" for all coal-fired power plants under section 112(d)(6). Accordingly, we support EPA's proposal to adopt a more stringent standard of 1.2 lb/TBtu for lignite plants. But we also urge EPA to adopt an even more stringent standard for nonlignite plants because such a wide subset of those units have demonstrated the capability to easily comply with an emissions rate of 0.65 lb/TBtu, or lower.

1. State Experience Regulating Power Plants Demonstrates that More Stringent Mercury Emissions Limits Are Necessary Under Section 112(d)(6) Because They Are Achievable and Affordable.

The experience in the jurisdictions of the Attorneys General and Local Governments confirms that stringent limits on power-plant mercury emissions can be readily achieved at lower-than-predicted costs and thus should be adopted nationally through section 112(d)(6). To address widespread mercury contamination of state waterbodies,[74] at least fourteen states have for years enforced state-based limits on power-plant mercury emissions,[75] and nearly every one

---

[72] *See id.*

[73] *See* 42 U.S.C. § 7412(d)(2).

[74] *See* Part I.A.2 *supra.*

[75] *See* 5 Colo. Code Regs. § 1001-8:B.VIII (first phase compliance by Jan. 1, 2012); Del. Admin. Code tit. 7 § 1146-6 (first phase compliance by Jan. 1, 2009); Conn. Gen. Stat. § 22a-199 (compliance by July 1, 2008); Ill. Admin. Code tit. 35 § 225.230 (compliance by July 1, 2009); Md. Code Regs. tit. 26, § 11.27.03.D (first phase compliance by Jan. 1, 2010); 310 Mass. Code Regs. § 7.29 (first phase compliance by Jan. 1, 2008); N.J. Admin. Code § 7:27-27.7

of those states has imposed a more stringent emissions limit than the Standards.[76] These lower emissions limits have driven significant and meaningful mercury emissions reductions, which have proven to be both achievable and cost-effective.

As detailed in the 2022 States Comments, coal-fired units have capably complied with the existing Standards, and have done so at significantly lower cost than EPA initially projected.[77] This is due in part to improvements and cost reductions in pollution controls, including the activated carbon injection ("ACI") technology used to control mercury.[78] Similarly, coal-fired power plants have been able to achieve state-law emissions limits at reasonable cost, even where they are more stringent than the current Standards.[79]

Further, recent analysis demonstrates that the cost of compliance continues to decline relative to EPA's 2012 projections, even using conservative assumptions.[80] And EPA acknowledges that its approach in the Proposal is a conservative one that is likely to overestimate compliance costs for lignite coal units.[81] As both EPA's assessment and other recent analysis

---

(compliance by Dec. 15, 2007); Minn. R. 7011.0561 (first phase compliance by Jan. 1, 2018); Mont. Admin. R. 17.8.771 (compliance by Jan. 1, 2010); N.H. Rev. Stat. Ann. § 125-O:11-18 (compliance by July 1, 2013); N.Y. Comp. Codes R. & Regs. tit. 6 § 246.6 (first phase compliance by Jan. 1, 2010); Or. Admin. R. 340-228-0606 (compliance by July 1, 2012); Wis. Admin. Code NR § 446.13 (compliance by Apr. 16, 2016); *see also* Mich. Admin. Code r. 336.2503(1)(a)-(b) (2009) (compliance by Apr. 16, 2015), modified by Mich. Admin. Code r. 336.2502a (2013) (exempting covered power plants "for which [MATS] is an applicable requirement relative to emissions of mercury" and, if the Rule ceases to be an applicable requirement, extending compliance date to the later of three months from the date of inapplicability or April 16, 2015).

[76] The current Standards require an emissions limit of 1.2 lb/TBtu or 0.013 lb/GW-hr. *See* 77 Fed. Reg. at 9367 tbl.3. Most state rate-based standards are set at 0.6 lb/TBtu or 0.008 lb/GW-hr. *See* Conn. Gen. Stat. § 22a-199(b)(1) (0.6 lb/TBtu); Del. Admin. Code tit. 7 § 1146–6.2 (0.6 lb/TBtu); Ill. Admin. Code tit. 35 § 225.230(a)(1)(A) (0.008 lb/GW-hr); 310 Mass. Code Regs. § 7.29(5)(a)(3)(f) (0.0025 lb/GW-hr); Mich. Admin. Code r. 336.2503(1)(b) (0.008 lb/GW-hr); Minn. R. 7011.0561 (0.008 lb/GW-hr); Mont. Admin. R. 17.8.771(1)(b)(ii) (0.9 lb/TBtu); N.J. Admin. Code § 7:27-27.7(a) (3.00 mg/MWh (equivalent to 0.66 lb/TBtu)); N.Y. Comp. Codes R. & Regs. tit. 6 § 246.6(a) (0.6 lb/TBtu); Or. Admin. R. 340-228-0606(1) (0.6 lb/TBtu); Wis. Admin. Code NR § 446.13(1) (0.008 lb/GW-hr).

[77] 2022 States Comments, *supra* note 9, at 33, 40 (*citing* NESCAUM, *supra* note 7, at 11).

[78] NESCAUM, *supra* note 7, at 11.

[79] *See* note 8, *supra*.

[80] Andover Technology Partners, Prepared for Center for Applied Environmental Law and Policy, *Assessment of Potential Revisions to the Mercury and Air Toxics Standards* (June 15, 2023) ("2023 ATP Assessment") at 32 ("Today there is far more data available on non-lignite units to evaluate the cost of complying with a lower Hg emission level than there was when EPA evaluated the cost of complying with the emission levels of the 2012 MATS regulation.") & Figs. 15-18, https://www.andovertechnology.com/wp-content/uploads/2023/06/C_23_ CAELP_Final.pdf.

[81] 88 Fed. Reg. at 24,881.

demonstrate, proven, cost-effective controls include increased usage of ACI and baghouses (or fabric filters), along with other HAP and PM controls including, dry flue-gas desulfurization systems ("FGD") (also known as dry scrubbers), wet scrubbers, and electrostatic precipitators ("ESP"), which provide co-benefit reductions in mercury emissions.[82]

The Attorneys General and Local Governments appreciate EPA's recognition of this record of successful power-plant mercury emissions reductions, which demonstrates the effectiveness and affordability of various mercury-control technologies.[83] Given that real-world experience, the next two subsections detail the Attorneys General and Local Governments' support for EPA's proposal of a 1.2 lb/TBtu mercury emissions limit for lignite coal-fired units and urge EPA to adopt a more stringent mercury emissions limit for nonlignite units of at least 0.65 lb/TBtu.

2. EPA's Proposal to Set a Mercury Emissions Limit of 1.2 lb/TBtu for Lignite Units Is Well-Supported by the Successful Performance of Nonlignite Units Under the Current Standards.

The State and Local Governments support EPA's proposed 1.2 lb/TBtu mercury emissions limit for lignite coal-fired units, which represents a starting point that can and should be revisited and strengthened as new compliance data becomes available. The proposed limit is the same mercury emissions limit that nonlignite-fired units already meet—and that many of those units regularly exceed.[84] Applying the experience of nonlignite units, EPA correctly observes that available controls and methods of operation, especially ACI systems, will allow lignite-fired units to meet the same mercury standard that is being met by units firing on non-lignite coal supply and that the costs of doing so are reasonable.[85] EPA appropriately relies on the beyond-the-floor costs from the 2012 MATS Final Rule, the injection rates reported in the section 114 survey results, and the calculated cost-effectiveness of using ACI controls.[86] EPA has also used a conservative method of determining the cost of injecting nonbrominated ACI, and, further, correctly recognizes that even with differences (and similarities) in feedstocks, lignite-fired units simply are not yet deploying *any* of the most effective control technologies that are already in use and proven at nonlignite-fired power plants.[87] And, as EPA notes, the projected cost of the revised lignite mercury standard, $8,703 per lb of mercury removed, is significantly lower than the cost it has previously found acceptable—both in calculating the existing mercury Standards and in other rulemakings.[88]

---

[82] 2023 ATP Assessment, *supra* note 82 at 30-33.
[83] 88 Fed. Reg. at 24,879, 24,881.
[84] 88 Fed. Reg. at 24,880-82.
[85] *See id*. at 24,880-81.
[86] *See id*. at 24,881.
[87] *See id*.
[88] *Id.* (citing a cost of approximately $27,000 per pound of mercury as part of the beyond-the-floor analysis supporting the 2012 MATS Rule and a cost of $27,500 per pound of mercury in the Primary Copper residual risk and technology review).

Given the experience of many of the Attorneys General and Local Government's jurisdictions in implementing more stringent mercury standards and EPA's robust analysis in the Proposal, its determination that it is "necessary" under section 112(d)(6) to reduce the emissions limit for lignite-fired units to 1.2 lb/TBtu is well-supported—especially since proven, cost-effective technology is so readily available. Further, because that emissions limit is the existing standard for nonlignite sources, EPA correctly applies the known cost-effectiveness and usability of ACI and other technologies in nonlignite units to inform its decision to propose the same standard for lignite units.[89] While the Attorneys General and Local Governments support EPA's adoption of the proposed 1.2 lb/TBtu limit, we would also support further mercury emissions reductions by lignite units below that limit and encourage EPA to collect information on those units' compliance with the proposed limit in order to support possible future strengthening of the standard.

3. The Attorneys General and Local Governments Urge EPA to Adopt a Mercury Emissions Limit of At Least 0.65 lb/TBtu for Nonlignite Coal-Fired Units.

The Attorneys General and Local Governments applaud the gains that the existing 1.2 lb/TBtu standard for nonlignite-fired power plants has provided and appreciate the benefits that such an emissions limit will continue to provide moving forward. Even so, we urge EPA to adopt an even more stringent standard similar to the lower emissions limits that many states have been implementing for years.[90] That state experience demonstrates that lower emissions limits—in particular 0.6 lb/TBtu—are being met using proven and affordable control technologies. Indeed, data from units consuming not-low-rank coal (i.e., nonlignite) shows that fully 80 percent of all such units are capable of achieving 90 percent mercury emissions capture or better and emissions rates of 0.65 lb/TBtu or less.[91] If 80 percent of such units are capable of achieving—and indeed exceeding—0.65 lb/TBtu, it is plainly a technologically feasible standard. Further, we recognize EPA's concern about assessing the costs of meeting such a lower mercury standard without having collected section 114 data on the type and injection rates of sorbents and chemical additives.[92] Nonetheless, EPA should be able to evaluate those costs using other available data sources.[93] The Attorneys General and Local Governments thus urge EPA to adopt a more stringent standard for nonlignite units of at least 0.65 lb/TBtu pursuant to its section 112(d)(6) review.

---

[89] *See id.* at 24,880-81.
[90] *See* Part II.B.1 & note 77, *supra.*
[91] 2023 ATP Assessment, *supra* note 82, at 33 & fig. 13.
[92] *See* 88 Fed. Reg. at 24,879.
[93] *See* 2023 ATP Assessment, *supra* note 82, at 31-39.

C. The Attorneys General and Local Governments Support Revision of the fPM Standard for Non-Mercury Metals by Lowering That Standard and Requiring Compliance Using PM CEMS.

The Attorneys General and Local Governments support lowering the surrogate fPM standard for non-mercury metal HAPs to at least the 0.010 lb/MMBtu level proposed by EPA, which is currently already achievable by almost all units. But we also urge EPA to go further to adopt a standard as low as the more stringent 0.0060 lb/MMBtu level that it also evaluated and on which it seeks comment, given that a majority of units are already capable of meeting it and that EPA's projected compliance costs for that standard are likely significantly overestimated. Finally, we support requiring all units to use PM CEMS to demonstrate compliance with whichever limit EPA adopts given that use of such continuous monitoring will provide emissions reduction benefits and that concerns about the feasibility of its use at low fPM levels are overblown.

1. More Stringent Limits on the Emission of Non-Mercury Metals from Coal-Fired Power Plants Through a Lower fPM Standard Are Warranted Under Section 112(d)(6).

The Attorneys General and Local Governments agree with EPA that it is "necessary" to lower the fPM limit for all units pursuant to section 112(d)(6).[94] As EPA notes, "the vast majority of existing coal-fired EGUs are performing well below" the 2012 fPM requirement of 0.030 lb/MMBtu using readily available control technologies.[95] That finding is consistent with the experience in our jurisdictions where coal-fired plants are employing electrostatic precipitators and/or fabric filters to meet that current standard. Moreover, as EPA recognizes,[96] and as many parties, including the Attorneys General and Local Governments, have consistently pointed out for years,[97] the costs of generating those lower emissions have been significantly less than anticipated by EPA in 2011, due in large part to operational and monitoring improvements that reduced the need to install or upgrade controls.[98] A revision to the fPM standard is thus "necessary" under section 112(d)(6) to reflect the lower emissions rates that are currently being achieved by most units with existing controls.

Further, the 0.010 lb/MMBtu limit that EPA has proposed is "achievable" using those proven technologies and at reasonable cost, and the Attorneys General and Local Governments support lowering the fPM standard to that level, at a minimum. EPA's analysis indicates that

---

[94] 88 Fed. Reg. at 24,869.
[95] *Id.* at 24,871, 24,868.
[96] *Id.* at 24,868-70.
[97] *See, e.g.*, 2022 States Comments *supra* note 9, at 33; Comments of the Attorneys General of Massachusetts, et al., Docket No. EPA-HQ-OAR-2009-0234-20551, at 8 (Jan. 15, 2016).
[98] *See* Andover Technology Partners, Analysis of PM and Hg Emissions and Controls from Coal-Fired Power Plants (Aug. 19, 2021), https://www.andovertechnology.com/wp-content/uploads/2021/08/PM-and-Hg-Controls_CAELP_20210819.pdf; NESCAUM, *supra* note 7, at 11.

91 percent of units can already meet this limit and that, at most, 20[99] of the 275-unit[100] fleet may be required to make upgrades to comply.[101] It is thus not surprising that EPA's projected annual compliance costs will be miniscule within the context of the power sector as a whole—equivalent, for example, to only 0.2 percent of 2019 total retail electricity sales (the lowest sales figure since 2000).[102] And it is notable that, considering the "cost-effectiveness" of the 0.010 lb/MMBtu limit, the upper limit of the projected annual costs here, $44,900 per ton of fPM and $86,000 per ton of $PM_{2.5}$,[103] are substantially lower than the per-ton costs that EPA has considered to be cost-effective in other technology reviews.[104] Thus, EPA should strengthen the standard to *at least* 0.010 lb/MMBtu.

EPA also evaluates and seeks comment on a more stringent fPM limit of 0.0060 lb/MMBtu, which it notes was the average emissions rate for units in 2010, prior to the implementation of the MATS Rule.[105] Currently, 72 percent of existing coal-fired capacity has demonstrated an emissions rate at that level or lower,[106] and a recent analysis shows that 50 percent of units emit below that rate on average annually.[107] Thus, as with the 0.010 lb/MMBtu limit, there is no doubt that meeting that lower emissions rate is technologically feasible using currently available controls and the Attorneys General and Local Governments urge EPA to adopt the 0.0060 lb/MMBtu limit.

EPA has raised concerns about the 0.0060 lb/MMBtu limit citing "potential costs, including the EPA's current assessment of measurement uncertainty, when considering the current fleet."[108] In particular, EPA projects that 65 units would need to install new or upgrade existing fabric filters, the most costly of the possible control upgrades.[109] But there is good reason to believe that this projection is too high. Recent independent analysis shows that only 11 units would likely require new fabric filters because most units would be able to comply with the

---

[99] This number, however, is likely an overestimate given that many units may be able to comply by using existing controls. *See* 2023 ATP Assessment*, supra* note 82, at 41, 44, tbl. 7.
[100] EPA, *2023 Technology Review for the Coal- and Oil-Fired EGU Source Category*, EPA–HQ–OAR–2018–0794–5789, at App. B, C (Jan. 2023) ("2023 Technology Review Memo") (listing number facilities and units, respectively, subject to the MATS Rule and for which EPA has fPM compliance data).
[101] 88 Fed. Reg. at 24,868.
[102] *Id.* at 24,870 & tbl. 3.
[103] *See* 2023 Technology Review Memo, *supra* note 103, at 12, tbl. 7.
[104] *See* Ferroalloys Production RTR, *supra* note 70, at 37,381 ($165,000 per ton $PM_{2.5}$); National Emissions Standards for Hazardous Air Pollutants: Secondary Lead Smelting, 76 Fed. Reg. 24,976, 29,060 (May 19, 2011) (proposed rule) ($100,000 per ton of fPM). It is important to note that because these per-ton costs from pre-2019 rulemakings are not adjusted for inflation, they provide a conservatively low estimate of compliance costs relative to the 2019 costs in the Proposal.
[105] 88 Fed. Reg. at 24,868.
[106] 88 Fed. Reg. at 24,686.
[107] 2023 ATP Assessment, *supra* note 82, at 40, tbl. 6.
[108] 88 Fed. Reg. at 24,871.
[109] *Id.* at 24,869.

limit using existing or upgraded ESPs.[110] Indeed, as EPA correctly observes, historically units have been able to achieve lower fPM levels through operational and monitoring changes to existing controls alone.[111] And because EPA's projections do not account for future (but currently unannounced) retirements likely to result from factors unrelated to the MATS Rule, such as the Inflation Reduction Act, they also may overestimate the number of units that would be subject to the more stringent fPM limit.[112]

Further, even assuming EPA's projections are correct, the total annual cost of complying with the 0.0060 lb/MMBtu standard, which EPA estimates to be $633 million annually,[113] is also miniscule in the context of the power sector as a whole, constituting only about 0.31 percent of power sector total expenditures in 2019 ($200.7 billion)[114] or about 0.15 percent of 2019 revenues ($401.7 billion),[115] and thus clearly absorbable by that sector. Even considering the "cost-effectiveness" of that lower rate, the annual costs, $103,000 per ton of fPM and $209,000 per ton of $PM_{2.5}$,[116] are similar to the per-ton costs that EPA has considered to be cost-effective in other technology reviews.[117]

Finally, EPA cites concerns about the cost and feasibility of using PM CEMS to monitor compliance at lower fPM emissions rates, such as a 0.0060 lb/MMBtu.[118] As discussed below, the Attorneys General and Local Governments strongly support the use of PM CEMS to demonstrate compliance. While we agree that it would not be appropriate to set an emissions limit that cannot feasibly be monitored by PM CEMS, it does not appear that EPA's concerns about the use of PM CEMS at low fPM emissions rates are so substantial as to militate against adoption of a 0.0060 lb/MMBtu standard.

---

110 2023 ATP Assessment, *supra* note 82, at 2, 19-25.
111 88 Fed. Reg. at 24,870.
112 *Id.* at 24,871-72.
113 *Id.* at 24,870.
114 *See* EPA, *Supplemental Data and Analysis for the National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units – Revocation of the 2020 Reconsideration, and Affirmation of the Appropriate and Necessary Supplemental Finding; Notice of Proposed Rulemaking* 81, tbls. A-4, A-6 (Sept. 21, 2022), Doc. ID. No. EPA-HQ-OAR- EPA–HQ–OAR–2018–0794– 4632. The 0.31 percentage is a conservative measure of the relative contribution of the $633 million in annual compliance costs to total industry expenditures because the projected $200.7 billion amount reflects 2007 dollars and has not been adjusted for inflation.
115 *See* U.S. Energy Info. Admin., *Electric Power Annual 2021*, tbl. 2.3 (Nov. 2022), https://www.eia.gov/electricity/annual/ (showing total revenue from sales of electricity to ultimate customers of $401.738 billion in 2019).
116 *See* 2023 Technology Review Memo, *supra* note 103, at 12, tbl. 7.
117 *See* note 107, *supra*.
118 88 Fed. Reg. at 24,871.

3. Revision of the fPM Standard to Require the Use of PM CEMS to Demonstrate Compliance Is Necessary as Part of EPA's Section 112(d)(6) Technology Review.

EPA is well justified in revising the Standards to require the use of PM CEMS to demonstrate compliance. That monitoring technology is already employed by a third of coal-fired units to demonstrate compliance with the fPM surrogate standard—providing a clear indication that use of PM CEMS is "achievable" in this context both in terms of cost and availability.[119] When it promulgated the MATS Rule in 2012, EPA estimated that the use of PM CEMS would be more cost-effective than the alterative quarterly stack testing method and it continues to be so.[120] Moreover, both the costs of installing and of operating PM CEMS have declined significantly since then.[121] And, as EPA recognizes, the use of such systems offers many advantages over the quarterly stack testing alternative, in particular continuous and real-time data on fPM emissions, which allow for immediate detection and correction of exceedances and, consequently, reductions in fPM emissions.[122] Further, we agree with EPA that the ability to prevent such non-compliance is especially valuable to communities living in close proximity to coal-fired units,[123] which disproportionately include communities of color and those experiencing poverty as well as cumulative harms from other sources of pollutants.[124] For all of these reasons, the Attorneys General and Local Governments agree with EPA that it is "necessary" under section 112(d)(6) to require all units to demonstrate fPM compliance through the use of PM CEMS.

In the Proposal, EPA also seeks comment on whether it is feasible to use PM CEMS to demonstrate compliance with lower fPM limits, such as the 0.0060 lb/MMBtu level that a majority of units are currently meeting.[125] As explained by EPA, whether such systems are *capable* of accurately measuring fPM at such low levels is not the issue;[126] rather EPA raises concern about the practicality and potential higher costs of using PM CEMS to monitor lower emissions levels in light of the longer collection periods required to calibrate such systems to address the measurement uncertainty inherent at low levels.[127]

---

[119] *See id*. at 24,857.
[120] *Id.* at 24,872.
[121] *Id*.
[122] *Id. See also* 2023 Sahu Technical Analysis, *supra* note 56, at 9 (Stack tests "are not representative of normal everyday operation" of regulated units or their PM control devices because "[p]reventive maintenance is paramount to ensure proper operation of these control devices[,]" and such "maintenance is often conducted just prior to a [stack] compliance test" rather than on an ongoing basis, which "adversely and dramatically affects the efficiencies of these controls.").
[123] 88 Fed. Reg. at 24,872.
[124] *See* Part I.B *supra*.
[125] 88 Fed. Reg. at 24,874.
[126] In this regard, it is not accurate to suggest, as the Proposal does elsewhere, that some PM CEMS would "struggle" to meet EPA's average random error requirements at low fPM levels. 88 Fed. Reg. at 24,871.
[127] *See id.* at 24,874.

It is notable, however, that numerous units are already using CEMS to report levels at or below 0.0060 lb/MMBtu, apparently at reasonable cost and in compliance with the required EPA calibration reference method.[128] In addition, as EPA recognizes, newer technology (i.e., qualitative aerosol generators) exists that would allow for direct PM CEMS calibration at low fPM levels.[129] These facts suggest that that the practical and cost limitations of using PM CEMS at those levels are not substantial. The Attorneys General and Local Governments thus urge EPA to require the use of PM CEMS for low fPM levels, including 0.0060 lb/MMBtu.

D. The Attorneys General and Local Governments Support Continued Evaluation of Strengthened Acid Gas Standards.

EPA is not proposing to modify the existing 0.0020 lb/MMBtu HCl emissions standard (nor the alternative SO_2 emissions standard), which serves as a surrogate for all acid gas HAPs (HCl, HF, SeO_2) emitted by coal-fired power plants.[130] But a significant number of units have demonstrated that readily available technology exists for achieving HCl emissions rates at least as low as 0.00060 lb/MMBtu.[131] Such a limit for HCl should be achievable using existing controls already in place or by adding dry-sorbent injection ("DSI") systems, a proven and affordable technology which also provides co-benefit reductions in SO_2 emissions.[132]

Specifically, using EPA's own technical assessment and supporting data, recent analysis by an independent consultant concludes that:

- Dry FGD systems provide HCl emissions that are below 0.00060 lb/MMBtu. Units that use this technology can already readily achieve that standard.
- Wet FGD systems used to address SO_2 also achieve correlated reductions in HCl, and units using wet FGD that can achieve an SO_2 limit below 0.20 lb/MMBtu can also likely achieve a 0.00060 lb/MMBtu HCl limit. Only six units equipped with wet FGD would need further HCl reductions, such as by upgrading those systems or by adding DSI, to meet a 0.00060 lb/MMBtu HCl limit.
- Units equipped with DSI as well as baghouses have HCl emissions rates well below 0.00060 lb/MMBtu—without need for further controls. Similarly, DSI-equipped units with ESPs that will require fabric filters to comply with a more stringent fPM limit should be able to achieve HCl emissions of 0.00060 lb/MMBtu. And those that do not use fabric filters could achieve that standard at reasonable cost by increasing DSI injection rates or changing coal types.

---

[128] 2023 ATP Assessment, *supra* note 82, at 35, 40-41 (based on Appendix C data from 2023 Technology Review for the Coal- and Oil-Fired EGU Source Category nearly half of the units with PM CEMS reported emissions levels of 0.005 lb/MMBtu or below (70% for stack sampling)).
[129] 88 Fed. Reg. at 24,874.
[130] *Id.* at 24,882-83. *See id.* at 24,858, 24,860 (discussing surrogate relationship), 24,882-83 (same, along with review of technology).
[131] 2023 ATP Assessment, *supra* note 82, at 45, tbl. 6, 46-49.
[132] *Id.*

- Units that are currently "uncontrolled" can meet a 0.00060 lb/MMBtu HCl emissions limit by installing DSI, which numerous other facilities currently use at reasonable cost.[133]

Data readily available to EPA thus appear to demonstrate the achievability and affordability of a more-stringent HCl emissions limit based on existing and/or easily installed HCl controls (or fPM and SO_2 controls with co-benefits for HCl emissions). The Attorneys General and Local Governments thus urge EPA to evaluate that data fully and to consider whether a more stringent HCl standard is warranted.

E. EPA Should Require Shorter Compliance Deadlines for Units that Do Not Need to Make Substantial Upgrades to Comply with the Revised Standards.

EPA proposes to allow 3 years for compliance with each of the proposed revisions to the Standards and seeks comment on whether less time is needed to comply.[134] The Attorneys General and Local Governments urge EPA to calibrate compliance periods to the time reasonably necessary for facilities to comply to ensure reductions of harmful emissions as quickly as possible. Thus, a 3-year compliance period may be appropriate for many units that must install new control devices or retrofit existing control devices to comply with more stringent fPM and mercury standards. For units that need to make operational changes only, however, such as units with existing ACI systems that will need to increase treatment rates, a 1-year compliance deadline is more appropriate. With regard to PM CEMS, 2 years is an appropriate compliance deadline given that two-thirds of units currently do not have such systems in place and the demand for such systems may create manufacturing and installation delays.

CONCLUSION

For all the reasons set forth above, pursuant to section 112(d)(6), EPA should revise the Standards by (1) adopting the proposed 1.2 lb/TBtu mercury standard for lignite-coal-fired units and a more stringent mercury standard for nonlignite coal-fired units of at least 0.65 lb/TBtu; (2) adopting an fPM standard for all coal-fired units of 0.0060 lb/MMBtu and requiring the use of PM CEMS to demonstrate fPM compliance; and (3) incorporating compliance deadlines for those revisions that are reasonable in light of the specific upgrades and operational changes required. We also urge EPA in its final rule to fully evaluate existing data on the achievability and affordability of a more stringent HCl standard and to determine whether such a revision is warranted.

---

[133] 2023 ATP Assessment, *supra* note 82, at 43-47.
[134] 88 Fed. Reg. at 24,887.

Respectfully submitted,

FOR THE COMMONWEALTH OF MASSACHUSETTS

ANDREA JOY CAMPBELL
ATTORNEY GENERAL
TRACY L. TRIPLETT
Assistant Attorney General
Energy and Environment Bureau
One Ashburton Place, 18th Floor
Boston, MA 02108
(617) 963-2431

FOR THE STATE OF MINNESOTA

KEITH ELLISON
ATTORNEY GENERAL
PETER SURDO
JOSEPH HEEGAARD
Assistant Attorneys General
445 Minnesota Street, Suite 900
St. Paul, MN 55101-2127
(651) 757-1244

FOR THE STATE OF CONNECTICUT

WILLIAM TONG
ATTORNEY GENERAL
MATTHEW I. LEVINE
Deputy Associate Attorney General
SCOTT N. KOSCHWITZ
Assistant Attorney General
Connecticut Office of the Attorney General
165 Capitol Avenue
Hartford, Connecticut 06106
(860) 808-5250

FOR THE STATE OF ILLINOIS

KWAME RAOUL
ATTORNEY GENERAL
MATTHEW J. DUNN
Chief, Environmental Enforcement/
Asbestos Litigation Division
JASON E. JAMES
ELIZABETH DUBATS
Assistant Attorneys General
Office of the Attorney General
201 West Pointe Drive, Suite 7
Belleville, IL 62226
(872) 276-3583

FOR THE STATE OF MAINE

AARON M. FREY
ATTORNEY GENERAL
EMMA AKRAWI
Assistant Attorney General
Natural Resources Division
Maine Office of the Attorney General
6 State House Station
Augusta, ME 04333
(207) 626-8800

FOR THE STATE OF MARYLAND

ANTHONY G. BROWN
ATTORNEY GENERAL
JOSHUA M. SEGAL
Special Assistant Attorney General
Office of the Attorney General
200 St. Paul Place
Baltimore, MD 21202
(410) 576-6446

FOR THE STATE OF MICHIGAN

DANA NESSEL
ATTORNEY GENERAL
JENNIFER ROSA
Assistant Attorney General
Michigan Department of the Attorney General
Environment, Natural Resources and
Agriculture Division
P.O. Box 30755
Lansing, MI 48909
(517) 335-7664

FOR THE STATE OF NEW JERSEY

MATTHEW J. PLATKIN
ATTORNEY GENERAL
LISA J. MORELLI
Deputy Attorney General
New Jersey Division of Law
25 Market Street
Trenton, NJ 08625
(609) 376-2740

FOR THE STATE OF NEW MEXICO

RAÚL TORREZ
ATTORNEY GENERAL
WILLIAM GRANTHAM
Assistant Attorney General
Environmental Protection Division
P.O. Box 1508
Santa Fe, NM 87504
(505) 717-3520

FOR THE STATE OF NEW YORK

LETITIA JAMES
ATTORNEY GENERAL
MICHAEL J. MYERS
Senior Counsel, Air Pollution & Climate
Change Litigation
ANDREW FRANK
Assistant Attorneys General
AMELIA GRANT-ALFIERI
Environmental Scientist
New York State Attorney General's Office
New York State Attorney General's Office
28 Liberty Street
New York, NY 10005
(212) 416-8271

FOR THE STATE OF OREGON

ELLEN F. ROSENBLUM
ATTORNEY GENERAL
PAUL A. GARRAHAN
Attorney-in-Charge
STEVE NOVICK
Special Assistant Attorney General
Natural Resources Section
Oregon Department of Justice
1162 Court Street NE
Salem, OR 97301
(503) 947-4540

FOR THE COMMONWEALTH OF
PENNSYLVANIA

MICHELLE HENRY
ATTORNEY GENERAL
ANN R. JOHNSTON
Senior Deputy Attorney General
Office of the Attorney General
Civil Environmental Enforcement Unit
Strawberry Square, 14th Floor
Harrisburg, Pennsylvania 17120
(717) 497-3678

FOR THE STATE OF RHODE ISLAND

PETER F. NERONHA
ATTORNEY GENERAL
ALLISON B. HOFFMAN
Special Assistant Attorney General
Chief, Environment and Energy Unit
Rhode Island Department of the Attorney General Counsel
150 South Main Street
Providence, RI 02903
(401) 274-4400

FOR THE STATE OF VERMONT

CHARITY R. CLARK
ATTORNEY GENERAL
NICHOLAS F. PERSAMPIERI
Assistant Attorney General
Vermont Attorney General's Office
109 State Street
Montpelier, VT 05609
(802) 828-3186

FOR THE STATE OF WASHINGTON

ROBERT W. FERGUSON
ATTORNEY GENERAL
CAROLINE E. CRESS
Assistant Attorney General
Ecology Division
Washington State Attorney General's Office
P.O. Box 40117
Olympia, WA 98504
(306) 586-4613

FOR THE STATE OF WISCONSIN

JOSHUA L. KAUL
ATTORNEY GENERAL
GABE JOHNSON-KARP
Assistant Attorney General
Wisconsin Department of Justice
P.O. Box 7857
Madison, WI 53702-7857
(608) 267-8904

FOR THE CITY OF BALTIMORE

EBONY M. THOMPSON
ACTING CITY SOLICITOR
DAWN LETTMAN
Chief Solicitor
Baltimore City Law Department
100 North Holliday Street, Suite 101
Baltimore, MD 21202
(410) 396-8393

Attorney for the Mayor and City Counsel of Baltimore, Maryland

FOR THE CITY OF CHICAGO

MARY RICHARDSON-LOWRY
CORPORATION COUNSEL
MORT AMES
Senior Corporation Counsel
GABRIELLE SIGEL
Assistant Corporation Counsel Supervisor
BRADLEY RYBA
Assistant Corporation Counsel
City of Chicago Law Department
2 North LaSalle Street, Suite 540
Chicago, Illinois 60602
(312) 744-6432

FOR THE CITY OF NEW YORK

HON. SYLVIA O. HINDS-RADIX
CORPORATION COUNSEL
DEVON GOODRICH
Assistant Corporation Counsel
New York City Law Department
100 Church Street
New York, NY 10007
(212) 356-2316

Exhibit 1

Comments of the Commonwealths of Massachusetts and Pennsylvania; the States of California, Connecticut, Delaware, Illinois, Iowa, Maine, Maryland, Minnesota, New Jersey, New Mexico, New York, North Carolina, Oregon, Rhode Island, Vermont, Washington, Wisconsin; the District of Columbia; and the Cities of Baltimore, Chicago, and New York City

on

the Environmental Protection Agency's Proposed "National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units— Revocation of the 2020 Reconsideration, and Affirmation of the Appropriate and Necessary Supplemental Finding," 87 Fed. Reg. 7624 (Feb. 9, 2022), Docket ID No. EPA-HQ-OAR-2018-0794

April 11, 2022

Table of Contents

The Commonwealths of Massachusetts and Pennsylvania; the States of California, Connecticut, Delaware, Illinois, Iowa, Maine, Maryland, Minnesota, New Jersey, New Mexico, New York, North Carolina, Oregon, Rhode Island, Vermont, Washington, Wisconsin; the District of Columbia; the Cities of Baltimore, Chicago, and New York City (together "States and Local Governments") respectfully submit these comments on the Environmental Protection Agency's ("EPA") proposal entitled "National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units—Revocation of the 2020 Reconsideration, and Affirmation of the Appropriate and Necessary Supplemental Finding," 87 Fed. Reg. 7624 (Feb. 9, 2022) ("Proposal"). The States and Local Governments strongly support the Proposal and EPA's reaffirmation that it is "appropriate and necessary" to regulate emissions of mercury and other hazardous air pollutants ("HAPs") from power plants under section 112 of the Clean Air Act ("Act"), 42 U.S.C. § 7412.

INTRODUCTION

More than twenty years ago, EPA first found it "appropriate and necessary" to regulate power plants under section 112, based on an extensive record reflecting over a decade of scientific research and data on actual power plant emissions. 65 Fed. Reg. 79,825 (Dec. 20, 2000). EPA reaffirmed that finding in 2012 based on a growing body of scientific evidence, 77 Fed. Reg. 9304 (Feb. 16, 2012), and reaffirmed it again in 2016 after considering cost pursuant to the Supreme Court's direction, 81 Fed. Reg. 24,420 (Apr. 25, 2016) ("Supplemental Finding"). The Mercury and Air Toxics Standards ("MATS") Rule, promulgated in 2012 and based on the agency's appropriate and necessary finding, has required power plants to substantially reduce their HAP emissions since that rule's 2015 compliance date. 77 Fed. Reg. 9304, 9418. Nonetheless, years after industry had already installed the controls necessary to comply with MATS, EPA in 2020 attempted to disavow its appropriate and necessary finding in a rulemaking that, as many of the States and Local Governments explained in extensive comments, was illegal, unsupported, and unsupportable. 85 Fed. Reg. 31,286 (May 22, 2020) ("2020 Action"). EPA's current Proposal corrects course, proposing to revoke the unlawful 2020 Action and reaffirming, yet again, that it is appropriate to control some of the most dangerous pollutants from the sources responsible for the greatest volume of emissions.

Industry compliance with MATS over the last several years has resulted in massive reductions of power plant HAP emissions, which have generated, and continue to generate, significant public health, environmental, and economic benefits for the States and Local Governments—and at a fraction of the originally predicted cost. Indeed, the pollutants reduced by MATS—including acid gases, mercury, and other toxic metals such as arsenic, chromium, and nickel—cause severe risks to human health and are especially harmful to certain highly exposed and sensitive populations, including children, communities that rely on subsistence fishing, and communities already disproportionately overburdened by exposure to pollution. Power plant mercury emissions, in particular, are a widespread environmental scourge, contributing to ubiquitous mercury contamination of U.S. waterways and necessitating fish consumption advisories in all fifty states. Overwhelming record evidence demonstrates that the public health and environmental benefits of reducing power plant emissions are vast and, by comparison, the costs of available emission controls are a bargain.

The States and Local Governments thus strongly support EPA's revocation of its 2020 Action and reaffirmation of its appropriate and necessary finding. We fully agree with EPA that the 2020 Action used a flawed methodology that, *inter alia*, inappropriately focused on the size of the small sliver of HAP-reduction benefits that could be monetized; failed to account for distributional impacts on the most exposed and historically marginalized and overburdened populations; improperly disregarded the extensive co-benefits of regulation; and failed to meaningfully account for the great mass of unquantified, but very real, benefits of reducing HAP emissions—such as reducing neurologic and cardiovascular harms, safeguarding Native American ways of life that rely on subsistence fishing, and protecting wildlife and ecosystems. The States and Local Governments also urge EPA to recognize that the 2020 Action was *ultra vires* because the agency attempted to take a deregulatory action outside of section 112's narrowly circumscribed delisting procedures, and to further recognize that the 2020 Action was arbitrary and capricious because, in addition to its unreasonable methodology, EPA failed to account for the reliance interests of states and other entities.

The States and Local Governments fully support EPA's return to a totality of the circumstances approach to the appropriate and necessary determination. That framework is the best way to effectuate the text and purpose of section 112, including Congress's intent that EPA account for all the benefits of HAP reductions, whether or not such benefits have been or can be quantified, and that EPA protect the most exposed and historically marginalized and overburdened populations. The States and Local Governments also commend EPA's work to update the record and provide new estimates of benefits and costs based on the latest science. But for a variety of reasons, even those updated figures remain extremely conservative and underestimate the true value of the MATS Rule.

The States and Local Governments also agree with EPA's conclusion that regulation of power plant HAP emissions is appropriate and necessary under any reasonable framework used to evaluate costs and benefits (either totality of the circumstances or a benefit cost analysis), and no matter which data is used to consider costs and benefits (the original record or an updated record accounting for new information). Although we believe that the law and sound policy favor using a totality of the circumstances approach with the most up-to-date information, we support the prudence of EPA's decision to look at multiple reasonable approaches, which inescapably lead to the same conclusion that regulation is appropriate.

Finally, the States and Local Governments support EPA's decision to seek more information to determine whether, and how, to strengthen the MATS standards as part of a risk and technology review. Because many members of our coalition are downwind of power plants with significant HAP emissions, our residents and natural resources continue to suffer from substantial exposure to mercury and other HAPs. Strengthening the standards would meaningfully reduce the ongoing risks posed by such pollutants, especially for our communities with environmental justice concerns and for populations that historically have been marginalized and overburdened.

DISCUSSION

I. Background

A. The States and Local Governments Face Significant Ongoing Harms from Power Plant Emissions of Mercury and Other HAPs.

For many decades, the States and Local Governments have been grappling with the substantial harms that HAPs emitted from power plants impose on our residents, natural resources, and economies. Yet because large amounts of airborne mercury and other HAPs are transported downwind across state borders, state regulation alone is insufficient, and strong federal standards are essential to curb the cross-border impacts of HAP emissions.

1. Power Plant HAP Emissions Cause Serious Public Health and Natural Resource Harms to the States and Local Governments.

Exposure to the hazardous air pollutants emitted by power plants can cause a wide range of human health harms, including injury to the nervous system and increased risk of pulmonary and cardiovascular disease.[1] But despite the substantial reductions in such pollutants resulting from the MATS standards, power plants remain the Nation's largest source of HAPs, emitting 2.6 tons of mercury (in 2020),[2] along with 4,831 tons of acid gases and 221 tons of non-mercury metals (in 2017). 87 Fed. Reg. at 7640, 7672; 84 Fed. Reg. at 2689, tbl. 4. Those emissions continue to pose significant environmental and health risks, particularly for certain sensitive populations, such as children, and highly exposed populations, such as subsistence fishers and individuals living near power plants, who are disproportionately likely to be communities experiencing poverty or communities of color. *See* 87 Fed. Reg. at 7646–47; 77 Fed. Reg. at 9347, 9441; 76 Fed. Reg. 24,976, 25,018 (May 3, 2011); 65 Fed. Reg. at 79,829; Env't Prot. Agency, *Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards* ("MATS RIA") 7-26, 7-35 to 7-36, 7-40 to 7-41 (2011), Doc. ID No. EPA–HQ–OAR–2009–0234–20131.

Of particular concern to the States and Local Governments are the harms due to mercury emissions from power plants, the source category that contributed half of all domestic mercury emissions before the MATS Rule took effect. 76 Fed. Reg. at 25,002, tbl.3. Mercury emitted by power plants falls back to the earth, where microorganisms convert it to methylmercury, a potent neurotoxin.[3] Methylmercury moves up the food chain in marine and freshwater ecosystems, increasing in concentration as larger predators consume contaminated prey.[4] The primary route

---

[1] David L. MacIntosh et al., Env't Health & Eng'g, Inc., *Emissions of Hazardous Air Pollutants from Coal-Fired Power Plants* 5, tbl.1, 35 (2011), https://www.lung.org/getmedia/25962184-d2fc-42f8-b5a3-8ece3257fbab/emissions-of-hazardous-air.pdf.pdf.

[2] Env't Prot. Agency, 2020 Power Sector Programs—Progress Report, 40, 41, fig.1 (2020), https://www3.epa.gov/airmarkets/progress/reports/pdfs/2020_full_report.pdf.

[3] *See* Philippe Grandjean et al., *Adverse Effects of Methylmercury: Environmental Health Research Implications*, 118(8) Env't Health Persp. 1137, 1140–41 (2010), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2920086/pdf/ehp-0901757.pdf; MacIntosh, *supra* note 1, at 16.

[4] MacIntosh, *supra* note 1, at 16.

of methylmercury exposure for humans is eating mercury-contaminated fish. 76 Fed. Reg. at 25,000.[5]

Acute or long-term exposure to methylmercury can lead to numerous harmful health effects. In adults, mercury exposure is linked to an increased risk of diabetes[6] and autoimmune dysfunction,[7] and is strongly correlated with adverse and fatal cardiovascular effects.[8] Children *in utero* and in early developmental stages are particularly susceptible to mercury exposure,[9] which can cause permanent neurological damage.[10] 76 Fed. Reg. at 25,018. Between 2001 and 2018, approximately a hundred thousand children born in the U.S. each year had blood mercury levels exceeding EPA's reference dose.[11] During the same time period, annual testing of blood mercury levels in adults nationwide indicated that mercury exposure has put millions at risk of fatal heart disease and more than ten million at risk of non-fatal heart disease.[12]

Power plants also emit huge volumes of toxic acid gases and non-mercury metals. In 2010, power plants were the Nation's largest emissions source of many of those pollutants, including hydrogen chloride, hydrogen fluoride, and selenium, and a major emissions source of others, including arsenic, chromium, nickel, and cobalt. 87 Fed. Reg. at 7637, 7640. Arsenic, chromium, and nickel are classified as human carcinogens, while cadmium, selenium, and lead

---

[5] Elsie M. Sunderland, Miling Li, & Kurt Bullard, *Decadal Changes in the Edible Supply of Seafood and Methylmercury Exposure in the United States*, 126(1) Env't Health Persp. 017006-1, 017006-2 (2018), https://ehp.niehs.nih.gov/doi/pdf/10.1289/EHP2644 (finding that estuarine and marine seafood accounted for an estimated eighty-two percent of the U.S. population's methylmercury intake between 2010 and 2012).

[6] Ka He et al., *Mercury Exposure in Young Adulthood and Incidence of Diabetes Later in Life: The CARDIA Trace Element Study*, 36 Diabetes Care 1584, 1587 (2013), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3661833/pdf/1584.pdf.

[7] Jennifer F. Nyland et al., *Biomarkers of Methylmercury Exposure Immunotoxicity among Fish Consumers in Amazonian Brazil*, 119(12) Env't Health Persp. 1733, 1736–37 (2011), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3261989/pdf/ehp.1103741.pdf.

[8] Giuseppe Genchi et al., *Mercury Exposure and Heart Diseases*, 14(1) Int'l J. Env't Rsch. & Pub. Health 1, 8–9 (2017), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5295325/pdf/ijerph-14-00074.pdf.

[9] Stephanie Bose-O'Reilly et al., *Mercury Exposure and Children's Health*, 40(8) Current Probs. in Pediatric & Adolescent Health Care 186, 186 (2010), https://doi.org/10.1016/j.cppeds.2010.07.002.

[10] *See also* Pub. Health & Env't, World Health Org., *Exposure to Mercury: A Major Public Health Concern* 3 (2021), https://www.who.int/publications-detail-redirect/9789240023567#:~:text=Mercury%20is%20highly%20toxic%20to,%2C%20methyl%2D%20and%20ethylmercury (neurological symptoms of prenatal methylmercury exposure can include "intellectual disability, seizures, vision and hearing loss, delayed development, language disorders and memory loss").

[11] Elsie Sunderland et al., *Mercury Science and the Benefits of Mercury Regulation* 23–24 & fig.11 (Dec. 16, 2021) (White Paper, Harvard T.H. Chan School of Health Center for Climate, Health, & the Glob. Env't), https://cdn1.sph.harvard.edu/wp-content/uploads/sites/2343/2021/12/Mercury_WhitePaper_121621.pdf.

[12] *Id.*

are considered probable human carcinogens. *Id.* at 7640. And more broadly, exposure to non-mercury HAPs is associated with a variety of other serious health conditions that include adverse neurological, cardiovascular, immunological, reproductive, liver, kidney, and respiratory effects. *Id.* at 7640; 77 Fed. Reg. at 9363; 76 Fed. Reg. at 25,003, 25,016; MATS RIA at 4-68 to 4-73.

As EPA has recognized, the serious human health harms caused by exposure to power plant HAP emissions disproportionately affect certain highly exposed populations within our borders. 87 Fed. Reg. at 7646–47; 77 Fed. Reg. at 9354, 9441; 76 Fed. Reg. at 24,977–78, 25,018. Communities living closest to power plants—generally within a three-mile radius—face greater exposure to most HAPs. MATS RIA at 7-36. And because seafood consumption is the main route for methylmercury exposure, populations that consume higher amounts of fish, including for socio-economic or cultural reasons, are at greater risk.[13] In Tribal communities, where self-caught fish is often an important source of affordable protein and cultural and spiritual connection,[14] methylmercury exposure through fish consumption is estimated to be three to ten times higher than that of the U.S. population as a whole.[15] For example, in Wisconsin, many Anishinaabe People (the Ojibwe or Chippewa Peoples) consume walleye—a species both subject to mercury fish consumption advisories and essential to maintaining a traditional way of life[16]—at significantly higher rates than the rest of the state's population.[17] Similarly, fishers experiencing poverty in urban areas, especially members of communities of color and immigrant populations, face greater risk because self-caught fish tends to make up a

[13] *See* Collin A. Eagles-Smith et al., *Modulators of Mercury Risk to Wildlife and Humans in the Context of Rapid Global Change*, 47(2) Ambio 170, 177–78 (2018), https://pubmed.ncbi.nlm.nih.gov/29388128/; Mass. Dep't of Pub. Health, *Massachusetts State Health Assessment* 80 (2017), https://www.mass.gov/doc/2017-massachusetts-state-health-assessment/download; Nat'l Env't Just. Advisory Council, *Fish Consumption and Environmental Justice* 2–4, 14, 26 (2002), https://www.epa.gov/sites/default/files/2015-02/documents/fish-consump-report_1102.pdf.

[14] *See* Great Lakes Comm'n, *Issue Brief: Mercury Contamination in the Great Lakes Basin* 6 (2021), https://www.glc.org/wp-content/uploads/GLC-Mercury-Issue-Brief-Final-Oct-2021.pdf, ("Methylmercury contamination in Great Lakes fish is an environmental justice issue for indigenous communities that depend on fish as a large part of their diet."); Eagles-Smith et al., *supra* note 13, at 1478; Nat'l Env't Just. Advisory Council, *supra* note 13, at 4–7, 17–18, 138.

[15] Jianping Xue et al., *Modeling Tribal Exposures to Methyl Mercury from Fish Consumption* 533 Sci. Total Env't 102, 108 (2015), https://pubmed.ncbi.nlm.nih.gov/26151654/.

[16] Adam D. DeWeese et al., *Efficacy of Risk-Based, Culturally Sensitive Ogaa (Walleye) Consumption Advice for Anishinaabe Tribal Members in the Great Lakes Region*, 29(5) Risk Analysis 729, 729–30 (2009), https://pubmed.ncbi.nlm.nih.gov/19220800/ (importance of walleye to the Anishinaabe); Wis. Dep't Nat. Res., *Choose Wisely: A Health Guide for Eating Fish in Wisconsin* 4 (2020), https://widnr.widen.net/s/2zs8brgxcg/fh824 (consumption advisories for walleye).

[17] *Compare* DeWeese et al., *supra* note 16, at 738 & tbl.III (mean consumption of 1.5 meals per month (18 meals per year)) *with* Nancy A. Connelly et al., *Factors Affecting Fish Consumption among Anglers Living in the Great Lakes Region*, 12-3 Hum. Dimensions Rsch. Unit Publ'n Series 37, tbl.28 (2012), https://ecommons.cornell.edu/bitstream/handle/1813/40457/HDRUReport12-3.pdf?sequence=1&isAllowed=y (mean consumption of 2.7 meals per year).

greater proportion of their diets.[18] In addition, fishers in these populations are less likely to travel to safer fishing areas due to income and transportation limitations[19] and are less likely to trust or follow fish advisories for a variety of reasons, including cultural, linguistic, and literacy barriers.[20] Within the U.S. population of "high-frequency" fish consumers, individuals with lower incomes and less than a high school education show the highest fish consumption rates, while individuals identifying as "Black, non-Hispanic" and "Asian, Pacific Islander, and Native American descent" are represented at a significantly higher proportion than in the general U.S. population.[21]

Blood mercury data show similar demographic trends. National data from 2000 to 2018 show that individuals identifying as Asian, Pacific and Caribbean Islander, or Native American, among others, have higher mercury blood levels than other demographic groups.[22] Asian

---

[18] *See* Mass. Dep't Pub. Health, *supra* note 13, at 80 ("Greater health risks from consuming contaminated fish occur more often in EJ areas because residents often depend on locally-caught fish as a regular part of their diet."); Susan L. Schantz et al., *Contaminant profiles in Southeast Asian immigrants consuming fish from polluted waters in northeastern Wisconsin*, 110(1) Env't Res. 33, 39–40 (2010), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2795147/ (finding elevated contaminant levels in Hmong communities in Green Bay, Wisconsin area due to consumption of locally caught contaminated fish); Joanna Burger et al., *Fishing in Urban New Jersey: Ethnicity Affects Information Sources, Perception, and Compliance*, 19(2) Risk Analysis 217, 221–22, 225 (1999), https://pubmed.ncbi.nlm.nih.gov/10765401/ (finding that Black and Hispanic urban fishers consumed greater proportion of self-caught fish and were less aware of fish consumption advisories and consumption risks than White fishers).

[19] *See* Komal Basra, M. Patricia Fabian, & Madeleine K. Scammell, *Consumption of Contaminated Seafood in an Environmental Justice Community: A Qualitative and Spatial Analysis of Fishing Controls*, 11(1) Env't Just. 6, 13 (2018), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5830855/; Mass. Dep't Pub. Health, *supra* note 13, at 80; Nat'l Env't Just. Advisory Council, *supra* note 13, at 6.

[20] Basra et al., *supra* note 19, 11–12; Andrew L. Stevens, Ian G. Baird, & Peter B. McIntyre, *Differences in Mercury Exposure among Wisconsin Anglers Arising from Fish Consumption Preferences and Advisory Awareness*, 43(1) Fisheries 31, 33, 38, 39 (2018), https://afspubs.onlinelibrary.wiley.com/doi/10.1002/fsh.10013; Emily Oken et al., *Which Fish Should I Eat? Perspectives Influencing Fish Consumption Choices*, 120(6) Env't Health Persp. 790, 794 (2012), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3385441/; Nat'l Env't Just. Advisory Council, *supra* note 13, at iv–v, 2–10, 91–98 (detailing the nutritional, economic, cultural, and other factors that prevent many environmental justice communities from following conventional fish consumption advisories).

[21] Katherine von Stackelberg, Miling Li, & Elsie Sunderland, *Results of a National Survey of High-Frequency Fish Consumers in the United States*, 158 Env't Rsch. 126, 128, 129, tbl.2, 130, fig.1 (2017), https://www.sciencedirect.com/science/article/abs/pii/S0013935117304024. An individual was defined as a "high frequency" consumer if they consumed three or more fish meals per week, corresponding to the 90-95th percentile seafood consumer in the National Health and Nutrition Examination Survey. *Id.* at 127.

[22] Sunderland et al. (2021), *supra* note 11, at 25 & fig.12.

communities in both the San Francisco Bay Area[23] and New York City,[24] for example, have registered blood-mercury concentrations exceeding levels of concern because their diets include large amounts of fish.

2. Nationwide Emissions Standards Are Essential to Addressing Harmful Cross-Border Impacts of Power Plant Emissions of Mercury and Other HAPs.

Today, as before the MATS standards took effect, mercury contamination of U.S. waters is nearly ubiquitous. Nearly 73,000 river and stream miles and 8,508,000 acres of lakes, reservoirs, and ponds nationwide are designated as impaired under Clean Water Act section 303(d), 33 U.S.C. § 1313(d), due to mercury contamination.[25] In thirteen states—Connecticut, Florida, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, North Carolina, Rhode Island, South Dakota, and Vermont—mercury contamination has become significant enough to require the development of state- or region-wide "total maximum daily loads" or "TMDLs" to meet Clean Water Act water quality standards.[26] *See* 33 U.S.C.

---

[23] *See* Lauren Baehner, *Metal Levels in Asian/Pacific Island Community Exposures (ACE) Project*, BioMonitoring California Scientific Guidance Panel Meeting 6, 11, 21, 24 (Nov. 8, 2018), https://biomonitoring.ca.gov/events/biomonitoring-california-scientific-guidance-panel-meeting-november-2018 (study participants with blood-mercury level exceedances had high rates of store-bought fish relative to those without exceedances).

[24] Wendy McKelvey et al., *A Biomonitoring Study of Lead, Cadmium, and Mercury in the Blood of New York City Adults*, 115(10) Env't Health Persp. 1435, 1439–40 & tbl.3 (2007), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2022653/ (Asian participants had significantly higher blood-mercury levels and reported significantly higher fish consumption than other ethnic groups surveyed).

[25] Env't Prot. Agency, *National Causes of Impairment, National Summary of Impaired Waters and TMDL Information*, https://iaspub.epa.gov/tmdl_waters10/attains_nation_cy.control#causes.

[26] *See* Env't Prot. Agency, *Northeast Regional Mercury Total Maximum Daily Load* vi (2007), https://www.mass.gov/doc/northeast-regional-mercury-total-maximum-daily-load-final-addendum-for-massachusetts/download [Northeast TMDL]; Fla. Dep't of Env't Prot., *Mercury TMDL for the State of Florida* (2013), https://floridadep.gov/sites/default/files/Mercury-TMDL.pdf [Florida TMDL]; Mich. Dep't of Env't Quality & Env't Prot. Agency, *Michigan Statewide Mercury Total Maximum Daily Load* (2018), http://www.michigan.gov/documents/deq/wrd-swas-hgtmdl-draft_415360_7.pdf [Michigan TMDL]; Minn. Pollution Control Agency, *Minnesota Statewide Mercury Total Maximum Daily Load* (2007), http://www.pca.state.mn.us/index.php/view-document.html?gid=8507 [Minnesota TMDL]; N.J. Dep't of Env't Prot., *Total Maximum Daily Load for Mercury Impairments Based on Concentration in Fish Tissue Caused Mainly by Air Deposition to Address 122 HUC 14s Statewide* (2009), https://www.nj.gov/dep/wms/bears/docs/TMDL%20HG%20document%20final%20version%209-8-09_formated%20for%20web%20posting%20js.pdf [New Jersey TMDL]; N.C. Dep't of Env't Quality, *North Carolina Mercury TMDL* (2012), http://portal.ncdenr.org/c/document_library/get_file?uuid=aecb3619-c246-4b49-bfd8-fd5541775110&groupId=38364 [North Carolina TMDL]; S.D. Dep't of Env't and Nat. Res., *South Dakota Mercury Total Maximum Daily Load* (2016), https://ofmpub.epa.gov/waters10/attains_impaired_waters.show_tmdl_document?p_tmdl_doc_blobs_id=78603;

§ 1313(d)(1) (requiring development of TMDLs for impaired waters). Numerous other states have developed waterbody-specific mercury TMDLs within their borders.[27] That mercury contamination not only harms our residents when they consume contaminated fish, but also limits their ability to enjoy the benefits of recreational fisheries; it also reduces the economic value of the States and Local Governments' recreational and commercial fisheries. *See infra* Section I.B.2.

For decades, the States and Local Governments have sought to reduce the public health and natural resource harms posed by the widespread mercury contamination of our waters. To limit public exposure, we have relied heavily on fish consumption advisories. Indeed, all fifty states have had mercury-related fish consumption advisories in place,[28] and as recently as 2018, over 4,000 fish advisories "affect[ed] almost half of the nation's lake acreage, river miles, and coastlines."[29] Such advisories, however, are often less effective in protecting many of our most highly exposed communities.[30] Many of the undersigned States also have taken regulatory action to reduce emissions of mercury from power plants and other sources within our borders.[31] At least fourteen states have promulgated limits on mercury emissions from power plants,[32] and

https://ofmpub.epa.gov/waters10/attains_impaired_waters.show_tmdl_document?p_tmdl_doc_blobs_id=78604 [South Dakota TMDL].

[27] *See* Env't Prot. Agency, *TMDL Pollutant Group: Mercury*, https://iaspub.epa.gov/tmdl_waters10/attains_impaired_waters.tmdls?p_pollutant_group_id=693 (showing that thirty-two states have at least one mercury TMDL and some states have dozens).

[28] Env't Prot. Agency, *2011 National Listing of Fish Advisories* 4 (2013), https://19january2017snapshot.epa.gov/sites/production/files/2015-06/documents/technical-factsheet-2011.pdf; *see also* IEc Report at 6–10 (describing fish consumption advisories and other actions taken by states, the federal government, and non-governmental actors to limit public exposure to mercury in fish and shellfish).

[29] Valoree S. Gagnon, Hugh S. Gorman, & Emma S. Norman, Great Lakes Rsch. Ctr., *Eliminating the Need for Fish Consumption Advisories in the Great Lakes Region* 3 (2018), https://www.mtu.edu/social-sciences/docs/res-fishconsumption-policybrief-030718.pdf.

[30] *See supra* notes 19 & 20.

[31] *See* Barbara Morin & Paul J. Miller, Northeast States for Coordinated Air Use Mgmt. ("NESCAUM"), *It Remains "Appropriate and Necessary" to Regulate Toxic Air Emissions from Coal- and Oil-fired Electric Generating Units* 8–9 (Apr. 7, 2022), https://www.nescaum.org/documents/nescaum-it-remains-approp-necess-reg-air-toxics-from-coal-oil-egus-update-20220407.pdf/; Great Lakes Comm'n, *supra* note 13, at 19–28 (describing Great Lakes states' regulatory programs).

[32] In fact, power plants in Connecticut, Massachusetts, and New Jersey were complying with those states' mercury standards three to four years before EPA's proposal of the MATS Rule in 2011. Conn. Gen. Stat. § 22a-199 (compliance by July 1, 2008); 310 Mass. Code Regs. § 7.29 (first phase compliance by Jan. 1, 2008); N.J. Admin. Code § 7:27-27.7 (compliance by Dec. 15, 2007); *see also* 5 Colo. Code Regs. § 1001-8:B.VIII (first phase compliance by Jan. 1, 2012); Del. Admin. Code tit. 7 § 1146-6 (first phase compliance by Jan. 1, 2009); Ill. Admin. Code tit. 35 § 225.230 (compliance by July 1, 2009); Md. Code Regs. tit. 26, § 11.27.03.D (first phase compliance by Jan. 1, 2010); Minn. R. 7011.0561 (first phase compliance by Jan. 1, 2018); Mont. Admin. R. 17.8.771 (compliance by Jan. 1, 2010); N.H. Rev. Stat. Ann. § 125-O:11-18

nearly every state with power plant mercury emission standards has imposed more health-protective limits than the MATS Rule.[33]

State requirements, however, have not solved, and cannot solve, the problem of interstate hazardous air pollution. Mercury can travel hundreds of miles from the smokestack. *See* 77 Fed. Reg. at 9444. Thirty percent of Minnesota's mercury deposition, for example, originates from out-of-state domestic sources.[34] And a significant portion of Northeast mercury deposition originates from uncontrolled power plants located in other states.[35] Unless those out-of-state power plant emissions are addressed, Northeast waters will not meet federal water quality standards, and our residents and fisheries will continue to suffer.[36] Further, mercury-contaminated fish are bought and sold in interstate commerce, and individuals who consume store-bought fish thus suffer the downstream effects of power plant toxic emissions even though they may not reside downwind of the source of the emissions.[37] Rigorous, nationally-uniform standards are thus essential to protect the States and Local Governments' residents, natural

---

(compliance by July 1, 2013); N.Y. Comp. Codes R. & Regs. tit. 6 § 246.6 (first phase compliance by Jan. 1, 2010); Or. Admin. R. 340-228-0606 (compliance by July 1, 2012); Wis. Admin. Code NR § 446.13 (compliance by Apr. 16, 2016); *see also* Mich. Admin. Code r. 336.2503(1)(a)-(b) (2009) (compliance by Jan. 1, 2015), *modified by* Mich. Admin. Code r. 336.2502a (2013) (exempting covered power plants "for which [MATS] is an applicable requirement relative to emissions of mercury" and, if the Rule ceases to be an applicable requirement, extending compliance date to the sooner of three months from the date of inapplicability or April 16, 2015).

[33] The MATS Rule imposes a mercury emission standard of 1.2 lb/TBtu or 0.013 lb/GW-hr. *See* 77 Fed. Reg. at 9367 tbl.3. Most state rate-based standards are set at 0.6 lb/TBtu or 0.008 lb/GW-hr. *See* Conn. Gen. Stat. § 22a-199(b)(1) (0.6 lb/TBtu); Del. Admin. Code tit. 7 § 1146–6.2 (0.6 lb/TBtu); Ill. Admin. Code tit. 35 § 225.230(a)(1)(A) (0.008 lb/GW-hr); 310 Mass. Code Regs. § 7.29(5)(a)(3)(f) (0.0025 lb/GW-hr); Mich. Admin. Code r. 336.2503(1)(b) (0.008 lb/TBtu); Minn. R. 7011.0561 (0.008 lb/TBtu); Mont. Admin. R. 17.8.771(1)(b)(ii) (0.9 lb/TBtu); N.J. Admin. Code § 7:27-27.7(a) (3.00 mg/MWh (equivalent to 0.66 lb/TBtu)); N.Y. Comp. Codes R. & Regs. tit. 6 § 246.6(a) (0.6 lb/TBtu); Or. Admin. R. 340-228-0606(1) (0.6 lb/TBtu); Wis. Admin. Code NR § 446.13(1) (0.008 lb/GW-hr).

[34] Minnesota TMDL, *supra* note 26, at 20–21, 45 (stating that federal regulation of those sources, such as power plants, holds most promise for reaching Minnesota's TMDL goals); *see also* New Jersey TMDL, *supra* note 26, at 31 (noting that twenty-six percent of New Jersey's air deposition mercury load originates from five surrounding states); North Carolina TMDL, *supra* note 26, at 6 (noting that fifteen percent of North Carolina's total mercury deposition originates from out-of-state regional sources); *see also Illinois Lake Michigan (nearshore) Mercury Final TMDL Report* 23 (2016), https://attains.epa.gov/attains-public/api/documents /actions /IL_EPA/IL-2019-002/135221 (relying on the MATS Rule to address out-of-state regional sources contributing twelve percent of the mercury deposition load).

[35] *See* NESCAUM, *supra* note 31, at 7.

[36] *See* Northeast TMDL, *supra* note 26, at 44 (concluding that EPA action to "implement significant reductions from upwind out-of-region sources, primarily coal-fired power plants" is necessary to return fish methylmercury concentrations to safe levels).

[37] *See* Baehner, *supra* note 23.

resources, and economies from the dangerous quantities of mercury and other hazardous air pollution that out-of-state power plants emit.

B. The States and Local Governments Have Benefited from the Reductions in Power Plant HAP Emissions Required by the MATS Rule.

Since the MATS Rule took effect, it has generated, and continues to generate, massive reductions in HAP emissions that are essential to protecting public health and the environment and leveling the regulatory playing field across the country.

1. Public Health Benefits

Power plant mercury emissions declined by 91 percent between 2010 and 2020 (from 29 tons to 2.6 tons), and acid gas and non-mercury metal HAP emissions declined by 96 and 81 percent, respectively, between 2010 and 2017. 87 Fed. Reg. at 7648; 84 Fed. Reg. at 2689, tbl. 4.[38] With regard to mercury, research confirms that the MATS Rule "has reduced mercury loadings to aquatic systems, in turn leading to a reduction in mercury levels in fish and shellfish."[39] ***Exhibit A***, Robert E. Unsworth et al., Industrial Economics, Inc., *The Economic Benefits of the Mercury and Air Toxics Standards (MATS) Rule to the Commercial and Recreational Fishery Sectors of Northeast and Midwest States* 3, 5–6 (2019) ("IEc Report"). For instance, studies have found that decreased mercury emissions corresponded with declines in mercury contamination in waterbodies and freshwater and saltwater fish species, including Atlantic Bluefin tuna,[40] mid-Atlantic bluefish,[41] and largemouth bass and yellow perch in Massachusetts.[42]

As EPA recognizes, the reductions in mercury contamination attributable to the MATS Rule have produced large, ongoing public health benefits for the residents of the States and Local Governments. EPA has estimated the annual benefits to include preventing the loss of thousands of IQ points in prenatally exposed children nationwide, and nearly a hundred fewer fatal heart attacks due to reduced mercury contamination in commercial fish. 87 Fed. Reg. at 7644. While those benefits, which EPA values annually at up to $53 million and $720 million, respectively, are substantial, they represent a small subset of the full benefits attributable to the Rule's pollution reductions. *See id.* at 7646; Env't Prot. Agency, *National-Scale Mercury Risk Estimates*

---

[38] Env't Prot. Agency, *supra* note 2, at 40–41.

[39] *See also* NESCAUM, *supra* note 31, at 14–15; Sunderland et al. (2021), *supra* note 11, at 9.

[40] Cheng-Shiuan Lee et al., *Declining Mercury Concentrations in Bluefin Tuna Reflect Reduced Emissions to the North Atlantic Ocean*, 50(23) Env't Sci. & Tech. 12,825, 12,829–30 (2016), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5161346/.

[41] Ford A. Cross, David W. Evans, & Richard T. Barber, *Decadal Declines of Mercury in Adult Bluefish (1972-2011) from the Mid-Atlantic Coast of the U.S.A.,* 49 Env't Sci. Tech. 9064, 9068 (2015), https://pubmed.ncbi.nlm.nih.gov/26148053/#:~:text=Concentrations%20of%20mercury%20decreased%20by,of%20about%2010%25%20per%20decade; *see also* Brian Bienkowski, *Cleaner Bluefish Suggest Coal Rules Work,* Sci. American (July 20, 2015), http://www.scientificamerican.com/article/cleaner-bluefish-suggest-coal-rules-work/.

[42] Michael S. Hutcheson et al., *Temporal and Spatial Trends in Freshwater Fish Tissue Mercury Concentrations Associated with Mercury Emissions Reductions*, 48(4) Env't Sci. Tech. 2193, 2197-99 (2014), https://www.ncbi.nlm.nih.gov/pubmed/24494622.

for Cardiovascular and Neurodevelopmental Outcomes for the National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units – ("2021 TSD") 25, 26 (Sept. 2, 2021), Doc. ID No. EPA-HQ-OAR-2018-0794-4605. Other studies considering a wider variety of avoided cardiovascular harms and broader economic impact have estimated significantly larger benefits from the MATS Rule. A 2016 study projected total Rule-related economy-wide benefits through 2050 of at least $43 billion due to avoided IQ deficits and avoided fatal and non-fatal heart attacks.[43] And other research estimates the societal costs of decreased IQ, alone, from anthropogenic mercury exposure in the United States at billions of dollars per year.[44]

The States and Local Governments have also benefitted from the MATS Rule's massive reductions in power plant emissions of acid gases and toxic non-mercury metals. *See* 87 Fed. Reg. at 7648; 84 Fed. Reg. at 2689, tbl. 4. Although EPA has not been able to quantify these

[43] Amanda Giang & Noelle E. Selin, *Benefits of mercury controls for the United States*, 113(2) Proc. of the Nat'l Acad. of Sci. 286, 288 (2016), https://www.pnas.org/content/pnas/113/2/286.full.pdf; *see also* Elsie Sunderland et al., *A Template for a State-of-the-Science Assessment of the Public Health Benefits associated with Mercury Emissions Reductions for Coal-fired Electricity Generating Units* 12–13 (Apr. 11, 2022) (White Paper, Harvard T.H. Chan School of Health Ctr. for Climate, Health, & the Glob. Env't), https://cdn1.sph.harvard.edu/wp-content/uploads/sites/2343/2022/04/MATSTemplateAnalysis_041122b.pdf (estimating that power plant mercury emissions reductions between 2010 and 2020 produced monetized benefits of $1.2 billion from avoided cardiovascular deaths and $25 million from avoided IQ deficits across the U.S. population); Vincent Nedellec & Ari Rabl, *Costs of Health Damage from Atmospheric Emissions of Toxic Metals: Part 2—Analysis for Mercury and Lead*, 36(11) Risk Analysis 1, 1, 4–5, & tbl.1 (2016), https://www.researchgate.net/profile/Nedellec-Vincent/publication/298908575_Costs_of_Health_Damage_from_Atmospheric_Emissions_of_Toxic_Metals_Part_2-Analysis_for_Mercury_and_Lead/links/5ae740c70f7e9b837d38255e/Costs-of-Health-Damage-from-Atmospheric-Emissions-of-Toxic-Metals-Part-2-Analysis-for-Mercury-and-Lead.pdf (estimating that the damage cost associated with one kilogram of mercury is 22,937 € (2013) if there is a no-effect threshold, and 52,129 € (2013) if there is none, with ninety-one percent of the cost due to mortality from heart disease and the rest from IQ loss); Glenn E. Rice, James K. Hammit, & John S. Evans, *A Probabilistic Characterization of the Health Benefits of Reducing Methyl Mercury Intake in the United States*, 44(13) Env't Sci. & Tech. 5216, 5221 (2010), https://pubs.acs.org/doi/10.1021/es903359u (considering avoided IQ deficits and fatal heart attacks, annual benefit of $860M associated with 10% reduction in MeHg exposure in U.S. population).

[44] Philippe Grandjean & Martine Bellanger, *Calculation of the disease burden associated with environmental chemical exposures: application of toxicological information in health economic estimation*, 16(123) Env't Health 1, 4, tbl.1, 5 (2017), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5715994/pdf/12940_2017_Article_340.pdf; *see also* Leonardo Trasande et al., *Public Health and Economic Consequences of Methyl Mercury Toxicity to the Developing Brain*, 113(5) Env't Health Persp. 590, 593–4, & tbl.1, fig.1 (2005), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1257552/ (documenting $8.7 billion in annual costs from lost productivity alone of methylmercury toxicity, $1.3 billion of which is attributable each year to mercury emissions from U.S. power plants).

benefits, it recognizes the significant health and environmental risks posed by the very high volumes of those HAPs emitted by power plants prior to implementation of the Rule. 87 Fed. Reg. at 7640; 77 Fed. Reg. at 9363. In addition, because of the way the pollution-control technologies installed to comply with the MATS Rule operate, the Rule has drastically reduced harmful criteria pollutants, such as sulfur dioxide and particulate matter, in addition to HAPs.[45] The value of those emission reductions is likewise enormous, including tens of thousands of fewer premature deaths each year and a wide array of other avoided adverse public health outcomes.[46] *See infra* Section III.B.1.

In terms of the distributional effects of the benefits of the MATS Rule's pollution reductions, EPA acknowledged that in 2010 populations living within three miles of coal-fired power plants disproportionately consisted of communities of color and individuals living in poverty. MATS RIA at 7-35 to 7-36. Similarly, EPA's watershed-based risk assessment indicates that low-income Black subsistence fishers in the Southeast, and likely also Tribal subsistence fishers in the Great Lakes region, face disproportionately high risks of fatal heart attacks from power plant methylmercury exposures. 87 Fed. Reg. at 7647, 2021 TSD at 20–22, tbl. 3.

2. Natural Resource and Fisheries Benefits

In addition to the substantial public health benefits attributable to reduced exposure to mercury and other HAPs, the MATS Rule has significantly reduced harms to natural resources within our borders that are, in many cases, owned or held in trust by State members of our coalition. Notably, methylmercury causes death and reproductive and behavioral harm in a wide range of piscivorous and insectivorous fish and wildlife.[47] 87 Fed. Reg. at 7640–42; 81 Fed. Reg. at 24,423; 65 Fed. Reg. at 79,830 (wildlife mercury exposures can be substantial because animals tend to consume fish from limited geographic areas). Mercury contamination of fisheries is of

---

[45] For instance, between December 2014 and April 2016, dry sorbent injection systems were installed on 15 gigawatts of coal capacity and flue gas desulfurization systems (also known as scrubbers) were installed on 12 gigawatts of coal capacity. U.S. Energy Info. Admin., *EIA Electricity Generator Data Show Power Industry Response to EPA Mercury Limits*, Today in Energy (July 7, 2016), https://www.eia.gov/todayinenergy/detail.php?id=26972. During 2015, those plants burned eighteen percent less coal than in 2014, but reduced their sulfur dioxide emissions by forty-nine percent. U.S. Energy Info. Admin., *Sulfur Dioxide Emissions from U.S. Power Plants Have Fallen Faster Than Coal Generation*, Today in Energy (Feb. 3, 2017), https://www.eia.gov/todayinenergy/detail.php?id=29812.

[46] Vivian E. Thomson, Kelsey Huelsman, & Dominique Ong, *Coal-fired power plant regulatory rollback in the United States: Implications for local and regional public health*, 123 Energy Pol'y 558, 559 (2018), https://www.sciencedirect.com/science/article/pii/S030142151830627X.

[47] *See* NESCAUM, *supra* note 31, at 15–16; D.C. Evers et al., *A Synthesis of Patterns of Environmental Mercury Inputs, Exposure and Effects in New York State*, 29(10) Ecotoxicology 1565, 1577–79 (2020), https://pubmed.ncbi.nlm.nih.gov/33170395/; Christopher D. Knightes et al., *Application of Ecosystem-Scale Fate and Bioaccumulation Models to Predict Fish Mercury Response Times to Changes in Atmospheric Deposition*, 28(4) Env't Sci. & Tech. 881, 881–88 (2009), https://doi.org/10.1897/08-242R.1. In addition, power plant acid gas emissions contribute to acidification of freshwater aquatic ecosystems and concomitant adverse effects to aquatic organisms. 87 Fed. Reg. at 7641.

special concern to the States and Local Governments because it can reduce the size and sustainability of those resources[48] and has necessitated the issuance of fish consumption advisories and other mercury-risk warnings, which in turn reduce recreational fishing as well as the consumption of commercially harvested fish and shellfish. IEc Report at 2–3, 10–13.

Because power plant mercury emissions "are a significant contributor to total mercury levels in fish and shellfish in the Northeast and Midwest states," the MATS Rule has benefitted the States and Local Governments by reducing mercury in our recreational and commercial fisheries. IEc Report at 2–3. The value of those reductions to our economies is substantial. Recreational fishing directly contributes more than $7.5 billion per year to the economies of the twelve Northeast and Midwest states considered in the IEc report. *Id.* at 3, 16. When jobs and expenditures associated with those states' recreational and commercial fisheries are considered, the overall economic value is enormous. In total, "the $12.0 billion in annual recreational fishing expenditures and the $1.6 billion in annual commercial fish landings for th[o]se [twelve] states result in a regional economic contribution of 276,696 full-time and part-time jobs, $8.7 billion in earnings, $17.2 billion in value added, and $28.1 billion in output." *Id.* at 22. Thus, even small changes to recreator and consumer behavior associated with reduced contamination from power plant mercury emissions could produce "substantial economic impacts to related economic industries at the state or regional level." *See id.* at 22–23.

3. Regulatory Benefits

Finally, in addition to the direct health, environmental, and economic benefits described above, many of the States and Local Governments also benefit from and rely on pollution reductions provided by the MATS Rule to satisfy other pollution-control requirements or goals, including to meet TMDL goals under the Clean Water Act. *See supra* Section I.A.2. Emissions reductions under the MATS Rule also play a key role in state compliance with other Clean Air Act programs, including satisfying national ambient air quality standards for various pollutants that are affected by the MATS Rule, such as sulfur dioxide and particulate matter, and achieving reasonable progress goals under regional haze plans.[49]

In sum, the MATS Rule is providing enormous continuing health, environmental, economic, and regulatory benefits to the States and Local Governments.

C. The History of Regulation and Litigation Surrounding EPA's Regulation of Power Plant HAP Emissions.

Because of our substantial interests in combating the harms of hazardous air pollutants, the States and Local Governments have been advocating for decades, in myriad ways, for strong federal regulation of power plant HAPs. EPA's Proposal, which these comments support, is the latest in a long line of EPA actions addressing the question whether it is appropriate and necessary to regulate HAP emissions from power plants under section 112.

In the 1990 amendments to the Act, Congress directed EPA to regulate emissions of hazardous air pollutants from power plants under section 112 if, after studying the public health hazards of those emissions, the agency determined that such regulation was "appropriate and

[48] *See* Evers et al., *supra* note 47, at 1577–78.
[49] NESCAUM, *supra* note 31, at 19–20.

necessary." 42 U.S.C. § 7412(n)(1)(A). EPA did just that in 2000, finding that it is "appropriate to regulate HAP emissions from coal- and oil-fired electric utility steam generating units under section 112 of the CAA because . . . [those] units are the largest domestic source of mercury emissions, and mercury in the environment presents significant hazards to public health and the environment," and because "control options" exist that "effectively reduce HAP emissions from such units." 65 Fed. Reg. 79,825, 79,830 (Dec. 20, 2000). EPA further explained that it is "necessary to regulate HAP emissions from coal- and oil-fired electric utility steam generating units under section 112 of the CAA because the implementation of other requirements under the CAA will not adequately address the serious public health and environmental hazards arising from such emissions." *Id.* Accordingly, EPA listed power plants as a source category to be regulated under section 112. 67 Fed. Reg. 6521, 6522, 6524 (Feb. 12, 2002).

Five years after this appropriate and necessary determination, EPA sought—illegally—to reverse it and remove power plants from the list of regulated source categories. 70 Fed. Reg. 15,994 (Mar. 29, 2005); 70 Fed. Reg. 28,606 (May 18, 2005). A coalition of states, including many of those commenting here, filed suit. *New Jersey v. EPA*, 517 F.3d 574 (D.C. Cir. 2008). In 2008, the D.C. Circuit vacated EPA's action, holding that EPA could not meet section 112's specific criteria allowing for delisting unless certain health and environmental thresholds were satisfied. 517 F.3d at 582 (citing 42 U.S.C. § 7412(c)(9)).

In 2012, EPA reaffirmed its 2000 appropriate and necessary finding, based on both the 2000 record and updated scientific and public health evidence (detailed in an extensive 2011 regulatory impact analysis), and issued the MATS Rule, imposing technology-based limits on mercury and other hazardous emissions from power plants. 77 Fed. Reg. 9304, 9310–11, 9363–64, 9366–76 (Feb. 16, 2012); MATS RIA. A state coalition intervened to defend EPA's rulemaking in challenges from various groups, including members of the regulated industry. After the D.C. Circuit upheld EPA's 2012 regulation in full, *White Stallion Energy Ctr., LLC v. EPA*, 748 F.3d 1222 (D.C. Cir. 2014) (per curiam), the Supreme Court granted review on a narrow question: whether EPA had improperly failed to consider costs when determining that it was appropriate to regulate hazardous air pollutant emissions from power plants, *Michigan v. EPA*, 135 S. Ct. 2699 (2015). The Supreme Court held that the agency had to consider costs, *id.* at 2712, and on remand EPA reaffirmed the appropriate and necessary finding after weighing both the massive public health and environmental benefits and the costs of regulation. 81 Fed. Reg. 24,420, 24,452 (Apr. 25, 2016). Many of the States and Local Governments again intervened to defend EPA's rulemaking against another round of challenges in a case that is currently in abeyance. *See Murray Energy Corp. v. EPA*, No. 16-1127 (D.C. Cir.).

In 2019, EPA, again, proposed to reverse the appropriate and necessary finding. 84 Fed. Reg. 2,670 (Feb. 7, 2019). Despite comments from many of the States and Local Governments and other parties cautioning that this proposed action was unlawful, EPA finalized its 2020 Action purporting to reverse the appropriate and necessary finding in May 2020, though EPA (unlike in 2005) did leave power plants as a listed source category. 85 Fed. Reg. at 31,289–90. Many of the States and Local Governments, once again, sued the EPA, in a case that is now in abeyance, and also petitioned EPA for reconsideration of that rule in July of 2020. Pet. for Review, *Massachusetts v. EPA*, No. 20-1265 (D.C. Cir. July 20, 2020), Doc. No. 1853575; Attorneys General of Massachusetts, et al., *Pet. for Recons. EPA's Final Rule* (June 21, 2020), Docket No. EPA-HQ-OAR-2018-0794. Many of the States and Local Governments also intervened to defend EPA's regulation of power plants under section 112 as appropriate and necessary in a suit, also currently in abeyance, brought by a coal mining company. *See Westmoreland Mining Holdings, LLC v. EPA*, No. 20-1160 (D.C. Cir.).

On February 9, 2022, EPA published the present Proposal to revoke the 2020 Action, to reaffirm its prior determination that regulating power plant HAP emissions is appropriate and necessary, and to solicit input on the agency's ongoing consideration of its 2020 residual risk and technology review. 87 Fed. Reg. at 7624.

II. EPA Correctly Proposes to Revoke the Unlawful and Unsupportable 2020 Revised Finding.

The States and Local Governments support EPA's proposed revocation of the 2020 Action. That rule was illegal because outside of a statutorily circumscribed process for deregulating under section 112, EPA lacks authority to reverse itself once it determines that regulation of power plant HAP emissions is appropriate and necessary and lists power plants as covered sources. EPA's action was also unlawful and arbitrary and capricious because the agency applied a flawed analytical framework that failed to meaningfully account for key benefits of regulation, giving little or no weight to factors Congress intended that EPA consider, such as unquantified benefits, ancillary co-benefits, effects on the most vulnerable populations, and reliance interests.

A. The 2020 Action Was *Ultra Vires*.

The States and Local Governments urge EPA to acknowledge, as one independent basis for its action, that the 2020 Action was an *ultra vires* exercise of authority. This is a separate ground compelling that rule's recission that EPA should recognize as an additional, independent basis for revocation.

The text, structure, and legislative history of the Clean Air Act confirm that Congress intended EPA to make a time-sensitive threshold decision about whether regulation of power plant HAPs was appropriate and necessary. As the D.C. Circuit made clear in *New Jersey*, once EPA has made an appropriate and necessary finding and listed power plants, the only way (absent a court order)[50] that the agency may reverse course is by invoking section 112(c)(9) and demonstrating that no power plant poses an unacceptably high risk to human health or the environment. 517 F.3d at 583. Because EPA in 2020 sought to revoke its appropriate and necessary finding without using this single statutorily mandated procedure for deregulation—and without a court invalidating the 2016 Supplemental Finding made on remand from *Michigan*—the agency acted beyond its authority and EPA should now disavow its prior attempt to evade the Act's procedures as *ultra vires*. *Cf.* 85 Fed. Reg. at 31,289–92.

[50] A reviewing court, subject to applicable judicial review procedures, may order EPA to revisit an appropriate and necessary finding by remanding the finding to the agency, as the D.C. Circuit did in 2015 on remand following *Michigan*. *White Stallion II* (D.C. Cir. Dec. 15, 2015) (order remanding the proceeding to EPA without vacatur of the MATS Rule), Doc. ID No. EPA-HQ-OAR-2009-0234-20567; *accord New Jersey*, 517 F.3d at 583 (confirming that "section 112(c)(9)'s delisting process or court-sanctioned vacatur" are the only avenues for deregulating power plants).

Once power plants are listed under section 112 based on a positive appropriate and necessary finding, the statute's plain text unambiguously prohibits EPA from reversing course outside of section 112(c)(9)'s delisting procedures. Enacted as part of the 1990 Clean Air Act Amendments, section 112(n)(1)(A) directed EPA to make an initial finding as to whether power plants should be regulated under section 112, based on a public health study that was due, and in fact completed, decades ago.[51] In the words of the statute, EPA "shall perform a study of the hazards to public health reasonably anticipated to occur as a result of emissions by [power plants]" and report the results of that study to Congress by 1993; and EPA further "shall regulate [power plants] under this section, if the Administrator finds such regulation is appropriate and necessary after considering the results of the study." 42 U.S.C. § 7412(n)(1)(A). As EPA has long recognized, "[o]nce the appropriate and necessary finding is made, EGUs [electric utility steam generating units, or power plants] are subject to section 112 in the same manner as other sources." 77 Fed. Reg. at 9330. Thus, upon finding that it is appropriate and necessary to regulate power plant hazardous air emissions—as EPA did in 2000, and reaffirmed in 2012 and 2016—the agency no longer has discretion to exercise; section 112(n)(1)(A) requires that EPA "shall regulate" power plants. *See Chevron*, 467 U.S. at 843–44 (agencies have discretion "only when Congress has left a gap for the agency to fill"); *Ethyl Corp. v. EPA*, 51 F.3d 1053, 1060 (D.C. Cir. 1995) ("level of specificity" in Clean Air Act provision "effectively closes any gap the Agency seeks to find and fill").

Whether or not EPA later believes its initial determination was made in error, the only regulatory off-ramp Congress provided EPA is section 112(c)(9). Under that provision, titled "[d]eletions from the list," EPA "may delete any source category from the list" of categories regulated under section 112 if EPA can demonstrate that no source in that category poses an unacceptable risk to human health or the environment. Specifically, EPA would have to make two determinations: first, "that no source in the category" emits hazardous air pollution "in quantities which may cause a lifetime risk of cancer greater than one in one million" to the most exposed individual, and, second, "that emissions from no source . . . exceed a level which is adequate to protect public health with an ample margin of safety and no adverse environmental effect will result from emissions from any source." 42 U.S.C. § 7412(c)(9)(B)(i)–(ii). As the D.C. Circuit has confirmed, section 112(c)(9)'s "comprehensive delisting process" unambiguously applies to *all* listed sources, including power plants. *New Jersey*, 517 F.3d at 582–83. And when EPA took the 2020 Action, it did not purport to make the findings necessary to delist power plants. Nor could it have made such findings given, *inter alia*, indisputable record evidence that cancer risks far exceed the delisting threshold.[52] *See* 84 Fed. Reg. at 2697 tbl.5, 2699 (inhalation risk assessment showing estimated maximum individual cancer risks of 9-in-1 million and about 193,000 people with cancer risks above 1-in-1 million).

---

[51] *See* EPA, Off. of Air Quality Planning & Standards, *Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units – Final Report to Congress* (1998), Doc. ID No. EPA–HQ–OAR–2009–0234–3052.

[52] Nor could EPA have demonstrated the absence of any adverse environmental effect given the well-established environmental harms of power plant mercury emissions in particular. *See supra* Section I.B.2; *see also, e.g.*, 81 Fed. Reg. at 24,423 (power plant mercury emissions "contribute to adverse impacts on fish-eating birds and mammals"); 65 Fed. Reg. at 79,830 ("[e]xposure to methylmercury can have serious toxicologic effects on wildlife").

Other than the delisting process, Congress did not vest EPA with any authority to "correct flaws" that it might later perceive in its appropriate and necessary determination, including purported flaws arising from new policy preferences or legal interpretations. 85 Fed. Reg. at 31,289; *see also id.* at 31,290 (noting "change in administrations" as a driver of 2020 Action). The reasons that Congress so circumscribed EPA's authority are apparent from the Clean Air Act's history. When enacting the 1990 Clean Air Act Amendments, Congress intended to remedy "the slow pace of EPA's regulation" that had hindered attainment of the Act's pollution-prevention aims. *New Jersey*, 517 F.3d at 578; *see also Air All. Houston v. EPA*, 906 F.3d 1049, 1061–62 (D.C. Cir. 2018) (Congress enacted the Clean Air Act "to encourage and promote 'pollution prevention'" (citing 42 U.S.C. § 7401(c))). Congress viewed EPA's failure to regulate hazardous air pollutants as a "history of abuse and abdication," S. Rep. No. 101-228 (1989), 1990 U.S.C.C.A.N. 3385, 3561, and designed the section 112 amendments to "entirely restructure the existing law, so that toxics might be adequately regulated by the Federal Government," *id.* at 3513. To that end, Congress "altered section 112 by eliminating much of EPA's discretion." *New Jersey*, 517 F.3d at 578; *see also Nat'l Lime Ass'n v. EPA*, 233 F.3d 625, 634 (D.C. Cir. 2000) (Congress "believed EPA had failed to regulate enough [pollutants] under previous air toxics provisions"). For instance, Congress itself listed 189 hazardous air pollutants, including mercury, 42 U.S.C. § 7412(b)(1), gave EPA one year to list all source categories that emitted the listed pollutants, *id.* § 7412(c)(1), and directed EPA promptly to establish emissions standards for those categories, *id.* § 7412(e). And Congress deliberately "restricted the opportunities for EPA and others to intervene in the regulation of HAP sources" by establishing the demanding section 112(c)(9) criteria for removing a listed source category and by barring judicial review of listing decisions until EPA promulgated emission standards for the source category. *New Jersey*, 517 F.3d at 578 (citing 42 U.S.C. § 7412(c)(9), (e)(4)). EPA's determination in the 2020 Action that it retained broad ongoing authority to reverse course flouted Congress's intent to channel and limit the agency's discretion.

Indeed, EPA's attempt in 2020 to rely on purported "inherent authority" to reverse its appropriate and necessary finding, 85 Fed. Reg. at 31,290, unlawfully and unreasonably "construe[d] the statute in a way that completely nullifie[d] textually applicable provisions meant to limit its discretion," *New Jersey*, 517 F.3d at 583 (quoting *Whitman*, 531 U.S. at 485). Courts, including the D.C. Circuit, have routinely struck down agency attempts to rely on "inherent authority" to evade statutory limits on their authority. *See, e.g.*, *Ivy Sports Medicine, LLC v. Burwell*, 767 F.3d 81, 87 (D.C. Cir. 2014) (Kavanaugh, J., op.) (invalidating FDA order because "it would be unreasonable under this statutory scheme to infer that FDA retains inherent authority to short-circuit or end-run the carefully prescribed statutory reclassification process"); *see also New Jersey*, 517 F.3d at 583 ("Congress . . . undoubtedly can limit an agency's discretion to reverse itself"); *American Methyl*, 749 F.2d at 835 ("when Congress has provided a mechanism capable of rectifying mistaken actions . . . it is not reasonable to infer authority to reconsider agency action").[53] And in *New Jersey*, the D.C. Circuit specifically rejected EPA's

[53] *Cf. Air All. Houston*, 906 F.3d at 1061 (EPA "may not circumvent specific statutory limits on its actions by relying on separate, general rulemaking authority"); *Humane Soc'y of United States v. Zinke*, 865 F.3d 585, 601–02 (D.C. Cir. 2017) (segmentation of listed species unlawful where, *inter alia*, Fish and Wildlife Service failed to analyze effect of segmentation on remnant's status, as omitting such analysis would turn segmentation into "a backdoor route to the *de*

attempt to claim "inherent authority" as a basis for unwinding regulation of power plant HAPs, explaining that Congress "can limit an agency's discretion to reverse itself, and in section 112(c)(9) Congress did just that," thereby "preclud[ing] EPA's [assertion of] inherent authority" to reverse course on its predicate regulatory determinations.

Congress commonly designs statutes to prevent an agency from deregulatory "backsliding" by eliminating or restricting an agency's authority to undo regulatory determinations and/or to loosen the stringency of regulations once such determinations have been made. For example, the Energy Policy and Conservation Act "prohibits DOE from promulgating an amended [energy conservation] standard that is less stringent than the preexisting standard." *Nat. Res. Def. Council v. Perry*, 940 F.3d 1072, 1075 (9th Cir. 2019). Section 172(e) of the Clean Air Act "protects against backsliding" by barring EPA from relaxing the stringency of controls for nonattainment areas even if the agency loosens an ambient air quality standard. *See S. Coast Air Quality Mgmt. Dist. v. EPA*, 472 F.3d 882 (D.C. Cir. 2006). And the National Highway Traffic Safety Administration (NHTSA), in administering the Corporate Average Fuel Economy (CAFE) standards program, has statutory authority to increase the amount of the penalty imposed on automakers that violate the standards, but no countervailing statutory authority to ratchet down the amount once it has been increased. 49 U.S.C. § 32912(c) (authorizing NHTSA to make discretionary increases to CAFE penalty amount); 28 U.S.C. § 2461 note § 3 (directing NHTSA and other federal agencies to increase penalties for inflation); *see New York v. Nat'l Highway Traffic Safety Admin.*, 974 F.3d 87, 100 (2d Cir. 2020) (holding that NHTSA had to follow "highly circumscribed schedule" to implement penalty increases and lacked freestanding authority to reverse a penalty increase once made). The scheme for regulating power plants under section 112 operates in a similar fashion to these other programs, constraining agency power to unwind certain regulatory determinations designed to protect public health and the environment, except in accordance with specifically enumerated statutory limits and procedures.

Because EPA in 2020 attempted to revoke the regulatory basis for the MATS Rule without following the statutory delisting procedures, the 2020 Action was not authorized by statute and was *ultra vires*. EPA should recognize as much and should ground its revocation of the 2020 Action on that additional and independent basis.

B. EPA Correctly Recognizes that the 2020 Action Should Be Revoked Because that Action Relied on a Flawed Methodology.

Regardless of EPA's authority to rescind an affirmative appropriate and necessary finding once made, the States and Local Governments support EPA's Proposal to revoke the 2020 Action on the ground that its 2020 methodology "was an approach ill-suited to making the appropriate and necessary determination." 87 Fed. Reg. at 7659. EPA's Proposal correctly recognizes that the approach taken in 2020 "places undue primacy on those HAP benefits that have been monetized, . . . fails to consider critical aspects of the" statutory framework under section 112(n)(1), and generally lacks sufficient justification. *Id.* at 7660. Furthermore, EPA's

facto delisting of already-listed species, in open defiance of the Endangered Species Act's specifically enumerated requirements for delisting").

2020 Action was arbitrary and capricious because it failed to account for reliance interests of the States and other actors.

1. EPA's 2020 Analysis Improperly Devalued the MATS Rule's Vast Array of Unquantified Benefits.

EPA's analysis in the 2020 Action failed to give meaningful weight to the multitude of unquantified benefits stemming from the HAP reductions achieved by the MATS Rule. As the first (and ultimately dispositive) step in its 2020 approach, EPA directly weighed the full monetized costs of the MATS Rule (estimated to be several billion dollars) against the single subset of benefits that the agency was then able to monetize (estimated to be about $5 million)—consisting only of IQ loss in children born to a subset of recreational fishers who consume fish while pregnant. That direct comparison was used as the benchmark that would control the agency's appropriate and necessary determination unless the agency, in subsequent steps, found a basis to believe that either the unquantified benefits of reducing HAPs or the ancillary benefits of reducing criteria pollutants were of sufficient weight to disturb its initial calculation. EPA then cursorily determined that unquantified benefits were "not likely to overcome the imbalance" between monetized costs and monetized benefits. 85 Fed. Reg. at 31,296.

By hinging its comparative benefit-cost analysis so predominantly on the single HAP benefit it could most easily monetize, and by giving short shrift to the unquantified benefits that comprised the majority of the actual HAP-related benefits of the MATS Rule, EPA impermissibly narrowed the proper focus of section 112. *See Michigan*, 135 S. Ct. at 2709 (noting that section 112(n)(1)(A)'s "broad reference to appropriateness encompasses *multiple* relevant factors"). The 2020 Action essentially gave no weight to the more than *sixty* distinct categories of unquantified health, environmental, and economic benefits that had previously been identified in the MATS RIA—contravening Congress's clear intent that EPA carefully analyze health hazards posed by power plant hazardous emissions. *See* 42 U.S.C. § 7412(n)(1)(A) (directing EPA to regulate after considering its study of health hazards reasonably anticipated to result from power plant hazardous emissions).

As EPA has long recognized, a great number of the benefits from regulation are difficult (or impossible) to quantify or assign monetary value, and where such quantification is not yet possible, such benefits should still be assessed qualitatively in a way that ensures they remain central to the analysis.[54] *See supra* at 10-12; *infra* at 26–27. In the MATS context, such unquantified benefits have included, for example, the fact that prenatal exposure to even low levels of mercury can cause serious harms limiting children's ability to learn and achieve, including by impairing their attention, fine motor function, language skills, visual-spatial abilities, and verbal memory. 76 Fed. Reg. at 25,018; *see also* 65 Fed. Reg. at 79,829. Those harms impose lifelong costs that are difficult to quantify. *See* 77 Fed. Reg. at 9353 (explaining that because IQ is "not the most sensitive neurodevelopmental endpoint affected by [methylmercury] exposure" reliance on IQ "underestimates the impact of reducing methylmercury in water bodies"); MATS RIA at 4-65. Similarly, a variety of other health

[54] *See, e.g.*, 77 Fed. Reg. at 9306 (noting "limitations and uncertainties" of monetary figures); MATS RIA at 4-2 (discussing uncertainty and concluding that mercury benefits were likely underestimated due to data limitations); *id.* at ES-9 to ES-13 (describing the particular difficulty in quantifying mercury-related neurologic, cardiovascular, genotoxic, and immunologic damage to humans and reproductive harm to fish, birds, and mammals).

conditions have not been quantified, such as cancer risks and adverse neurological, cardiovascular, immunological, reproductive, liver, kidney, and respiratory effects. 76 Fed. Reg. at 25,003; MATS RIA at 4-68 to 4-73. Nor has EPA quantified, for example, the benefits of the MATS standards in fostering the ability of many historically overburdened communities to maintain traditional ways of life based on subsistence fishing. *See infra* at 27–28.

EPA's minimization of the overwhelming bulk of benefits that were not yet capable of being monetized is contrary to the specific concern Congress expressed about mercury harms, including from power plant mercury emissions. *See* 42 U.S.C. § 7412(c)(6) (prioritizing development of non-power-plant standards for certain persistent pollutants, including mercury); *id.* § 7412(n)(1)(B), (C) (requiring study of mercury emissions, including from power plants, and health risks); S. Rep. No. 101-228, 1990 U.S.C.C.A.N. at 3515 (noting widespread contamination of fish in northern lakes "attributable to mercury emissions from coal-fired power plants"). That approach is also contrary to Congress's plain understanding that the potential harms of hazardous air pollutants would be extremely difficult to quantify in time for an appropriate and necessary determination, as assessments of those harms would instead become clearer over years and decades—more time than EPA would have to determine whether to list power plants and to set standards. *See Portland Cement Ass'n v. Ruckelshaus*, 486 F.2d 375, 387 (D.C. Cir. 1973) (rejecting argument that section 111(a) requires quantified benefit-cost analysis in part because of "the specific time constraints" imposed by Congress for listing sources and setting standards); Richard L. Revesz, *Quantifying Environmental Benefits*, 102 Cal. L. Rev. 1423, 1436 (2014) (noting that some of the most important categories of benefits of environmental regulation that were once considered unquantifiable have subsequently been quantified); *see also infra* at 26-27.

EPA's present analysis confirms the importance of benefits that were unquantified in 2020. By using more up-to-date science, EPA is now able to provide estimates of certain benefits that had previously been unquantified, such as the cardiovascular benefits of reductions in mercury. *See infra* Section III.B.2. These benefits, unsurprisingly, are substantial. In fact, they drastically increase the monetized estimate of quantifiable benefits *more than a hundredfold*. *See id*. The States and Local Governments thus support EPA's current determination that the 2020 Action unjustifiably "discount[ed] the social value (benefit)" of numerous impacts "simply because the Agency c[ould]not assign a dollar value to those impacts." 87 Fed. Reg. at 7660.

2. EPA's 2020 Analysis Failed to Properly Consider the Massive Benefits of the MATS Rule in Reducing Emissions of Particulate Matter and Sulfur Dioxide.

EPA also failed in 2020 to meaningfully account for the extensive reductions in harmful particulate matter and sulfur dioxide attributable to the MATS Rule. The predicted benefits of the MATS Rule for particulate matter reductions alone, for example, included an estimated 4,200 to 11,000 avoided premature deaths; 2,800 fewer cases of chronic bronchitis; 4,700 fewer non-fatal heart attacks; 830 fewer hospital admissions for respiratory symptoms; 1,800 fewer hospital admissions for cardiovascular symptoms; 540,000 fewer lost work days; and 3,200,000 fewer minor restricted activity days in adults. 77 Fed. Reg. at 9306; MATS RIA at 5-95. And even though EPA was unable to quantify all categories of co-benefits associated with reductions in sulfur dioxide and fine particulate matter (notably ecosystem and visibility effects), its estimates of the monetized benefits were massive, ranging from $59 billion to $140 billion. 76 Fed. Reg. at 25,085.

It defied common sense for EPA, after finding an inflated estimate of monetized costs to substantially exceed the small sliver of HAP-related benefits that had been monetized, to essentially disregard the extensive co-benefits that had been quantified and monetized and that, if properly considered, would weigh even further in favor of regulation. First, section 112(n)(1)(A) itself reflects a congressional intent that such "co-benefits" be a part of regulatory decisionmaking; that provision directs the agency, in making the appropriate and necessary determination, to consider the how the regulation of sulfur dioxide and nitrogen oxides under other Clean Air Act programs would lead to HAP reductions. *See* 80 Fed. Reg. 75,025, 75,041 (Dec. 1, 2015). Thus, section 112 plainly demonstrates that Congress understood the interplay between different regulatory schemes and intended for EPA to holistically account for environmental co-benefits under the Act's interrelated procedures. Second, the co-benefits of the MATS Rule are a direct consequence of the emission controls required by MATS. Because the acid gases, selenium, and ionic mercury regulated under section 112 are readily captured by technologies that are typically used to control sulfur dioxide, sources are using those very sulfur dioxide control technologies as a means of complying with the MATS Rule.[55] And reducing emissions of hazardous non-mercury metals necessarily results in reductions of particulate matter because those toxic metals normally are found in particles and, like particle-bound mercury, are captured by removing the filterable particulate matter emitted by power plants. 80 Fed. Reg. at 75,041. Third, EPA's attempt to ignore ancillary *benefits* on the basis that they are "indirect" cannot be squared with the agency's determination in 2020 to consider ancillary *costs* in its rulemaking—for example, the knock-on costs of the MATS Rule to the power sector and to consumers beyond the direct compliance costs of installing pollution controls. Nor can EPA's disregard of "indirect benefits" be squared with the Supreme Court's direction in *Michigan*, 135 S. Ct. at 2707, that the agency should not blind itself to all of the effects of regulation, including, for example, indirect effects such as unintended "harms that regulation might do to human health or the environment." Just as indirect harms must be considered, so too must indirect benefits.

While the States and Local Governments agree that the appropriate and necessary determination is supported even without looking to ancillary benefits, EPA's failure to consider this massive set of benefits in concluding that regulation was not appropriate is another reason its 2020 Rule was illegal.

3. EPA's Framework in 2020 Failed to Give Meaningful Weight to the Benefits Accruing to Historically Marginalized and Overburdened Populations, a Touchstone of Section 112.

The States and Local Governments also fully support EPA's present recognition that its 2020 approach was illegal because it failed to adhere to Congress's clear intent to reduce exposures to historically marginalized and overburdened populations, notably including the

---

[55] NESCAUM, *Control Technologies to Reduce Conventional and Hazardous Air Pollutants from Coal-Fired Power Plants*, 23–24 (2011), https://www.nescaum.org/documents/coal-control-technology-nescaum-report-20110330.pdf/; *see also id.* at 13, 22 (noting that injection of dry sorbent reagents that react with acid gases (DSI), combined with downstream particulate matter control device to capture reaction products, can remove ninety percent of sulfur dioxide and ninety-eight percent of hydrochloric acid (regulated under section 112) present in power plant emissions). The MATS Rule thus targets fine particulate matter and sulfur dioxide as surrogates for certain hazardous air pollutants. *See* 81 Fed. Reg. at 24,438 n.29.

"most exposed and most sensitive subpopulations." 87 Fed. Reg. at 7660. EPA's 2020 analysis was arbitrary because it failed to account for that critical "relevant factor." *See Michigan*, 135 S. Ct. at 2709.

The text and structure of the statute codify the concern for protecting the most vulnerable individuals through, for example, the residual risk review provision, which directs EPA to promulgate standards if even a single individual has a cancer risk exceeding a one-in-one-million threshold. 42 U.S.C. § 7412(f)(2)(A). Likewise, section 112's circumscribed procedures for delisting sources and deleting regulated substances allow EPA to deregulate only under the narrowest circumstances: where substances are determined to have no adverse health or environmental effects, or where source categories do not cause any individual's lifetime cancer risk to exceed one-in-one-million. *Id.* § 7412(c)(9)(B)(i). The legislative history to the 1990 Amendments further demonstrates Congress's concern with the lifetime cancer risk to the most exposed individuals, by recognizing the synergistic effects on such individuals of multiple direct and indirect pathways of exposure to toxic pollutants. H.R. Rep. No. 101-190, at 315. These provisions collectively illustrate Congress's concern with protecting individuals in the most exposed and vulnerable communities, which are often the same communities that have been historically marginalized and overburdened. Yet despite these clear indications of Congress's concern that regulation be designed to eliminate even low levels of risk to the most exposed and sensitive persons in such communities, the framework adopted in 2020 centering on a direct comparison of costs to monetized benefits unlawfully and arbitrarily gave no weight to these impacts, as EPA now appropriately acknowledges. *See* 87 Fed. Reg. at 7660.

4. EPA's Failure in 2020 to Consider Reliance Interests Is Another Basis for Rescinding the 2020 Action.

Another independent ground for revoking the 2020 Action is the agency's failure to properly account for reliance interests. When an agency changes regulatory policy, it is "required to assess whether there [a]re reliance interests, determine whether they [a]re significant, and weigh any such interests against competing policy concerns." *Dep't of Homeland Sec. v. Regents of the Univ. of Cal.*, 140 S. Ct. 1891, 1915 (2020). EPA failed to do so in the 2020 Action.

As many of the States and Local Governments anticipated when commenting on the proposal preceding EPA's 2020 Action, it was foreseeable that opponents of the MATS Rule would seek to leverage EPA's 2020 determination to request that a court invalidate the MATS emissions standards that were predicated on the affirmative appropriate and necessary finding. And indeed, after the 2020 Action was promulgated, such a challenge was brought in the D.C. Circuit. *Westmoreland Mining Holdings LLC v. EPA*, No. 20-1160 (D.C. Cir.), Doc. No. 1857810 (challenger's statement of issues). Yet EPA entirely failed to consider the risks posed by such a lawsuit, including the potential health, environmental, and economic consequences to States and Local Governments if the MATS emissions controls were no longer required.[56]

---

[56] In the absence of enforceable emission standards, power plants would be unlikely to operate their HAP controls, leading to an enormous increase in HAP and criteria pollutants and wiping out the myriad health and environmental gains attributed to the MATS Rule, *supra* Section I.B.1, with particularly severe effects for vulnerable and sensitive subgroups, *supra* at 5–7, and with substantial economic impacts imposed on, *inter alia*, state fisheries, *supra* Section I.B.2.

Of note, EPA's 2020 Action threatened to undermine a wide variety of state planning, as certain states depend on the MATS Rule to meet TMDL goals, to develop strategies to attain and maintain ambient air quality standards, and to achieve reasonable progress goals under regional haze plans. *See supra* Section I.B.3. EPA also failed to consider the reliance interests of electricity customers, who might be forced to continue to bear the costs of controls that power plant owners and operators had turned off. Nor did EPA consider reliance interests of utilities that had made the substantial capital expenditures required by the MATS Rule and that might, in the absence of an affirmative appropriate and necessary finding, be unable to recover from ratepayers some or all of their investments if deemed imprudent by a public utility commission. EPA now recognizes the existence of these many "aligned" reliance interests, 87 Fed. Reg. at 7668, and it should acknowledge that its failure to account for them in the 2020 Action is yet another ground for that rule's rescission.

III. EPA's Approach to Affirming the Supplemental Finding Lawfully and Faithfully Comports with Congress's Intent and the Supreme Court's Direction in *Michigan*, and the Record Supports EPA's Conclusion under that Approach.

EPA's totality of the circumstances approach is faithful to the Clean Air Act's text and purpose, carefully evaluates the relevant statutory considerations, and rectifies flaws in the agency's 2020 analysis. *See* 87 Fed. Reg. at 7627. Moreover, abundant record evidence supports EPA's determination that regulation of power plant HAP emissions remains appropriate and necessary under this framework. And this is so, as EPA correctly finds, on both the original record previously before the agency as well as an updated record that accounts for more recent evidence on benefits and costs. In fact, even the updated record offers a conservative accounting of the justification for regulation, as additional evidence demonstrates that benefits are even higher and costs lower than EPA presently estimates.

A. EPA's Totality of the Circumstances Approach is Rational and Best Effectuates the Statute's Goals and Intent.

In its proposed totality of the circumstances approach, EPA carefully considers and weighs all statutorily relevant factors to determine whether to regulate hazardous air pollution from power plants. 87 Fed. Reg. at 7668. Taking its cue from Congress's focus on public health in section 112(n)(1)(A), EPA begins by considering the human health advantages. *Id.* at 7637–48. This analysis looks to the direct, quantified as well as unquantified, health effects of regulating hazardous air pollutants from power plants. *See id.* EPA pays particular attention to the distribution of the benefits of such regulation and how they affect the populations most exposed and most vulnerable to the health impacts of air pollutants. *See id.* Next, EPA, considers the environmental benefits to society of regulating hazardous air pollutant emissions from power plants, *id.* at 7640–41, 7647–48, as well as the overall volume of emissions of hazardous air pollutants from power plants, *see id.* at 7662 (citing 42 U.S.C. § 7412(n)(1)(B)). EPA then carefully considers, under several different contextual metrics, the varied costs of such regulation, including both the direct costs of compliance as well as the broader costs to society, such as potential increases in retail electricity prices associated with regulation and potential reductions in the reliability of electricity service. *See* 87 Fed. Reg. at 7628, 7663, 7666–68. Finally, EPA "proposes to conclude that the substantial benefits of reducing HAP from EGUs, which accrue in particular to the most vulnerable members of society, are worth the costs," and that, "after weighing the totality of the circumstances, . . . regulation of HAP from [power plants] is appropriate." *Id.* at 7668.

EPA's totality of the circumstances approach is not only "rationally related to the goals of the statute," *Good Fortune Shipping SA v. Comm'r of Internal Revenue Serv*., 897 F.3d 256, 261 (D.C. Cir. 2018) (internal quotation marks omitted), but it is also the best effectuation of Congress's intent. As EPA thoroughly explains in its Proposal, the totality of the circumstances approach to the section 112(n)(1)(A) determination aligns with the text and structure of the provision and furthers the statute's purposes. *See* 87 Fed. Reg. at 7662–69; *cf. Spectrum Pharms., Inc. v. Burwell*, 824 F.3d 1062, 1067 (D.C. Cir. 2016) (upholding agency application of governing statute that "closely hews to the [statute's] text" and "conforms to the statutory purposes").

1. EPA's Totality of the Circumstances Approach is the Best Approach to Faithfully Consider the Factors Congress Deemed Important.

The language and context of section 112's appropriate and necessary determination indicate that EPA ought to account for the many relevant potential benefits of HAP regulation when making the finding. The totality of the circumstances approach is well-suited to carrying out this directive. First and foremost, this approach allows EPA to effectively prioritize the public health implications of regulating hazardous air pollution from power plants. Second, it allows EPA to consider other statutory factors that Congress highlighted, including critical considerations that other analytical approaches might overlook, such as the distributional and cumulative impact of hazardous air pollutants on overburdened and marginalized communities.

As the Supreme Court instructed, "'appropriate' is 'the classic broad and all-encompassing term that naturally and traditionally includes consideration of all the relevant factors.'" *Michigan*, 576 U.S. at 751 (quoting *White Stallion Energy Ctr., LLC*, 748 F.3d at 1266 (Kavanaugh, J., dissenting)). It is thus eminently reasonable for EPA to make the appropriate and necessary determination by balancing a broad swath of considerations that Congress has indicated are relevant to this section's goals, including public health, health impacts on the most vulnerable and exposed individuals, environmental effects, and costs. Indeed, courts have routinely blessed agency uses of a totality of the circumstances approach in analogous statutory contexts. *See Catawba Cty. v. EPA*, 571 F.3d 20, 39 (D.C. Cir. 2009) (holding that agency may "adopt a totality-of-the-circumstances test to implement a statute that confers broad authority"); *Chippewa & Flambeau Imp. Co. v. FERC*, 325 F.3d 353, 358–59 (D.C. Cir. 2003) (holding that Congress granted FERC significant discretion "by enacting [a] 'necessary or appropriate' standard" and that FERC's "case-by-case approach" to making that determination based on a "series of relevant factors" was reasonable and consistent with the governing statute). Many of the undersigned States have also adopted similarly wide-ranging analytical frameworks that account for all relevant factors when enacting their own regulatory standards to address certain hazardous (and other) air pollutant emissions from power plants.[57]

The States and Local Governments support EPA's decision under a totality of the circumstances approach to prioritize all of the public health benefits of regulating hazardous air

[57] For example, in 2006, Delaware established regulations to reduce emissions of nitrogen oxides, sulfur dioxide, and mercury from power plants to "reduce the impact of those emissions

pollution from power plants, whether capable of quantification or not, in line with Congress's clear intent. *See* 87 Fed. Reg. at 7637–48. While Congress did not define the precise methodology that EPA is to employ when making an appropriate and necessary determination, 42 U.S.C. § 7412(n)(1)(A), it clearly communicated that EPA should focus on the "hazards to public health . . . as a result of emissions" from power plants, explicitly directing EPA to conduct a formal study on that issue to inform its determination, 87 Fed. Reg. at 7662 (citing 42 U.S.C. § 7412(n)(1)(A)).

The other studies that Congress authorized EPA to conduct in section 112(n) further indicate Congress's intent that EPA pay careful attention to the multiple insidious harms of hazardous air pollution from power plants; Congress directed the agency to study and consider: the "health and environmental effects of such emissions," 42 U.S.C. § 7412(n)(1)(B); the amount ("rate and mass") of those emissions, *id.*; and the health risks of even low levels of mercury to sensitive populations, *id.* § 7412(n)(1)(C). And, as EPA details in its Proposal, other references in section 112 highlight Congress' concern that EPA exercise its section 112 authority to address even small health and environmental risks posed by hazardous air pollutants. *See, e.g.*, *id.* § 7412(b)(3)(D) (prohibiting deletion of substance from regulated list unless data show that "the substance may not reasonably be anticipated to cause *any* adverse effects to human health or adverse environmental effects" (emphasis added)).

Additionally, EPA's totality of the circumstances approach allows the agency to consider, as instructed by Congress, the distributional and cumulative impact of HAPs on already overburdened and marginalized communities. A more linear balancing of costs against general societal benefits would not capture these impacts. As EPA details in its Proposal, section 112 "is drafted in order to be protective of small cohorts of highly exposed and susceptible populations." 87 Fed. Reg. at 7666. For example, Congress instructed the agency to account for the most vulnerable communities and persons by directing it to evaluate the "threshold level of mercury exposure below which adverse human health effects are not expected to occur," specifically by taking into account consumption of fish tissue by "sensitive populations." 42 U.S.C. § 7412(n)(1)(C). And the residual risk assessment that Congress requires in section 112(f)—mandating that the agency promulgate regulations if even a single person exceeds a threshold cancer risk level—indicates Congress' intention that regulations under section 112 not only reduce overall pollution, but limit health risks to the most vulnerable and exposed individuals. *See id.* § 7412(f)(2) (requiring EPA to impose further regulations if existing standards for

---

on public health," help the state meet attain National Ambient Air Quality Standards (NAAQS), help reduce particulate and mercury pollution related to coal and oil-fired power plants, satisfy the state's obligations under federal rules, and "improve visibility" and reduce "EGU-related regional haze." Del. Admin. Code tit. 7 § 1146, Electric Generating Unit (EGU) Multi-Pollutant Regulation (Dec. 2006), https://regulations.delaware.gov/AdminCode/title7/1000/1100/1146.pdf. Similarly, the Maryland Department of the Environment, when assessing air pollutant regulations for fossil-fuel burning power plants, evaluated the impacts of such regulation on compliance with federal standards, public health and welfare, pollution in the Chesapeake Bay, and vegetation and agriculture. *See* Md. Dep't of the Env't, Technical Support Document for Proposed COMAR 26.11.38 (May 26, 2015), https://mde.maryland.gov/programs/Regulations/air/Documents/TSD_Phase1_with_Appendix.pdf.

particular source of pollution fail to reduce "lifetime excess cancer risks to the individual most exposed to" emissions from that source below one in one million).

If EPA were to evaluate whether to regulate HAP emissions from power plants by comparing quantified costs and benefits on an aggregate, societal level, as the agency did in 2020, it would ignore Congress' directive to consider impacts on specific vulnerable populations. *See supra* Section II.B.3. In contrast, by adopting a totality of the circumstances approach to the 112(n)(1) inquiry, EPA is able to weigh critical fact-specific data on that score, such as evidence that Black subsistence fisher women in the Southeast face disproportionately high levels of mercury exposure carrying a risk of prenatal neurodevelopmental harm. *See* 87 Fed. Reg. at 7647; *cf. PDK Lab'ys Inc. v. U.S. Drug Enf't Admin.*, 438 F.3d 1184, 1194 (D.C. Cir. 2006) (affirming appropriateness of totality of the circumstances approach to make "fact-intensive determinations").

In sum, EPA's totality of the circumstances approach best allows the agency to evaluate the full range of benefits of power plant HAP regulation that Congress deemed relevant to the appropriate and necessary determination.

2. EPA Appropriately Considers Unquantified Benefits and Co-Benefits as Part of its Totality of the Circumstances Analysis.

EPA's totality of the circumstances approach, unlike the approach taken in the 2020 Action, sensibly recognizes and accounts for those benefits that Congress required EPA to consider—health related and otherwise—that are unquantifiable or as-yet unquantified. Indeed, OMB has long cautioned agencies against "ignoring unquantifiable benefits, because the most efficient rule may not have the "largest quantified and monetized . . . estimate," Office of Mgmt. & Budget, Circular A-4, at 2 (2003), and directed agencies to consider values that are difficult or impossible to quantify, including equity, human dignity, fairness, and distributive impacts, Exec. Order No. 13,563 § 1, 76 Fed. Reg. 3821, 3821 (Jan. 21, 2011) (affirming Exec. Order No. 12,866). *See also Exec.* Order No. 12,866 § 1, 58 Fed. Reg. 51,735 (Sept. 30, 1993) ("Costs and benefits shall be understood to include both quantifiable measures . . . and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider.").[58] In this context, for example, a direct comparison of costs to social benefits fails to account for the impact of HAPs in threatening the traditional lifestyle of subsistence fishers.

Even for benefits where quantification is at least theoretically possible, EPA accurately recognizes that it can be extremely difficult and time-consuming to quantitatively estimate the manifold health and environmental benefits of reducing emissions of air toxics. 87 Fed. Reg. at 7645. Among other reasons, it is difficult to design population-based epidemiological studies, limited data exist that monitor ambient air pollutant concentrations and individual exposure, insufficient economic research exists that would permit analysts to monetize the health impacts

---

[58] *See, e.g.*, 87 Fed. Reg. 10,805–02, 10,812 (describing how FEMA must account for co-benefits that "may not be quantifiable" related to "disadvantaged communities; cultural, historic, and sacred sites; and subsistence-related resources and activities" when evaluating grants); 69 Fed. Reg. 38,958, 39,138–39 (June 29, 2004) (evaluating all effects of regulating emissions from non-road diesel engines and "not just those benefits and costs which could be expressed [] in dollar terms"); 64 Fed. Reg. 52,828, 53,023 (Sept. 30, 1999) (considering the "real, but unquantifiable, benefits" of section 112 standards for hazardous waste combustors).

associated with exposure to air toxics, logistical and ethical barriers make it difficult to conduct controlled scientific studies on the impacts of HAP exposures, and the effects of HAP exposures are dispersed less evenly than other types of impacts that are analyzed epidemiologically. *See id*. For these and other reasons, EPA remains unable to quantify, let alone monetize, anywhere near the full scope of benefits that accrue from regulation of hazardous air pollutants from power plants, including the prevention of myriad health effects like cognitive impairment, cancer, and adverse reproductive effects. The totality of the circumstances approach more effectively captures these unquantified or unquantifiable benefits than one that simply weighs monetized costs against those benefits that may currently be quantified.

In addition, while the States and Local Governments agree with EPA that the appropriate and necessary finding is lawful and supported on the basis of direct benefits alone, *see* 87 Fed. Reg. at 7668, EPA also can and should consider co-benefits of the MATS Rule,[59] as it does here as part of the totality of the circumstances framework. As discussed above, *supra* at 20–21, the co-benefits of the MATS rule include massive health and environmental benefits due to reductions in particulate matter and sulfur dioxide pollution attributable to the MATS controls.[60] 87 Fed. Reg. at 7668–69.

As the States and Local Governments have consistently articulated, *see, e.g.*, Comments of the Attorneys General of Massachusetts et al. ("2019 States' Comments"), Doc. ID No. EPA-HQ-OAR-2018-0794-1175, at 34–37 (Apr. 17, 2019), and as explained in more detail above, *supra* Sections II.B.1 and II.B.2, multiple elements of the Clean Air Act's text and structure show that Congress intended that EPA take a comprehensive view of regulation's advantages and disadvantages when evaluating its appropriateness, including the full scope of its benefits. Notably, section 112(n)(1)(A)'s direction that EPA assess how effectively control technologies targeting other pollutants, under other provisions of the Act, were controlling hazardous air pollution from power plants, demonstrates that Congress did not intend that EPA take a blinkered view of benefits when regulating under section 112. That is especially true where, as here, doing so would give no weight to reductions in particulate matter and other pollutants that have led to massive public health benefits to the States and Local Governments and their residents.

Moreover, these benefits accrue to some of the same sensitive and highly exposed populations most at risk of adverse health effects from HAPs,[61] and there is no reason to believe that Congress's concern about protecting sensitive populations from adverse health impacts extends to some pollutants but not others. *See supra* Section II.B.2. Indeed, before taking its aberrant position in 2020, EPA itself maintained that the co-benefits from reduced emissions of other pollutants associated with HAP regulation were an important part of the agency's determination. Courts have also agreed in other contexts that "considering co-benefits . . . is consistent with the [Clean Air Act]'s purpose—to reduce the health and environmental impacts

[59] Nonetheless, the States support EPA's decision to analyze the totality of the circumstances both with and without consideration of co-benefits.

[60] These benefits include "decreased risk of premature mortality among adults, and reduced incidence of lung cancer, new onset asthma, exacerbated asthma, and other respiratory and cardiovascular diseases." 87 Fed. Reg. at 7669.

[61] *See* MATS RIA at 7-36 to 7-37; *see also infra* at 30–31 (summarizing co-benefits in MATS RIA).

of hazardous air pollutants." *U.S. Sugar Corp. v. EPA*, 830 F.3d 579, 623–25 (D.C. Cir. 2016) (affirming EPA's reliance on co-benefits, including "reductions in emissions of other pollutants," to justify more stringent standards for hydrogen chloride emissions from boilers, process heaters, and incinerators).

3. EPA's Focus on Sensitive and Vulnerable Populations Aligns with Important Federal and State Environmental Justice Policies.

The States and Local Governments commend EPA for focusing on the disproportionate burden of hazardous air pollution on the communities most sensitive and vulnerable to its impacts. This focus is not only required by the statute, *see supra* at 21–22, 25-26, but also furthers environmental justice policies that the federal government and the undersigned States have deemed critical in a wide range of contexts. For example, Executive Order 14,008 instructed EPA to "secure environmental justice . . . for disadvantaged communities that have been historically marginalized and overburdened by pollution and underinvestment in housing, transportation, water and wastewater infrastructure, and health care" by "address[ing] the disproportionately high and adverse human health, environmental, climate-related and other cumulative impacts on disadvantaged communities" in its "programs, policies, and activities." Exec. Order 14,008 § 219, 86 Fed. Reg. 7,619, 7,629–32 (Feb. 1, 2021). Likewise, many of the undersigned States have declared their own commitment to promoting environmental justice through an array of different laws and policies.[62]

The totality of the circumstances analysis allows EPA to give adequate weight to the cumulative impact of HAP emissions on disadvantaged communities that already face disproportionate burdens in housing, transportation, infrastructure, and health care. The States

---

[62] *See, e.g.*, Cal. Pub. Res. Code § 71113 (establishing working group on environmental justice); S. 2408, 102nd Gen. Assemb. (Ill. 2021) (requiring expedited emissions reductions of power plants operating near designated "environmental justice" and "equity investment eligible" communities and requiring meaningful participation to "protect[] and improve[] the well-being of communities . . . that bear disproportionate burdens imposed by environmental pollution"); 2021 Mass. Acts ch. 8 (incorporating environmental justice principles into Massachusetts climate policy); Mich. Exec. Order No. 2019-06 (establishing Interagency Environmental Justice Response Team); Minn. Pollution Control Agency, *Admin. Policy no. i-admin8-29* (Nov. 2020), (announcing policy to protect "[c]ommunities of color, indigenous communities, and low-income residents" and to "reverse generations of environmental inequities"); S. 232, 2020–2021 Sess. (N.J. 2020) (addressing "the environmental and public health impacts of certain facilities on overburdened communities"); N.C. Exec. Order No. 80 (2018) (requiring cabinet agencies to develop climate adaptation and resiliency plans that "support communities and sectors of the economy that are vulnerable to the effects of climate change"); Or. Admin. R. 182.538 (creating Environmental Justice Task Force); H. 8036, Jan. Sess. (R.I. 2022) ("Environmental Justice Act" requiring, among other things, permitting decision-making to consider cumulative impacts in overburdened areas).

commend EPA for considering the totality of burdens exacerbating health inequities and environmental injustice when making the appropriate and necessary determination.

4. EPA Appropriately Evaluates Costs Holistically.

On the other side of the ledger, EPA's methods of evaluating the costs of regulation are an effective means of paying "attention to . . . the disadvantages of [its] decision[]." 576 U.S. at 753. As the Supreme Court directed, EPA considers the costs of regulation, and the "cost of compliance" in particular, *id.* at 759, when assessing the appropriateness of regulating power plant HAP emissions. *See* 87 Fed. Reg. at 7648–59. EPA proposes to do this not simply by tallying estimated costs to generate a single numerical figure that can be weighed against benefits, but by conducting detailed analyses to contextualize the costs of EGU regulation along different axes.

The States and Local Governments support this holistic approach to assessing costs as part of the totality of the circumstances analysis. Indeed, this approach is especially apt here, where Congress has emphasized its concern with various types of benefits that cannot be translated into simple dollar figures, such as the distribution of regulation's benefits and the impacts on particularly vulnerable segments of society. *See supra* Section II.B.3. Understanding whether these types of benefits are worth the costs necessarily requires an inquiry into the reasonableness of imposing costs separate and apart from a simple comparison of monetized figures. *See* 87 Fed. Reg. at 7659.

The metrics EPA uses to assess costs all fit this bill as reasonable methods of placing costs in context. For example, EPA analyzes projected capital costs of compliance with MATS in the context of the power sector's overall annual capital expenditures. *See id.* at 7657. Such a comparison demonstrates that the investments required to comply with HAP regulations "would comprise a small percentage of the sector's historical annual capital expenditures . . . and also would fall within the range of historical variability in such capital expenditures." *Id.* at 7659. Similarly, EPA analyzes the impact of EGU regulation on retail electricity prices as well as the overall reliability of electricity supply for consumers. *Id.* at 7657–58. These contextualized analyses of the costs of compliance appropriately respond to the Supreme Court's direction in *Michigan* to consider costs and do so in a way that is faithful to the statute. *See Michigan*, 576 U.S. at 752–53.

B. The Record Evidence Justifies EPA's Determination that, Considering the Totality of the Circumstances, Regulating Power Plants Under Section 112 Is Appropriate.

Whether one considers the record before the agency when it issued the 2016 supplemental finding on remand from the *Michigan* decision (i.e., evidence of costs and benefits from the MATS RIA) or looks at an updated record that includes subsequently developed evidence of benefits and costs, EPA's proposed decision that it is appropriate to regulate power plant HAP emissions under a totality of the circumstances approach is amply supported. The States and Local Governments believe that the most reasonable and legally supportable course is for EPA to assess the most up-to-date information and science, rather than relying on old information, much of which is known to be inaccurate (most often because it erroneously inflates costs and minimizes benefits). No court has directly addressed whether the agency, in this type of reaffirmation action under this statute, should look to the original record, or whether the agency may (or must) look to the most recent information. The States and Local Governments thus support as prudent EPA's proposal to analyze both records under its totality of the circumstances framework, with more recent information confirming the appropriateness of regulation on the initial record. In addition, the States and Local Governments note that EPA continues to rely on a series of conservative and limiting assumptions when evaluating new data, and that the benefits are even higher and the costs even lower than EPA finds based on an updated record, thus providing even more support for EPA's proposed conclusion that regulating power plant HAP emissions is appropriate and necessary.

1. The Record before the Agency in 2016 Demonstrates Abundant Public Health Benefits Sufficient to Justify Regulation in Light of the Costs.

The States and Local Governments support EPA's proposed conclusion that, looking to the initial record that was available to the agency in 2012 and that comprised the basis for the 2016 Supplemental Finding, regulation is appropriate because "the substantial benefits of reducing HAP from EGUs, which accrue in particular to the most vulnerable members of society, are worth the costs." 87 Fed. Reg. at 7668.

As EPA once again recognizes in its current Proposal, EPA's earlier rulemaking record established the extensive benefits of regulating power plant HAP emissions, both on a societal level and for the most vulnerable and exposed populations. *See* 87 Fed. Reg. at 7665. Mercury, for example, has long been known to cause neurologic, cardiovascular, immunologic, and genotoxic harms to humans, especially in fetuses and children; to have disparate impacts on certain vulnerable populations in certain watersheds, including communities experiencing poverty and communities of color; and to have adverse effects on wildlife and ecosystems. *See* 87 Fed. Reg. at 7666; MATS RIA at 4-5 to 4-10. In the initial record, EPA quantified a small subset of these benefits, consisting only of annual prenatal-methylmercury-related IQ loss in the children of recreational fishers attributable to power plant emissions, with EPA estimating that MATS-Rule emissions reductions would prevent the loss of 511 IQ points and yield lifetime earning benefits of $4 to $6 million. MATS RIA at ES-1, ES-6 tbl.ES-4; 4-56, 4-67. EPA has recognized that this estimate was extremely conservative even as to the specific subset of benefits measured,[63] and also that the MATS Rule would lead to a vast array of unquantified benefits, including, *inter alia*, reduced harm from cardiovascular and non-IQ neurological effects of mercury; reduced health risks of exposure to non-mercury hazardous air pollutants that cause cancers and neurological, cardiovascular, immunological, reproductive, liver, kidney, and respiratory effects; and reduced ecosystem harms to wildlife and ecosystem acidification. 76 Fed. Reg. at 25,003; MATS RIA at 4-68 to 4-73, 5-6 to 5-7 & tbl.5-3; 5-59 to 5-92; 77 Fed. Reg. at 9428, 9323, 9363, 9426–28; 87 Fed. Reg. at 7666.

[63] EPA acknowledged that both its mercury risk assessment and IQ-loss quantification analyses underestimated the risks of exposures to power plant mercury emissions, in particular because IQ is "not the most sensitive neurodevelopmental endpoint affected by [methylmercury] exposure" and reliance on it "underestimates the impact of reducing methylmercury in water bodies." 77 Fed. Reg. at 9353; MATS RIA at 4-64 to 4-65. It also recognized that its focus on neurological impacts from self-caught fish did not capture exposures from consumption of commercial fish and seafood. MATS RIA at 4-65; *see also* 80 Fed. Reg. at 75,040 (noting the limited nature of the MATS rulemaking IQ-loss benefit analysis, and that EPA did not consider ocean or estuarine waterbodies or commercially caught fish as part of its analysis).

The earlier record also highlighted the disproportionate impact of HAPs on sensitive and highly exposed populations, including children, Tribal communities, and historically marginalized and overburdened communities who rely on subsistence fishing or live near power plants.[64] 77 Fed. Reg. at 9444–45; MATS RIA at 7-35 to 7-36; 76 Fed. Reg. at 25,018–19; *see also* 81 Fed. Reg. at 24,429, 24,442. And that record predicted massive co-benefits through reductions in particulate matter and sulfur dioxide emissions that reduce health risks most likely to affect sensitive populations[65] and yield important environmental benefits.[66] The MATS RIA predicted, for example, up to 11,000 avoided premature deaths, as well as a slew of other non-mortality health benefits of the MATS Rule. 77 Fed. Reg. at 9306; MATS RIA at 5-95. And although EPA was unable to quantify all categories of co-benefits (particularly those associated with ecosystem and visibility effects), its 2016 estimates of the monetized co-benefits ranged from $59 billion to $140 billion. 76 Fed. Reg. at 25,085; MATS RIA at 5-103.

On the cost side of the ledger, EPA in 2011 projected compliance costs of $9.6 billion to the power sector as a whole during the first year of compliance. MATS RIA at 3-31 tbl.3-16. As it determined in 2016 and proposes to reaffirm now, that costs figure, which is certainly an overestimate, is an appropriate sum to impose on industry to achieve the manifold benefits of the MATS Rule. EPA reasonably continues to assess that such costs would not impede the electric sector's ability to "provide adequate, reliable, and affordable electricity to the American public." 87 Fed. Reg. at 7649. And EPA continues to appropriately place the compliance costs in context by comparing them against annual power sector sales and capital expenditures and by assessing their impact on electricity prices and reliability. *Id*. at 7649, 7656–58. That contextual analysis demonstrates that MATS-related compliance costs would have minimal impact on the power sector—they would represent a small percentage of sales and capital expenditures on a sector-wide basis, result in retail price increases within the range of historic variability, and have little effect on generating capacity. *Id.*

---

[64] *See* Env't Prot. Agency, *Revised Technical Support Document: National-Scale Assessment of Mercury Risk to Populations with High Consumption of Self-caught Freshwater Fish* ("2011 TSD") at 81, tbl.2-6, 83 Doc. ID. No. EPA-HQ-OAR-2009-0234-3057 (noting that power plant attributable mercury risk estimates for the Southeastern low income White and low income Black scenarios and for the Laotian scenario are higher than those for the typical female subsistence fish consumer).

[65] MATS RIA at ES-12 to ES-13 (co-benefit reductions will have advantageous environmental effects including reductions in visibility impairment, reduced vegetation and ecosystem effects from exposure to ozone, reduced effects from acid deposition (e.g., improved ecosystem functions), and reduced effects from nutrient enrichment (e.g., coastal eutrophication)).

[66] *Id.* at 5-95 (providing estimates of significant improvements in children's health, including reductions in acute bronchitis and asthma, from MATS Rule); *id.* at 7-36 to 7-37 (exposure to fine particulate matter can cause or contribute to adverse health effects, such as asthma and heart disease, that significantly affect many Tribal communities, communities of color, and communities experiencing poverty); *id.* at 7-38 (largest reductions in $PM_{2.5}$ mortality risk will occur in counties facing the highest risk, with poorer counties experiencing a proportionally larger reduction as compared to other counties).

In short, EPA correctly concluded that, considering the totality of the circumstances and based upon the record before it in 2016, the benefits of regulating power plant HAP emissions through the MATS Rule far outweigh the costs of doing so.

2. As EPA Properly Recognizes, an Array of New Scientific and Cost Data Developed Since 2011 Further Confirms the Immense Advantages of Regulating Power Plants Under Section 112.

The States and Local Governments laud EPA's efforts to update the record to reflect the best available information. Given the availability of new evidence, it is reasonable for EPA to account for new information on costs and benefits in reaffirming its appropriate and necessary determination; indeed, as a general matter, case law and best agency practices strongly favor reliance on up-to-date information, rather than on stale data that an agency knows to be incomplete or inaccurate. *See, e.g.*, *Med. Waste Inst. v. EPA*, 645 F.3d 420, 426 (D.C. Cir. 2011) (when an agency revises a rule on judicial remand, it should update data and procedures as appropriate); *Nat'l Ass'n of Regulatory Util. Comm'rs v. U.S. Dep't of Energy*, 680 F.3d 819, 824 (D.C. Cir. 2012) (agency should not "put [its] head in the sand" to ignore relevant and updated information). And nothing in this particular statutory scheme prohibits EPA from finding that newly developed evidence buttresses and confirms its determination that it remains appropriate and necessary to regulate power plants under Section 112. As EPA thus correctly proposes to find, such new information demonstrates that HAP impacts to human health and the environment, and the concomitant benefits of reducing power plant emissions, are substantially greater than it determined in 2011, and that costs are even lower than it had previously estimated, thus further justifying power plant HAP regulation.[67]

In particular, the States and Local Governments support EPA's use of current scientific evidence to expand its assessments of the risks posed by power plant mercury emissions to include exposures related to commercial seafood consumption and cardiovascular harms—effects that many of the States and Local Governments urged EPA to quantify when seeking reconsideration of the 2020 Action.[68] *See* 87 Fed. Reg. at 7641–44. EPA has assessed increased risk of one kind of cardiovascular death, fatal heart attacks, finding that, in as many as 10 percent of the 3,141 watersheds studied, subsistence fishers face an increased risk of heart attack mortality due to power plant mercury emissions alone. 87 Fed. Reg. at 7642; 2021 TSD at 21–22, tbl. 3. And such impacts are not borne equally: for example, "low-income Black subsistence fisher females in the Southeast" and Tribal fishers in the Great Lakes region face an increased

[67] In addition to the new scientific studies and cost data EPA explicitly addresses, the States and Local Governments note that a large number of other studies and data published since the MATS Rule was promulgated further demonstrate that the Rule's health, environmental, and economic benefits are substantially greater than initially anticipated, and that its costs are lower than originally estimated. To that end, we have appended a letter submitted to EPA during the summer of 2021 compiling many relevant studies and data. *See* ***Exhibit B*** Letter from Megan Herzog to Erika Sasser & Nick Hutson, Re: Supplemental Comments on "National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units—Reconsideration of Supplemental Finding and Residual Risk and Technology Review," RIN: 2060-AV12, Doc. ID No. EPA–HQ–OAR–2018–0794 (July 26, 2021).

[68] *See* 2019 States' Comments at 44, 46.

risk of fatal heart attack in up to twenty-five percent of studied watersheds in those regions. 87 Fed. Reg. at 7647 & n.70 (noting that fatal heart attack screening-analysis may have underestimated Tribal-associated risks). EPA also estimates that, without MATS-Rule mercury reductions, power plant emissions would cause five to ninety-one excess deaths each year in the general population through consumption of commercially sourced fish. 87 Fed. Reg. at 7643–44; 2021 TSD at 10–11, & tbl.1. Beyond this new analysis of cardiovascular risks, the States and Local Governments also support EPA's expansion of its 2011 IQ analysis to include prenatally exposed children in the general U.S. population, in which EPA estimates that, absent the MATS Rule, children would lose 1,600 to 6,000 IQ points due to consumption of commercially sourced fish contaminated by power-plant-contributed methylmercury. 87 Fed. Reg. at 7644, 2021 TSD at 15–16, & tbl.2.

In being able to monetize these new categories of benefits for the first time, EPA determines that the annual value of avoided fatal heart attacks could range from $40 to $720 million, and avoided IQ loss from $14 to $53 million. 2021 TSD at 25–26, & tbls. 4 & 5. EPA's present ability to assign such significant values to these previously unquantified benefits not only confirms the massive benefits of regulating power plant HAPs, but also demonstrates the appropriateness of regulation in the face of uncertainty about the exact degree of benefits—uncertainty that existed when EPA created the MATS RIA and that persists today in regard to a huge segment of still-unquantified, but certainly enormous, benefits of the MATS Rule.

EPA has also correctly considered updated information on the compliance costs of the MATS Rule. As EPA recognizes, since 2015, real-world studies confirm that its original $9.6 billion cost estimate greatly overestimated—by billions of dollars—the actual compliance costs. 87 Fed. Reg at 7651. The reasons for this are multifold, including that power plants have installed fewer controls at lower operating costs than predicted in the MATS RIA and that the price of natural gas has been lower than projected. *Id.* Many of the States and Local Governments have pointed to information demonstrating lower-than-anticipated costs in comments on prior MATS-related actions[69] and agree with EPA that it is reasonable (if not required) to consider such updated data in reaffirming the appropriate and necessary finding. *See Michigan*, 576 U.S. at 759 ("It will be up to the Agency to decide (as always, within the limits of reasonable interpretation) how to account for costs."). Like the updated benefit information, the updated costs information further confirms that regulation is appropriate when considering the advantages and disadvantages of regulation.

3. EPA's Updated Estimates Remain Conservative and Do Not Capture the Full Benefits of the MATS Rule.

Although EPA has done significant, important work to assess and monetize previously unquantified human health benefits of the MATS Rule's mercury reductions, EPA's estimates of the benefits of reducing power plant HAP emissions continue to provide an extremely conservative measure of the public health and environmental advantages of those reductions.

Research since 2011 has confirmed that the MATS RIA underestimated power plants' contribution to local mercury deposition, and thus the role of power plants in creating health and environmental risks has also necessarily been underestimated in both the MATS RIA and the

[69] *See id.* at 42–43; Comments of the Attorneys General of Massachusetts et al. ("2016 States' Comments"), Docket No. EPA-HQ-OAR-2009-0234-20551, at 8 (Jan. 15, 2016).

Proposal's expanded assessment.[70] Further, both the MATS RIA and the Proposal focus on quantifying IQ impacts from prenatal mercury exposure, however, studies have shown, and EPA acknowledges, that such exposure also causes serious, neurobehavioral harms, such as memory and learning difficulties.[71] *See supra* Section II.B.1; 77 Fed. Reg. at 9353 (explaining that because IQ is "not the most sensitive neurodevelopmental endpoint affected by [methylmercury] exposure" reliance on it "underestimates the impact of reducing methylmercury in water bodies"); MATS RIA at 4-65. Research has also shown that when the confounding neurological benefits of the omega-3 fatty acids found in seafood are considered, the dose-response relationship between IQ and methylmercury exposure is steeper than EPA assumes—i.e., more significant adverse effects occur at the same dosage level.[72] Additionally, the Proposal's quantification of cardiovascular benefits focuses only on the risk of fatal heart attacks without considering risks from other cardiovascular fatalities, as well as from non-fatal heart attacks and other cardiovascular disease, which studies have shown are substantial.[73]

Further, the mercury-health-harms assessments in the MATS RIA and the Proposal are limited to adverse effects caused by methylmercury originating from power plants alone and thus do not address the cumulative nature of methylmercury exposure to individuals who face numerous sources of exposure. Because environmental mercury contamination is so widespread, *see supra* Section I.A.2, highly exposed individuals, like those consuming larger proportions of self-caught or commercial fish, are likely to have high blood methylmercury levels based on contamination from many sources, not just power plants. Thus, as EPA acknowledges, an additional benefit of power plant mercury emission reductions that it has not quantified is the health benefits to individuals for whom power plant emissions alone do not cause exceedances of EPA's methylmercury reference dose (RfD), but who nonetheless exceed the RfD due in part to power plant mercury emissions. *See* 2021 TSD at 18.

---

[70] Sunderland et al., *Benefits of Regulating Hazardous Air Pollutants from Coal and Oil-Fired Utilities in the United States*, 50 Env't Sci. Tech. 2117, 2118–19 (2018), https://pubs.acs.org/doi/pdf/10.1021/acs.est.6b00239; Yanxu Zhang et al., *Observed decrease in atmospheric mercury explained by global decline in anthropogenic emissions*, 113(3) Proceedings of the Nat'l Acad. Sci. 526, 527-28 (2016), https://www.pnas.org/doi/10.1073/pnas.1516312113.

[71] *See e.g.,* Sara T.C. Orenstein et al., *Prenatal Organochlorine and Methylmercury Exposure and Memory and Learning in School-Age Children in Communities Near the New Bedford Harbor Superfund Site, Massachusetts*, 122(11) Env't Health Persp. 1253, 1256, 1257–58 (2014), https://ehp.niehs.nih.gov/doi/10.1289/ehp.1307804 .

[72] *See* Sunderland et al. (2021), *supra* note 11, at 22; Anna L. Choi et al., *Negative Confounding in the Evaluation of Toxicity: The Case of Methylmercury in Fish and Seafood*, 38(10) Crit. Rev. in Toxicology 877-93 (2008), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2597522/pdf/nihms61457.pdf.

[73] *See* Sunderland et al. (2022), *supra* note 43, at 10–12 (considering a broader range of cardiovascular mortalities in addition to fatal heart attacks); Giang et al., *supra* note 43, at 288 (monetizing life-time benefits and economy-wide benefits from avoided non-fatal heart attacks, as well as fatal heart attacks and IQ deficits, due to MATS mercury controls); *see also* Xue Fang Hu et al., *Mercury Exposure, Cardiovascular Disease, and Mortality: A Systematic Review and Dose-Response Meta-Analysis,* 193 Env't Rsch. 110538: 4–8 (2021), https://doi.org/10.1016/j.envres.2020.110538.

Declining to consider power plant contributions to cumulative mercury exposure also discounts the greater benefits that the MATS Rule is providing to disproportionately affected, highly exposed populations that include Tribal and immigrant communities, communities experiencing poverty, and communities of color. *See supra* Section I.A.1. For example, in northern Minnesota, Tribal communities, who depend heavily on self-caught fish as a healthy source of protein and for cultural and spiritual well-being, face mercury exposure not just from upwind coal-fired power plant emissions but also from the taconite iron ore processing industry,[74] which contributes approximately half of Minnesota's in-state mercury inventory. [75] Significantly, waterbodies within such Tribal areas are highly contaminated by methylmercury[76] and ten percent of infants born in Minnesota's Lake Superior Basin—an area containing environmental justice communities—have blood mercury levels exceeding EPA's RfD.[77]

---

[74] Comments of the Leech Lake Band of Ojibwe ("Leech Lake Band Comments"), Doc. ID No. EPA-HQ-OAR-2017-0664-0155, at 3–4 (Nov. 12, 2019); Comments of the Fond du Lac Band of Lake Superior Chippewa ("Fond du Lac Band Comments"), Doc. ID No. EPA-HQ-OAR-2017-0664-0156, at 4 (Nov. 12, 2019); Comments of the 1854 Treaty Authority ("1854 Treaty Authority Comments"), Doc. ID. No. EPA-HQ-OAR-2017-0664-0147, at 3–4 (Nov. 12, 2019).

[75] Minn. Pollution Control Agency, Statewide Mercury TMDL Emissions Inventory 8 (2021), https://www.pca.state.mn.us/sites/default/files/wq-iw4-02i8.pdf. The taconite iron ore processing industry is not currently regulated for mercury under section 112. 85 Fed. Reg. 45,476, 45,485 (July 28, 2020) (declining to regulate mercury emissions as part of section 112(d)(6) review because no mercury emission standard was imposed in 2003 taconite iron ore processing NESHAP).

[75] Minnesota Pollution Control Agency, *Statewide Mercury TMDL Emissions Inventory* 8 (2021), https://www.pca.state.mn.us/sites/default/files/wq-iw4-02i8.pdf (specifying draft 2019 mercury emissions of 676.3 pounds for "Ferrous Mining/Processing," out of 1395 pounds for all state sources). The taconite iron ore processing industry is not currently regulated for mercury under section 112. 85 Fed. Reg.45476, 45,485 (Sep. 15, 2019) (declining to regulate mercury emissions as part of section 112(d)(6) review because no mercury emission standard was imposed in 2003 taconite iron ore processing NESHAP).

[76] *See* Leech Lake Band Comments, *supra* note 74, at 5; Fond du Lac Band Comments, *supra* note 74, at 5, 9–10 (describing how ditched areas and wetlands increase rate of methylization in a reservation watershed). Due to that mercury contamination, several Northern Minnesota Tribes have issued fish consumption advisories for waters within their lands, including the Leech Lake Band of Ojibwe which conducts regular mercury sampling of fish, water, and other media within its lands. Leech Lake Band Comments, *supra* note 74, at 5.

[77] Minn. Pollution Control Agency, *Environmental Justice: Overview of Areas of Concern*, https://mpca.maps.arcgis.com/apps/MapSeries/index.html?appid=f5bf57c8dac24404b7f8ef1717f57d00 (map of environmental justice areas in Minnesota); Minn. Dep't of Health, *Mercury in Newborns in the Lake Superior Basin*, https://www.health.state.mn.us/communities/environment/fish/techinfo/newbornhglsp.html, (noting that ten percent of tested infants born to mothers residing in Minnesota's Lake Superior Basin exceeded the RfD); *see also* Patricia McCann, Minn. Dep't of Health, *Mercury Levels in Blood from Newborns in the Lake Superior Basin* 10, 16 tbl.2 (2011), https://www.health.state.mn.us/communities/environment/fish/docs/glnpo.pdf.

Similarly, Hmong women in the Minneapolis-Saint Paul area are exposed to mercury both through consumption of contaminated fish and the use of mercury-containing skin-lightening products.[78] Reducing the incremental contribution of power plant mercury emissions to the cumulative mercury loads of such communities thus provides a real and important health benefit that EPA has yet to quantify.

Additionally, EPA's focus on quantifying the direct human-health benefits of mercury emission reductions is also a conservative measure of the advantages of regulation because it does not incorporate the wide range of human welfare[79] and ecological benefits such regulation provides. Of significant concern to the States and Local Governments are the benefits of reduced mercury contamination to recreational and commercial fisheries, *see* MATS RIA at 5-7 tbl.5-3, from which states derive substantial economic benefit. Studies show that mercury fish consumption advisories create enormous costs to those industries, including by reducing the number of fishing days and locations. *See* IEc Report at 3–4.[80] Such advisories also decrease consumer demand even in non-sensitive populations not targeted by the advisory. *Id.* at 3. In the twelve Northeast and Midwest states considered in the IEc Report, changes in recreator and consumer behavior in response to reduced mercury contamination "are likely to result in substantial benefits to the economies and residents of these states and the Nation as a whole." *Id.* at 4. Such benefits include economic welfare benefits as well as regional and national economic activity in the form of jobs and expenditures. *Id.* at 17–18. And they can be huge; for example, a ten percent per year reduction in recreational anglers' equipment- and trip-related expenditures across the twelve states could cause a negative economic impact on the order of $1.5 billion annually. *Id.* at 23. Moreover, the value of reduced mercury levels in fish and shellfish also can be monetized through well-known quantification methods that are used by federal and state agencies bringing natural resource damages claims when acting as trustees for natural resources. *Id.* at 24.

The same natural resource damages quantification methods are, of course, also available to assess the numerous ecological benefits of reduced mercury emissions, including reduced mortality and other harms to wildlife and avoided degradation of habitats and loss of ecological services.[81] *See also, e.g*., 87 Fed. Reg. at 7640; 81 Fed. Reg. at 24,423; 65 Fed. Reg. at 79,830.

---

[78] Minn. Family Env't Exposure Tracking, MN FEET Study Report 3–5 (2019), https://www.health.state.mn.us/communities/environment/biomonitoring/docs/mnfeetcommreporten.pdf.

[79] The substantial improvements in public health associated with decreased pollution reduce costs from lost school and work days, emergency room visits, and other health care-related costs. *N. Carolina ex rel. Cooper v. Tennessee Valley Auth.,* 593 F. Supp. 2d 812, 823 (W.D.N.C. 2009)*, rev'd on other grounds,* 615 F.3d 291 (4th Cir. 2010); MATS RIA at 5-37 to 5-38, tbl.5-7; *see generally* Philip J. Landrigan et al., *The* Lancet *Commission on Pollution and Health*, 391 Lancet 462, 482–87 (2018), https://doi.org/10.1016/S0140-6736(17)32345-0 (discussing the substantial welfare costs of pollution).

[80] For instance, research found that the decline in economic value for recreational fishing trips due to the presence of a fish consumption advisory at one New York fishing location was $34.34 per fishing day at that site alone. IEc Report at 15, exh.4. Other research found that New York State property values within one mile of a lake subject to a mercury-related fish consumption advisory decrease by an average of six to seven percent. *Id.* at 23–24.

[81] *See* NESCAUM, *supra* note 31, at 15–16.

There is reason to believe such quantification approaches would show substantial monetizable benefits from power plant mercury reductions. In Virginia, for example, federal and state trustees obtained a settlement valued at $50 million for natural resource damages caused by mercury releases from an industrial facility that contaminated one hundred miles of river and floodplain.[82] The Massachusetts and federal trustees have similarly obtained nearly $10 million dollars as compensation for natural resource damages caused to aquatic habitats and wildlife by two different industrial mercury releases to rivers.[83] Given that nearly half the Nation's waterways are contaminated enough to be subject to mercury fish consumption advisories,[84] even if power plant emissions contribute only a fraction of that mercury contamination, the cumulative amount of monetizable natural resource damages is likely immense.

In sum, EPA's updated estimates of the monetized human health benefits from reduced mercury emissions under the MATS Rule represent a significant, but very conservative, estimate of the full public health and environmental advantages of reducing power plant HAP emissions.

---

[82] Consent Decree, *United States v. E.I. du Pont*, No. 5:16-00082, 8, 10–12 (W.D. Va. Dec. 15, 2016),https://www.justice.gov/sites/default/files/enrd/pages/attachments/2016/12/15/env_enforcement-2631152-v1-lodged_consent_decree.pdf (obligating DuPont to pay $42 million for natural resource restoration projects and, separately, to fund renovation of a fish hatchery); Laura Vozzella, *DuPont agrees to $50 million deal to clean up mercury pollution from Va. plant,* Washington Post (Dec. 15, 2016), https://www.washingtonpost.com/local/virginia-politics/dupont-agrees-to-50-million-deal-to-clean-up-mercury-pollution-from-va-plant/2016/12/15/6bfd7a8c-c2e9-11e6-8422-eac61c0ef74d_story.html (fish hatchery renovation estimated to cost up to $10 million).

[83] These releases occurred from a former munitions manufacturing, testing, and disposal site (the Fireworks Superfund Site) in Hanover, MA, to the Drinkwater, Indian Head, and North Rivers ($6.8 million) and from the Nyanza Chemical Waste Dump Superfund Site in Ashland, MA, to the Sudbury River ($3 million). *See* Env't Prot. Agency, *Case Summary: Settlement Agreement in Anadarko Fraud Case Results in Billions for Environmental Cleanups Across the Country*, https://www.epa.gov/enforcement/case-summary-settlement-agreement-anadarko-fraud-case-results-billions-environmental#distribution ($4.475 billion payment (plus interest) to Anadarko Litigation Trust for environmental beneficiaries); Notice of Lodging of Proposed Consent Decree and Proposed Environmental Settlement, *In re Tronox, Inc.*, No. 09-10156, exh.1 (Consent Decree and Environmental Settlement), at 160, 176 (Bankr. S.D.N.Y. Nov. 23, 2010), https://www.epa.gov/sites/default/files/2013-08/documents/tronox-sa.pdf (Fireworks Superfund Site to receive $94,797 plus 0.15% of Anadarko Litigation Trust for natural resource damages); Consent Decree, *United States v. PQ Corp.*, No. 98:10760, 16 (D. Mass. Jun. 22, 1998), https://www.mass.gov/doc/nyanza-nrd-settlement-consent-decree/download; *see also* Mass. Dep't Env't Prot., *Public Information Material for Upcoming NRD Funding Opportunity at Former National Fireworks Site*, https://www.mass.gov/doc/public-information-material-for-upcoming-nrd-funding-opportunity-at-former-national-fireworks/download; Stratus Consulting, Inc., *Restoration Plan and Environmental Assessment for the Nyanza Chemical Waste Dump Superfund Site* at 3–6 (Aug. 6, 2012), https://www.mass.gov/doc/nyanza-nrd-final-restoration-plan/download.

[84] Gagnon et al., *supra* note 29, at 3.

IV. EPA's Alternative Benefit-Cost Analysis Approach is Also Permissible and Supports the Proposed Reaffirmed Finding.

EPA's totality of the circumstances approach best effectuates Congress' intent in section 112(n)(1)(A). Nonetheless, EPA's alternative benefit-cost-analysis approach is also reasonable and permissible under the statute so long as EPA considers—as it does here—*all* of the factors that Congress deemed essential to the 112(n)(1)(A) determination, even if those factors are difficult to quantify and monetize. *See City of Arlington v. FCC*, 569 U.S. 290, 296 (2013) (agency interpretation must be a "permissible construction of the statute"); *cf. Southern Electric Power Co. v. EPA*, 920 F.3d 999, 1026 (5th Cir. 2019) (rejecting EPA's "benefit-weighing approach" when it failed to account for factors that Congress expressly made relevant and was "incompatible . . . with the broader statutory scheme").

Unlike the benefit-cost analysis that EPA employed in 2020, *see* 87 Fed. Reg. at 7660, EPA's current approach to employing an economic efficiency analysis as part of its section 112(n)(1)(A) determination complies with OMB guidance and comports with the statute by accounting for all of the essential factors. First, the agency accounts for certain preexisting data gaps by developing conservative estimates for certain benefits that have been more challenging to monetize. *See Southwestern Elec. Power Co*, 920 F.3d at 1031 (declining to accept "lack of data" as a "valid excuse" for failing to regulate). In so doing, EPA recognizes that evidence developed since 2016 further demonstrates the significance of the benefits associated with regulation of hazardous air pollution from power plants. *See* 87 Fed. Reg. at 7671. Second, EPA's proposed alternative benefit-cost analysis approach comports with longstanding OMB guidance and the statute's aims by considering the full scope of monetizable benefits, including co-benefits. *See id.* at 7670. Finally, EPA's proposed alternative benefit-cost analysis approach is faithful to the statute because it accounts for factors that are difficult or impossible to quantify but are essential to the statutorily mandated determination, including the distributive impacts of hazardous air pollution and the risks to highly exposed and vulnerable individuals. *See id.* at 7669–70.

Despite the permissibility of this approach, however, the States and Local Governments, like EPA, continue to prefer the totality of the circumstances approach, which provides a more suitable methodology for giving sufficient weight to all of the factors Congress has identified explicitly and implicitly in section 112. For example, we share EPA's concern that the benefit-cost approach, even while qualitatively considering distributional risks and the importance of protecting vulnerable populations, is not the best tool to "grapple with the equitable question of whether a subset of Americans should continue to bear disproportionate health risks in order to avoid the increased cost of controlling HAP from EGUs." *Id.* at 7669.

V. The States and Local Governments Support Strengthening MATS Following a Revised Residual Risk and Technology Review.

To assist in its review of the 2020 Residual Risk and Technology Review (RTR), EPA also seeks input on several issues, including how to factor in the reductions in mercury and other hazardous air pollutants produced by the Rule, as well as information regarding the risks posed by current power plant emissions and post-2012 advances, including performance and cost changes, in the practices, processes, and control technologies used to control those emissions. 87 Fed. Reg. at 7672. The States and Local Governments support EPA's review. We urge EPA to initiate a separate rulemaking to reconsider the 2020 RTR and strengthen MATS because we are continuing to experience residual risks from power plant HAP emissions despite implementation of those standards and because the industry's actual experience in complying with the standards shows that lower emissions can be achieved at reasonable cost with available technology.

As EPA notes, power plant emissions continue to be the largest domestic source of mercury, 87 Fed. Reg. at 7672, and because many of the largest emitters are concentrated geographically, the risks posed by those residual emissions are significant. For example, the Midwest states of North Dakota and Missouri, upwind of certain members of our coalition, rank second and third in the Nation for power plant mercury emissions, emitting 829 and 345 pounds of mercury, respectively, in 2020.[85] Emissions from those plants and others in the region adversely affect downwind states by contributing to the cumulative mercury exposures faced by residents and natural resources in those states. Illinois, for instance, is downwind of numerous coal-fired plants in the region and borders Missouri, where several coal-fired units are situated just across the state-line.[86] Such continued out-of-state mercury emissions are of particular concern for communities overburdened by mercury exposure, such as Tribal communities in Minnesota, who are high consumers of self-caught-fish, and other Minnesota communities with environmental justice concerns, who are exposed to mercury emissions not only from neighboring North Dakota, but also from the in-state taconite iron ore processing industry. *See supra* Section III.B.3.

We strongly encourage EPA during its 2020 RTR review to include a robust evaluation of these kinds of cumulative exposure harms that current power plant HAP emissions exacerbate. That analysis is necessary to fully account for the risks those emissions pose to communities already facing disproportionate exposure to such pollutants. Further, in addition to such cumulative exposure harms, the myriad ways in which EPA's past and current assessments have underestimated the mercury risks posed by power plant emissions are relevant to its residual risk assessment under section 112(f)(2). *See supra* Section III.B.3.

---

[85] *See* Env't Prot. Agency, *Progress Report: Emissions Reductions: MATS State-by-State* (2020), https://www3.epa.gov/airmarkets/progress/reports/emissions_reductions_mats.html#figure2 (individual state power plant mercury emissions for 2020 available by selecting 2020 version of map and clicking on individual states in map); *see also* Adam Willis, *US coal plants slashed their mercury pollution. North Dakota accounts for a big share of what remains*, InForum, Mar. 4, 2022, https://www.inforum.com/news/north-dakota/us-coal-plants-slashed-their-mercury-pollution-north-dakota-accounts-for-a-big-share-of-what-remains?utm_source=ourcommunity now&utm_medium=web.

[86] *See* Env't Prot. Agency, *supra* note 85; William Skipworth, *Labadie plant to stay open as Ameren moves to close Rush Island plant sooner than originally planned*, eMissourian.com (Dec. 26, 2021), https://www.emissourian.com/local_news/labadie-plant-to-stay-open-as-ameren-moves-to-close-rush-island-plant-sooner-than/article_66f7d5fe-6669-11ec-8bc0-3f4e19d96fd1.html?utm_medium=social&utm_source=email&utm_campaign=user-share (Labadie Energy Center, situated on the Missouri River, will continue operating until 2042); *see also* Kavahn Monsouri, *Midwest Coal-Fired Power Plants are Among the Country's Worst Polluters, but They Don't Break EPA Rules*, Nebraska Public Media, (Jan. 11, 2022), https://nebraskapublicmedia.org/de/news/news-articles/midwest-coal-fired-power-plants-are-among-the-countrys-worst-polluters-but-they-dont-break-epa-rules/.

With regard to EPA's section 112(d)(6) consideration of "developments in practices, processes, and control technologies," the States and Local Governments note, as EPA recognizes, 87 Fed. Reg. at 7634, 7651, 7655, that annual compliance costs for the industry have been significantly lower than EPA estimated in 2011, due in part to improvements and cost reductions in pollution controls, including the activated carbon technology used to control mercury.[87] Moreover, many of the undersigned States have for years been controlling mercury emissions under state law at reasonable cost and often under stricter standards than the MATS Rule.[88] *See supra* Section I.A.2. Thus, it is not surprising that nearly all power plant units reported 2020 emissions below the Rule's mercury standards—and many significantly below those standards.[89] These facts strongly indicate that it is "necessary" for EPA to strengthen those standards as part of its review. *See* 42 U.S.C. § 7412(d)(6).

Respectfully submitted,

FOR THE COMMONWEALTH OF MASSACHUSETTS

MAURA HEALEY
ATTORNEY GENERAL
DAVID S. FRANKEL
Special Assistant Attorney General
TRACY L. TRIPLETT
JULIA JONAS-DAY
Assistant Attorneys General
ALEKSANDRA GEORGE RUIZ
Special Assistant Attorney General for Environmental Justice
Energy and Environment Bureau
One Ashburton Place, 18th Floor
Boston, MA 02108
(617) 963-2674

[87] *See* NESCAUM *supra* note 31, at 11.

[88] *See id.* at 10; Comments of the National Association of Clean Air Agencies on EPA's Proposed Supplemental Finding, Doc. ID No. EPA-HQ-OAR-2009-0234-17620, at 7 (Aug. 4, 2011) ("To our knowledge, no source has failed to comply with state deadlines for achieving [mercury] limitations, and no significant adverse impacts on electric system reliability were encountered as units were upgraded to meet state requirements."); *id.* at 6 ("Years, and in some cases decades, of experience demonstrates that [the technologies available to reduce power plant hazardous air pollutant emissions] can reliably deliver the expected performance at reasonable cost.").

[89] *See* Nat. Res. Def. Council, *MATS Data Analysis* 7–10 (Aug. 2021), https://www.nrdc.org/sites/default/files/mats-data-analysis-202108.pdf.

FOR THE STATE OF CALIFORNIA

XAVIER BECERRA
ATTORNEY GENERAL
DAVID A. ZONANA
MYUNG J. PARK
Supervising Deputy Attorneys General
ERIN GANAHAL
JONATHAN WEINER
MICAELA M. HARMS
Deputy Attorneys General
Office of the Attorney General
1515 Clay Street, 20th Floor
Oakland, CA 94612
(510) 879-1300

Attorneys for the State of California, by and through Attorney General Rob Bonta and the California Air Resources Board

FOR THE STATE OF CONNECTICUT

WILLIAM TONG
ATTORNEY GENERAL
MATTHEW I. LEVINE
Deputy Associate Attorney General
SCOTT N. KOSCHWITZ
Assistant Attorney General
Connecticut Office of the Attorney General
165 Capitol Avenue
Hartford, Connecticut 06106
(860) 808-5250

FOR THE STATE OF DELAWARE

KATHLEEN JENNINGS
ATTORNEY GENERAL
VALERIE S. EDGE
Deputy Attorney General
Delaware Department of Justice
102 West Water Street, 3rd Floor
Dover, DE 19904
(302) 739-4636

FOR THE STATE OF ILLINOIS

KWAME RAOUL
ATTORNEY GENERAL
MATTHEW J. DUNN
Chief, Environmental Enf./
Asbestos Litig. Div.
GERALD T. KARR
JASON E. JAMES
Assistant Attorneys General
69 W. Washington St., 18th Floor
Chicago, IL 60602
(312) 814-0660

FOR THE STATE OF IOWA

THOMAS J. MILLER
ATTORNEY GENERAL
JACOB J. LARSON
Assistant Attorney General
Environmental Law Division
Hoover State Office Building
1305 E. Walnut Street
Des Moines, IA 50319
(515) 281-5341

FOR THE STATE OF MAINE

AARON M. FREY
ATTORNEY GENERAL
LAURA JENSEN
Assistant Attorneys General
Maine Office of the Attorney General
6 State House Station
Augusta, ME 04333
(207) 626-8800

FOR THE STATE OF MARYLAND

BRIAN E. FROSH
ATTORNEY GENERAL
MICHAEL F. STRANDE
Assistant Attorney General
Office of the Attorney General
Deputy Counsel
Maryland Department of the Environment
1800 Washington Blvd., Suite 6048
Baltimore, MD 21230
(410) 537-3421

JOSHUA M. SEGAL
Special Assistant Attorney General
Office of the Attorney General
200 St. Paul Place
Baltimore, MD 21202
(410) 576-6446

FOR THE STATE OF MINNESOTA

KEITH ELLISON
ATTORNEY GENERAL
PETER SURDO
Assistant Attorney General
445 Minnesota Street, Suite 900
St. Paul, MN 55101-2127
(651) 757-1244

FOR THE STATE OF NEW JERSEY

MATTHEW J. PLATKIN
ACTING ATTORNEY GENERAL

LISA MORELLI
Deputy Attorney General
R.J. Hughes Justice Complex
25 Market Street
Trenton, NJ 08625
(609) 376-2745

FOR THE STATE OF NEW MEXICO

HECTOR BALDERAS
ATTORNEY GENERAL
WILLIAM GRANTHAM
Assistant Attorney General
Environmental Protection Division
P.O. Box 1508
Santa Fe, NM 87504
(505) 717-3520

FOR THE STATE OF NEW YORK

LETITIA JAMES
ATTORNEY GENERAL
MICHAEL J. MYERS
ANDREW FRANK
Assistant Attorneys General
JEREMY MAGLIARO
Policy Analyst
New York State Attorney General's Office
28 Liberty Street
New York, NY 10005
(212) 416-8271

FOR THE STATE OF NORTH CAROLINA

JOSHUA H. STEIN
ATTORNEY GENERAL
FRANCISCO BENZONI
AMY BIRCHER
Special Deputy Attorneys General
North Carolina Department of Justice
114 W Edenton Street
Raleigh, NC 27603
(919) 716-6400

FOR THE STATE OF OREGON

ELLEN F. ROSENBLUM
ATTORNEY GENERAL
PAUL A. GARRAHAN
Attorney-in-Charge
STEVE NOVICK
Special Assistant Attorney General
Natural Resources Section
Oregon Department of Justice
1162 Court Street NE
Salem, OR 97301
(503) 947-4590

FOR THE COMMONWEALTH OF PENNSYLVANIA

JOSH SHAPIRO
ATTORNEY GENERAL OF PENNSYLVANIA
MICHAEL J. FISCHER
Executive Deputy Attorney General
ANN JOHNSTON
Senior Deputy Attorney General
Office of Attorney General
Strawberry Square, 14th Floor
Harrisburg, Pennsylvania 17120
(717) 705-6938

FOR THE STATE OF RHODE ISLAND

PETER F. NERONHA
ATTORNEY GENERAL
RANDELLE L. BOOTS
Special Assistant Attorney General
Rhode Island Department of Attorney General
150 South Main Street
Providence, RI 02903
(401) 274-4400

FOR THE STATE OF VERMONT

THOMAS J. DONOVAN, JR.
ATTORNEY GENERAL
NICHOLAS F. PERSAMPIERI
Assistant Attorney General
Vermont Attorney General's Office
109 State Street
Montpelier, VT 05609
(802) 828-3186

FOR THE STATE OF WASHINGTON

ROBERT W. FERGUSON
ATTORNEY GENERAL
CAROLINE E. CRESS
Assistant Attorney General
Washington State Attorney General's Office
P.O. Box 40117
Olympia, WA 98504
(360) 586-4613

FOR THE STATE OF WISCONSIN

JOSHUA L. KAUL
ATTORNEY GENERAL
GABE JOHNSON-KARP
Assistant Attorney General
Wisconsin Department of Justice
Post Office Box 7857
Madison, WI 53702-7857
(608) 267-8904

FOR THE DISTRICT OF COLUMBIA

KARL A. RACINE
ATTORNEY GENERAL
KATHLEEN A. KONOPKA
Deputy Attorney General,
Public Advocacy Division
DAVID S. HOFFMAN
Senior Assistant Attorney General
Office of the Attorney General
400 Sixth Street N.W.
Washington, D.C. 20001
(202) 442-9889

FOR THE CITY OF BALTIMORE

JAMES SHEA
CITY SOLICITOR
City of Baltimore
100 N. Holliday Street, Suite 101
Baltimore, MD 21202
(410) 396-8393

Attorney for the Mayor and City Council of Baltimore, Maryland

FOR THE CITY OF CHICAGO

CELIA MEZA
CORPORATION COUNSEL
MYRIAM ZRECZNY KASPER
Deputy Corporation Counsel
2 N. LaSalle Street, Suite 580
Chicago, Illinois 60602
312-744-7764

FOR THE CITY OF NEW YORK

HON. SYLVIA O. HINDS-RADIX
CORPORATION COUNSEL
DEVON GOODRICH
AMY CASSIDY
Assistant Corporation Counsels
New York City Law Department
100 Church Street
New York, NY 10007
(212) 356-2316

Exhibit A

IEc

The Economic Benefits of the Mercury and Air Toxics Standards (MATS) Rule to the Commercial and Recreational Fishery Sectors of Northeast and Midwest States

Final Report | 17 April 2019

prepared for:

Commonwealth of Massachusetts, Office of the Attorney General

State of Illinois, Office of the Attorney General

State of Minnesota, Pollution Control Agency

State of New Jersey, Department of Environmental Protection

State of New York, Office of the Attorney General

State of Rhode Island, Office of the Attorney General

prepared by:

Robert E. Unsworth (Principal),
Dr. Heather Balestero (Associate),
Shikha Chivukula (Research Analyst),
Maura Flight (Principal),
Eric Horsch (Senior Associate), and
Christopher Smith (Technical Consultant)

Industrial Economics, Incorporated

2067 Massachusetts Avenue

Cambridge, MA 02140

617/354-0074

This report was prepared in response to:

EPA's Proposed Revised Supplemental Finding for the Mercury and Air Toxics Standards, and Results of the Residual Risk and Technology Review

Re: National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units—Reconsideration of Supplemental Finding and Residual Risk and Technology Review.

Docket ID No. EPA-HQ-OAR-2018-0794. Federal Register Vol. 84, No. 26, Thursday, February 7, 2019. Proposed Rules.

TABLE OF CONTENTS

THE ECONOMIC BENEFITS OF THE MERCURY AND AIR TOXICS STANDARDS (MATS) RULE TO THE COMMERCIAL AND RECREATIONAL FISHERY SECTORS OF NORTHEAST AND MIDWEST STATES

THE ECONOMIC BENEFITS OF THE MERCURY AND AIR TOXICS STANDARDS (MATS) RULE TO THE COMMERCIAL AND RECREATIONAL FISHERY SECTORS OF NORTHEAST AND MIDWEST STATES

INTRODUCTION AND PURPOSE OF THIS REPORT

On December 27, 2018, the U.S. Environmental Protection Agency (EPA) proposed to revise the Supplemental Cost Finding for the Mercury and Air Toxics Standards (the "MATS Rule"), as well as to complete the Clean Air Act (CAA) required risk and technology review associated with the MATS Rule (EPA 2018). On February 7, 2019 EPA published and asked for public comment on a Proposed Rule (EPA 2019). Specifically, EPA proposes to compare the cost of compliance with the MATS Rule solely with what EPA maintains are the direct, monetized benefits specifically associated with reducing emissions of the hazardous air pollutant (HAP) mercury in order to satisfy the duty to consider cost in the context of the CAA section 112(n)(1)(A) "appropriate and necessary" finding (U.S. EPA 2019, pp. 2674). While EPA states that there are unquantified HAP benefits and significant monetized particulate matter (PM) co-benefits associated with the MATS Rule, it notes the Administrator has concluded that the identification of these benefits is not sufficient, in light of what EPA has characterized as the "gross" imbalance of monetized costs and HAP benefits, to support a finding that it is appropriate and necessary to regulate Electric Generating Units (EGUs) under CAA section 112 (EPA 2019, pp. 2677).

Reopening the MATS Rule could result in a lifting of regulatory limits on mercury emissions from EGUs in the United States. This regulatory change could generate a significant increase in mercury emissions from the source category, leading to higher mercury levels in waterbodies that are subject to atmospheric deposition and loadings of mercury. An increase in atmospheric loadings would in turn increase mercury levels in the edible portions of recreationally and commercially harvested fish and shellfish. Given that state and federal agencies, as well as non-governmental entities, provide guidance to recreators and consumers to limit their exposure to mercury from consumption of fish and shellfish, any increases in mercury levels could result in changes in recreator and consumer behaviors. These behavioral changes would have an adverse impact on the wellbeing of recreators and negative consequences for the regional economies of the Northeast and Midwest.

The purpose of this report is to assess the potential impact of elevated mercury fish tissue contamination on the recreational and commercial fishing industries of the Northeast and Midwest,[1] as well as the scale of the potential economic benefits of the MATS Rule on those regionally-important economic sectors. Specifically, we ask the following questions:

- *To what extent do power plant emissions contribute to mercury in the environment, particularly in sportfish and commercially harvested fish tissue (as compared to other sources)?*
- *What actions have Northeast and Midwest states and federal agencies taken to limit the public's exposure to mercury from freshwater and saltwater fish consumption in order to protect public health (i.e., recreationally caught fish consumption advisories (FCAs); commercially harvested seafood health guidelines)?*[2] *What information do recreators and consumers receive from non-governmental organizations on the risks of exposure to mercury from self-caught and commercially caught fish species.*
- *How do FCAs affect anglers' propensity to fish and the associated economic benefits of recreational fishing, including consumer surplus (i.e., values incurred by anglers) and regional economic contributions (i.e., jobs, income) from fishing trip expenditures? How do health guidelines on commercially harvested seafood affect demand for commercially important species, and by extension consumer and producer surplus and jobs/economic activity across the broader regional economy?*
- *What is the scale of recreational fishing activity in the Northeast and Midwest? What is the scale of economic activity associated with commercial catch and revenues? Given the scale of these activities, what is the potential economic benefit of the MATS Rule?*
- *Could EPA estimate the change in economic wellbeing and regional economic activity that has and could result from maintaining the MATS Rule?*

Our findings, described in detail below, are as follows:

- Emissions of mercury from coal-fired EGUs are a significant contributor to total mercury levels in fish and shellfish in the Northeast and Midwest states.

---

[1] We consider the following states in this report: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont for the Northeast; and Illinois, Michigan, Minnesota, and Wisconsin for the Midwest. However, we note that the benefits of the MATS Rule described in this report also likely exist for other states experiencing elevated fish tissue concentrations of mercury due to emissions from EGUs.

[2] References to "seafood" in this report include fish harvested commercially from both marine and freshwater.

- The existing MATS Rule, effective since 2015, has reduced mercury loadings to aquatic systems, in turn leading to a reduction in mercury levels in fish and shellfish.
- Given the health risks posed by mercury to human health, federal and state agencies have acted to put in place consumption advisories for fish and shellfish harvested commercially, recreationally, and by subsistence fishers.
- These advisories are intended to change individuals' behavior and thus protect sensitive populations and the general public from the health risks of mercury.
- In addition, non-governmental organizations and private businesses provide consumers with information on the risks of consuming fish and shellfish that are high in mercury.
- The public has been shown to respond to these advisories and other sources of information by changing their recreational and subsistence behaviors, as well as their consumption patterns for commercially harvested fish and shellfish.
- The total contribution to economic welfare in the 12 states considered in this analysis resulting from recreational fishing activity is approximately $7.5 billion *per year*.
- Recreational fishing and commercial fish and shellfish harvest and processing are substantial contributors to the regional economies of the Northeast and Midwest. While the specific contributions vary from year to year, recreational fishing contributes $16 billion (2019 dollars) in value added annually (i.e., contribution to regional GDP) to the economies of 12 states in these regions, and approximately 259,000 jobs.[3] Additionally, annual commercial fish landings for these 12 states generate $1.6 billion in value added annually (specific estimate is variable from year to year), and approximately 18,000 jobs.
- Adverse changes in recreational behavior and purchase patterns for commercially harvested fish and shellfish reduces economic welfare (e.g., consumer surplus) and regional economic activity (e.g., jobs and expenditures) in the Northeast and Midwest states.[4] The magnitude of economic impacts increases as contamination worsens and FCAs become more restrictive.

---

[3] In the context of regional economic impact analysis, which reflects a single-year snapshot of impacts on economic activity levels in a region, the metric "jobs" refers to "job-years," defined as one job lasting one year.

[4] Consumer surplus is the difference between the price of the good or service and the amount we would be willing to pay for that good or service before we would forgo consumption. In the case of recreational behavior, if the cost of a day of fishing (i.e., the cost of getting to a fishing site and the opportunity cost of not working) is less than the participant's willingness to pay for the experience, the individual experiences a gain in consumer surplus (i.e., social welfare). When the quality of a recreational experience declines, the consumer surplus also declines, reflecting a lower willingness to pay for the experience.

- Given the importance of recreational fishing and the commercial fishing and processing sectors to the economies of the Northeast and Midwest, even modest changes in recreator and consumer behavior in response to reductions in mercury concentrations from the MATS Rule are likely to result in substantial benefits to the economies and residents of these states and the Nation as a whole. While this report does not evaluate the specific effects of the MATS Rule on contaminant and FCA levels, this analysis does find that it is reasonable to conclude that the Rule may generate recreational and commercial fishing benefits in excess of $1 billion *annually*.
- There are widely accepted methods that EPA could have used to monetize the benefits of reduced mercury concentrations in recreationally caught and commercially harvested fish. These benefits would include both regional economic performance (including jobs and expenditures) as well as social welfare benefits. However, despite the availability of these methods, neither the previous EPA rulemaking nor the current proposed rulemaking attempt to measure these benefits or even describe them qualitatively.

THE ROLE OF POWER PLANT EMISSIONS IN CONTRIBUTING TO MERCURY CONCENTRATIONS IN FISH AND SHELLFISH

Mercury (Hg) is an element found throughout the environment. It exists in elemental (metallic), organic (methylmercury), and inorganic forms. Natural sources of mercury enter the environment from volcanic activity, forest fires, and weathering of rocks (UNEP 2019). Anthropogenic sources of mercury include fossil fuel combustion, artisanal and small-scale gold mining and other mining activities, industrial activity, and incineration of waste (Giang and Selin 2016, UNEP 2019, Driscoll *et al.* 2013, Pacyna *et al.* 2010). In addition to primary sources of mercury, mercury can be remobilized from environmental sources (e.g., soil, sediment, water) where previously deposited (UNEP 2019, Giang and Selin 2016).

While mercury is an element and is thus naturally occurring, atmospheric deposition of mercury has increased by a factor of two to five since preindustrial times, with even higher increases in deposition rates in industrialized areas (Fitzgerald *et al.* 1998, Krabbenhoft and Sunderland 2013, Swain *et al.* 1992, UNEP 2019). Burning of fossil fuels—mainly coal—is a significant source of anthropogenic mercury, contributing 24 to 45 percent of total global anthropogenic mercury emissions (UNEP 2019, Pacyna *et al.* 2010). In North America, fuel combustion is the highest contributor of anthropogenic mercury emissions, estimated to be around 60 percent of total anthropogenic emissions. North American anthropogenic sources, on average, contribute roughly 20 to 30 percent of total mercury atmospheric deposition within the continental United States (Selin *et al.* 2007). The remainder comes from anthropogenic sources in other countries and from natural sources.

Mercury is released in the form of gaseous elemental mercury (Hg^0) from EGUs during combustion. Once in the atmosphere, it can be transported over short and long distances (Giang and Selin 2016, Driscoll *et al.* 2013). In the atmosphere, it reacts with oxidants to form water soluble inorganic mercury species (Hg^{II}) where it can then be deposited via precipitation to terrestrial and aquatic ecosystems. Some of this mercury is then cycled through aquatic systems where it can form organic mercury (methylmercury; Vijayaraghavan *et al.* 2014, Krabbenhoft and Sunderland 2013). Methylmercury, a known toxicant for wildlife and humans, is known to biomagnify through food chains, with higher trophic level organisms acquiring increasingly large body burdens (UNEP 2019). Nearly all the mercury in humans, fish, and predatory insects is in the form of methylmercury (Harris *et al*. 2007, Mason *et al.* 2000, Cristol *et al.* 2008, Driscoll *et al*. 2007). Overall, the proportion of methylmercury in organisms is a function of food chain length (Knightes *et al*. 2009). Fish are predominantly exposed to mercury in the water column (via atmospheric deposition), but are also exposed through contaminated sediments and terrestrial transport from the watershed where mercury has been stored (Harris *et al*. 2007, Mason *et al*. 2012). Humans are subsequently exposed to methylmercury via fish consumption.

The distance that emitted mercury can travel depends on the form emitted; elemental mercury (Hg^0) can transport further than particulate or mercury gas (Hg^{II}), which are generally deposited closer to the source (Giang and Selin 2016, Driscoll *et al*. 2013). Studies have suggested that, although the timeframe over which the impacts occur is uncertain, a reduction in inorganic mercury loading would directly reduce exposure of fish and subsequent mercury concentrations in fish (Vijayaraghavan *et al*. 2014, Mason *et al*. 2012, Selin *et al*. 2010, Harris *et al.* 2007, Krabbenhoft and Sunderland 2013, Giang and Selin 2016; Knightes *et al*. 2009).

Overall, there is broad agreement in the literature that a decline in anthropogenic mercury inputs will lead to a relatively proportional decrease in fish tissue concentrations (Giang and Selin 2016, Lee *et al*. 2016, Cross *et al*. 2015, Vijayaraghavan *et al*. 2014, Evers *et al*. 2011). Giang and Selin (2016) modeled various policies and mercury reduction scenarios on a national and global scale relative to a no policy scenario. Their results show that from the baseline of year 2005, by the year 2050, with the MATS Rule in place, there would be a 20 percent reduction in mercury deposition in the Northeast and a six percent reduction in deposition to global oceans relative to a no policy scenario. The authors note that, while reductions in mercury emissions will result in national reductions in exposure to mercury from fish consumption, there are potential uncertainties in predicting the timeframe associated with these benefits due to ecosystem dynamics, as well as mercury from sources outside the U.S. Other studies have modeled emission reductions in North America and subsequent regional reductions in mercury, noting that emission reductions would particularly affect mercury concentrations in fish in the Northeast (Selin *et al*. 2010). Lee *et al*. (2016) found a 19 percent decline in Atlantic bluefin tuna mercury concentrations from 2004-2012 relative to a 20 percent decline in North Atlantic mercury emissions from 2001-2009. With fewer samples, Cross *et al*.

(2015) found a similar reduction in bluefish tissue concentration from 1972 to 2011 in response to reductions in atmospheric deposition and other mercury inputs (e.g., point source).

Depending on where fish species reside in the water column, their prey, and the physiochemical parameters of the system, the response of mercury concentrations in fish to a reduction of mercury from EGUs will range from a rapid reduction over a few years or decades to long-term reductions over centuries (Vijayaraghavan *et al*. 2014, Knightes *et al*. 2009). For example, using a lake in New Hampshire as a modeled case study for mercury reductions in fish tissue, Vijayaraghavan *et al*. (2014) found it would take more than 50 years for fish tissue to proportionally reflect the reduction in atmospheric mercury deposition as a result of local and regional emissions reductions. However, fish tissue would begin to reflect reductions in atmospheric mercury deposition within three to eight years.

In short, while the timeframe of reductions in mercury concentrations in fish tissue in response to emissions reductions ranges, the relationship is clear: Policy changes requiring a reduction in mercury emissions from EGUs will reduce mercury deposition and subsequent fish tissue mercury concentrations. These changes in fish tissue mercury concentrations and human exposure from fish consumption will vary by location, species, and watershed and waterbody, but are expected to occur widely across the Northeast and Midwest.

ACTIONS STATES HAVE TAKEN TO LIMIT PUBLIC EXPOSURE TO MERCURY IN FISH AND SHELLFISH

As described above, coal-fired EGUs are a significant source of mercury emissions in North America. As such, emissions from this source are a significant contributor to mercury concentrations in fish and shellfish caught, purchased, and consumed in the United States. Federal and state agencies are responsible for disseminating information about mercury levels in self-caught and purchased fish products and encouraging safe consumption habits for members of the public. For example, by issuing FCAs, federal and state agencies seek to limit the population's exposure to high mercury levels and avoid adverse health effects in the population, including especially sensitive populations (e.g., pregnant women, young children). In addition to governmental guidelines, popular seafood chains and retailers, public health research organizations, environmental and consumer advocacy groups, and educational organizations provide consumers with materials to encourage and facilitate safe fish consumption.

Federal and state agencies generally provide details on safe fish consumption behaviors based on waterbody, fish size and species, serving size, and serving frequency (see Exhibit 1 below). Consumption advisories are generally categorized as either targeting a sensitive population (i.e., pregnant women, women of childbearing age, young children, and adolescents) and general population, reflecting the role mercury plays in neurological development (U.S. Environmental Protection Agency 2017). Appendix A includes three examples of general statewide safe fish guidelines: Michigan and Vermont both provide a general list of fish species from their respective waterbodies, chemical(s) of concern, size of fish, and servings per month based on consumers' classification as a "sensitive population. Massachusetts lists advisories for specific waterbodies that include advice regarding which species of fish should be avoided by certain populations (or in some instances, all populations) based on the presence of certain contaminants. In addition to providing specific advisory information, the U.S. EPA, the U.S. Food and Drug Administration, and many states provide information on the risk of health effects of mercury exposure in humans, contextual information on bioaccumulation and biomagnification of mercury in fish, and undertake contamination monitoring and mitigation efforts.

EXHIBIT 1. EXAMPLES OF FEDERAL AND STATE MERCURY ADVISORIES AND GUIDANCE

JURISDICTION	HOW INFORMATION IS COMMUNICATED	EXAMPLE OF GUIDANCE	OTHER INFORMATION	SOURCE
U.S. Environmental Protection Agency	Webpages and factsheets	Recommended serving size and frequency for about 60 fish species based on their mercury levels for sensitive populations		http://www2.epa.gov/choose-fish-and-shellfish-wisely
U.S. Food and Drug Administration	Chart targeted at pregnant women and parents	Serving amount and size for "best", "good", and "to avoid" choices	Data collected from 1990 – 2012 of mercury levels in commercial fish and shellfish	https://www.fda.gov/Food/ResourcesForYou/Consumers/ucm393070.htm
State of Connecticut, Department of Public Health	Guides for fish caught in Connecticut waters and store-bought fish	Weekly/monthly serving amount for fish species for general and sensitive populations, monthly serving amount for fish species caught in Connecticut waterbodies		http://www.ct.gov/dph/cwp/view.asp?a=3140&q=387460&dphNav_GID=1828&dphPNavCtr=|#47464
State of Illinois, Department of Public Health	List of specific fish species with mercury advisories	Meal amount per week or month for fish species for general and sensitive populations	Interactive map of waterbodies per county that lists all the fish advisories, including pictures of each species	http://dph.illinois.gov/topics-services/environmental-health-protection/toxicology/fish-advisories
Commonwealth of Massachusetts, Department of Public Health	List of waterbodies/towns in Massachusetts with fish consumption advice, guidelines for fish consumption for marine and fresh waterbodies	Advice is provided for fish species and recommended monthly fish consumption amounts for general and sensitive populations	Searchable directory of advisories per waterbody and town	http://www.mass.gov/dph/fishadvisories

JURISDICTION	HOW INFORMATION IS COMMUNICATED	EXAMPLE OF GUIDANCE	OTHER INFORMATION	SOURCE
State of Maine, Center for Disease Control & Prevention	Safe eating guidelines for freshwater fish in Maine waterbodies and saltwater bodies	Freshwater guide: recommended monthly serving amount Saltwater guide: serving amount for sensitive and general populations	Poster with images and a scale of fish-mercury levels in store-bought and self-caught fish; Maine Center for Disease Control and Prevention's Family Fish Guide which details fish type, size, serving amount, fish origin, and cooking methods are safe to eat for sensitive populations	http://www.maine.gov/dhhs/mecdc/environmental-health/eohp/fish/
State of Michigan, Department of Community Health	Statewide safe fish guidelines, and regional Eat Safe Fish Guides for species found in Michigan waterbodies	Serving size based on person's weight, size of fish caught, monthly serving suggestion, chemical of concern	Guide for safe serving amount of fish from a grocery store or restaurant that also includes information on omega-3 fatty acids	http://www.michigan.gov/eatsafefish
State of Minnesota, Department of Health	Safe eating guidelines for general and sensitive populations; list of Minnesota waterbodies and corresponding meal advice for general and sensitive populations	Serving amount and frequency of MN caught and purchased fish, fish size	Level of mercury in fish and corresponding meal frequency for general and sensitive populations	http://www.health.state.mn.us/divs/eh/fish/index.html
State of New Hampshire, Fish and Game Department	Fish consumption guidelines for freshwater and saltwater	Recommendations for monthly serving amount/size of fish, no specific information of species and water body guidelines easily accessible		http://www.wildlife.state.nh.us/fishing/consume-fresh.html
State of New Jersey, Departments of Environmental Protection and Health	List of all species in each waterbody with an advisory; there are separate lists for estuarine & marine waters, and inland waterbodies	Serving frequency for general and sensitive populations	Images of fish species; interactive map to locate waterbody specific advisories	http://www.state.nj.us/dep/dsr/njmainfish.htm
State of New York, Department of Health	List of advisories per waterbody in each region of the state	Fish species, serving frequency recommended for general and sensitive populations, chemicals of concern		https://www.health.ny.gov/environmental/outdoors/fish/health_advisories/

JURISDICTION	HOW INFORMATION IS COMMUNICATED	EXAMPLE OF GUIDANCE	OTHER INFORMATION	SOURCE
State of Rhode Island, Department of Health	Brochure targeted to pregnant women and parents	List of safe species of RI-caught fish and generally low mercury level fish		http://www.health.ri.gov/healthrisks/poisoning/mercury/about/fish/
State of Vermont, Department of Health	List of general fish consumption guidelines and for specific waterbodies	Fish species and serving frequency per general and sensitive populations		http://healthvermont.gov/health-environment/recreational-water/mercury-fish
State of Wisconsin, Department of Natural Resources	List of general and specific waterbody fish consumption advisories	Fish species, fish size, serving frequency for general and sensitive populations	Search directory of county and advisory area (waterbody)	http://dnr.wi.gov/topic/fishing/consumption/

Consumers also can access information on fish and shellfish safety, health benefits/effects, and consumption from additional sources. Retail chains, research organizations/academic institutions, environmental advocacy groups, and consumer protection groups publish contextual information on mercury consumption, and safe consumption guidelines. These sources of information can sometimes be redundant of state and federal guidelines, and are designed to be supplemental to official advisories, to ensure that consumers have all pertinent information available to them prior to purchasing or consuming potentially toxic fish product. Some of these sources include:

- The grocery chain Whole Foods publishes "Mercury in Seafood: Frequently Asked Questions" which explains the health concerns of elevated levels of methylmercury in fish, and lists fish species safe for consumption, while referring to EPA and FDA guidelines;
- The Safina Center at Stony Brook University's "Mercury in Seafood: A Guide for Consumers" recommends serving size for several popular fish species and discusses risks and signs of methylmercury exposure. The Safina Center also publishes brochures for health care professionals and a full report on mercury in the environment;
- The Gelfond Fund for Mercury Research & Outreach's "Seafood Mercury Database" aggregates government data and scientific literature of mercury levels in commercial fish in the U.S.;
- Environmental Working Group publishes a "Consumer Guide to Seafood" and has an interactive "Seafood Calculator" tool that allows users to input their weight and basic health condition to get specific recommendations of species of serving size based on mercury content, omega-3 fatty acid content, and sustainability; and

- Environmental Defense Fund's "Seafood Selector" gives recommended serving size of fish species based on age, the fish species' eco-rating, contaminant level, and omega-3 level.

FCAs aim to reduce the amount of fish consumed to safe levels, and/or suggest safer alternatives for consumers (e.g., switching species consumed). Research on the role of advisories on consumer behavior suggests that they are a useful public health tool in reducing methylmercury exposure levels in sensitive human populations. An analysis of the effectiveness of advisory scenarios on minimizing blood-mercury levels in humans from fish consumption suggests that strategies that aim to reduce methylmercury exposure through reducing fish consumption overall are more effective than strategies intended to encourage safer alternative species (Carrington *et al.* 2004). One study focused on responses to an FDA advisory in 2001 found that information-based advisories can achieve the agency goal of minimizing consumption of mercury in fish if the advisories are targeted toward the sensitive populations of pregnant women, children, and women of child-bearing age (Shimshack, Ward, and Beatty 2007). Shimshack *et al.* found that education and readership were determinants of people's responses to fish health advisories, suggesting that advisories need to be more accessible and targeted towards the highest risk and lowest educated population to ensure FDA's goals of reducing exposure to mercury from fish consumption through reduced purchases and therefore consumption of fish products (2007). Furthermore, a survey study by the Epidemic Intelligence Service at the Centers for Disease Control demonstrated that awareness of sport fish health advisories in Midwest states among women, people of color, and persons with lower educational attainment is low compared to traditionally targeted licensed angles who tend to be white men (Tilden *et al*. 1997). This finding suggests that accessible and targeted communication of the risks and health effects associated with fish consumption are crucial in effectively decreasing mercury exposure through consumption (Tilden *et al.* 1997).

THE ROLE OF ADVISORIES AND HEALTH GUIDELINES IN ANGLER AND CONSUMER BEHAVIOR

While advisories are likely to reduce the public's exposure to mercury by modifying consumption patterns of fish and shellfish, these behavioral changes reduce social welfare and adversely impact regional economies. In this section we consider impacts to both recreational anglers as well as consumers purchasing fish and shellfish commercially sold in the marketplace.

RECREATIONAL FISHING

Numerous published studies have identified the negative impact that FCAs have on the quantity and quality of recreational fishing trips. The primary reason that anglers change their behavior in response to FCAs is because they are concerned about consuming species covered by the FCA or sharing it with friends and family. Since some anglers may practice catch-and-release fishing, they may not be affected. However, since many anglers fish to keep and consume their catch, FCAs do have an impact on recreational fishing behavior.

When recreational anglers change their behavior, there are two types of economic losses: 1) lost social welfare value of fishing to recreationists (i.e., the consumer surplus they experience from fishing) and 2) lost regional economic activity. The term social welfare value refers to the difference between the maximum amount a recreationist would be willing to pay to participate in a recreational activity and the actual cost of participating in that activity. This is referred to by economists as consumer surplus or net economic value.

A decline in value for recreational fishing trips can arise for the following reasons:

- Anglers may continue to fish at affected sites, but enjoy their fishing less (i.e., diminished use);
- Anglers may choose to fish at other sites (i.e., substitute use); and
- Anglers may forgo fishing entirely (i.e., lost use).

The behavioral responses above and losses in economic value have been documented for mercury-based advisories (e.g., Tang *et al*. 2018; Jakus and Shaw 2003; Jakus *et al*. 2002; Hagen *et al*. 1999; Chen and Cosslett 1998; MacDonald and Boyle 1997) as well as for other contaminants (e.g., MacNair and Desvousges 2007; Morey and Breffle 2006; Hauber and Parsons 2000; Parsons *et al*. 1999; Jakus *et al*. 1998, 1997; and Montgomery and Needelman 1997). Claims for lost economic value due to recreational mercury-based fishing advisories have been developed for several natural resource damage assessments (NRDAs) (e.g., Confederated Tribes of the Colville Reservation *et al*. 2012; Texas General Land Office *et al*. 2001; IEc 2017).

Economic value is distinct from the amount that anglers actually spend on their trips, such as gasoline to fuel their vehicles to reach a site or to make purchases of fishing gear. These expenditures support regional economic activity in the form of jobs and income.[5] When anglers take fewer trips or spend less money on their trips due to FCAs, there is a decline in regional economic activity associated with recreational fishing.

In the sections below, we summarize available literature on behavioral responses of recreational anglers to FCAs and the resulting impacts on economic value and regional economic activity. The discussion emphasizes impacts from mercury-based FCAs, but includes impacts from other contaminants (e.g., polychlorinated biphenyls or PCBs) to provide additional perspective on how FCAs affect behavior as the literature is reasonably consistent, regardless of contaminant source.

[5] The summation of trip expenditures and economic value incurred when a trip is taken is called an angler's willingness to pay.

Changes In Recreator Behavior

Several studies, which are summarized in Exhibit 2, have demonstrated that anglers change their behavior in response to FCAs. The behavioral responses to FCAs include changing fishing destination (i.e., substitute use) and taking fewer trips (i.e., lost use), as well as other responses such as targeting different species, eating fewer fish or refraining from consumption entirely (including sharing it with others), and changing cooking methods.[6] While some anglers might not report changes in their behavior, they may still enjoy their fishing less (i.e., diminished trips) or have concerns about consuming their catch. Any of these behavioral responses results in a decline in value if the angler feels worse off than if the FCA were not present. Further, anglers may take fewer trips or spend less money on their trips due to FCAs, which results in a decline in regional economic activity.

Recent data demonstrate that recreational fishing is a popular activity in the Northeast and Midwest. Exhibit 3 presents estimates of annual fishing days taken to selected states in these regions and in total. Applying the range of percentages from Exhibit 2 to the user day estimates in Exhibit 3 results in a large estimated number of affected user days, which may be expressed either in terms of changes in participation, substitution, or diminished use or through other behavioral responses (e.g., changing target species, eating fewer fish). Losses in recreational fishing value associated with these behavioral responses are described in the next section.

EXHIBIT 2. RECREATIONAL ANGLER BEHAVIORAL RESPONSES TO FCAS

STUDY	LOCATION	BEHAVIORAL RESPONSES
USFWS and Stratus Consulting (1999)	Lower Fox River/ Green Bay	-30% spend fewer days fishing -31% change locations fished -23% target different species -45% change the species they keep to eat -47% change the size of fish they keep to eat -45% change the way they clean/prepare fish -25% change the way they cook fish
Connelly *et al*. (1990)	New York	-17% take fewer trips -31% change fishing locations -46% change cleaning/cooking methods -51% eat fewer fish from the site -17% eat different species -11% no longer eat fish from the site

[6] While changes in cooking and preparation methods can be effective for fat-soluble contaminants (e.g., PCBs), they are largely ineffective for mercury contamination since mercury does not concentrate in specific body tissues.

STUDY	LOCATION	BEHAVIORAL RESPONSES
Connelly *et al*. (1992)	New York	-18% take fewer trips -45% change cleaning methods -25% change the size of fish consumed -21% change cooking methods -70% eat less fish from the site -27% eat different species -17% no longer eat fish from the site
Connelly *et al*. (1996)	Lake Ontario	-79% use risk-reducing cleaning methods -42% use risk-reducing cooking methods -32% would eat more fish in the absence of FCAs
Kunth *et al*. (1993)	Ohio River	-37% take fewer trips -26% change fishing locations -26% change targeted species -23% change cleaning methods -17% change the size of fish consumed -13% change cooking methods -42% eat less fish from the site -13% no longer eat fish from the site
Vena (1992)	Lake Ontario	-16% take fewer trips -30% change fishing locations -20% change targeted species -31% change cleaning methods -53% eat less fish from the site -16% no longer eat fish from the site
MacDonald and Boyle (1997)	Maine	-15% would consume more fish -10% would fish more days -5% would fish more waters -5% would fish different waters
Silverman (1990)	Michigan	-10% take fewer trips -31% change fishing locations -21% change targeted species -56% change cleaning methods -41% change the size of fish consumed -28% change cooking methods -56% eat less fish from the site -31% eat different species
West *et al*. (1993)	Michigan	-86% change cooking methods (Great Lakes anglers) -80% eat different species (Great Lakes anglers) -46% eat less fish from the site (overall) -27% change cooking methods (overall) -80% are aware of advisories; of these 80%, 75% change cleaning methods

EXHIBIT 3. ESTIMATES OF ANGLERS AND FISHING EFFORT NORTHEAST AND MIDWEST STATES[7]

STATE	ANGLERS	DAYS OF FISHING	AVERAGE DAYS PER ANGLER
Connecticut	342,000	4,705,000	14
Illinois	1,044,000	13,343,000	13
Maine	341,000	3,873,000	11
Massachusetts	532,000	8,367,000	16
Michigan	1,744,000	28,177,000	16
Minnesota	1,562,000	21,702,000	14
New Hampshire	228,000	4,370,000	19
New Jersey	766,000	9,454,000	12
New York	1,882,000	29,874,000	16
Rhode Island	175,000	2,080,000	12
Vermont	207,000	2,215,000	11
Wisconsin	1,247,000	21,284,000	17
Total	10,070,000	149,444,000	15
Source: USFWS and U.S. Census Bureau (2018)			

Lost Value for Recreational Fishing

Several studies estimate the decline in economic value for recreational fishing trips due to the presence of FCAs. Exhibit 4 summarizes the estimated decline in value per trip to a site with an FCA for selected studies. These studies use a well-accepted method—random utility site choice models—and the results can be standardized for comparison (see footnote to Exhibit 4). In site choice models, anglers are assumed to choose sites that maximize their utility (i.e., the value gained). The utility of a site is a function of the cost to access the site (e.g., travel cost) and other site attributes, such as expected catch rates, species available and the presence and severity of FCAs. All else equal, anglers get more utility from sites without FCAs. The model can be used to estimate the decline in value due to the presence of an FCA.

While the locations, methods, and valuation scenarios (i.e., type of affected species, number of sites) vary across these studies, the key takeaways are two-fold: 1) FCAs reduce recreational fishing values; and 2) the decline in value increases with the restrictiveness of the advisory (e.g., the lost value associated with a *Do Not Eat* FCA is greater than the loss associated with an *Eat No More Than One Meal Per Week* FCA).

[7] Note that, across these 12 states, approximately 68 percent of angling participants take part in freshwater fishing, and freshwater fishing accounts for 81 percent of all angling trips.

EXHIBIT 4. SELECTED ESTIMATES OF LOST VALUES ASSOCIATED WITH FCAS[A]

STUDY	LOCATION	LOST VALUE PER FISHING DAY AT SITE WITH A FCA (2019$)
Montgomery and Needelman (1997)	New York	Mixture of "Eat no more than one meal per month" and "Do not eat" FCAs: $34.34
Jakus *et al.* (1997)	Tennessee	Mixture of "Limited" and "Do not eat" FCAs: $25.49
Jakus *et al.* (1998)	Tennessee	Mixture of "Limited" and "Do not eat" FCAs: $24.14
MacNair and Desvousges (2007)	Lower Fox River/ Green Bay	"Limited" FCA: $3.37 "Do not eat" FCA: $11.56
Morey and Breffle (2006)	Lower Fox River/ Green Bay	Mixture of "Unlimited " and "Eat no more than one meal per week" FCAs: $4.04 Mixture of "Eat no more than one meal per month" and "Do not eat" FCAs: $33.78

Notes:

A. The lost values in this table are standardized by dividing the coefficient associated with FCAs by the coefficient associated with the travel cost variable. This standardization provides an estimate of the lost value conditional on choosing a site with a FCA. We refer to this estimate as the lost value per fishing day at a site with a FCA to distinguish it from the lost value per fishing day at any site. Without this adjustment, the lost values are not comparable, as they are affected by the relative importance of the sites that have advisories and by researchers' choices regarding the set of fishing trips to include in the model.

In extreme cases, contamination in fish can result in regulatory closures to recreational fishing (e.g., upper Hudson River from 1976-1994). In most cases, however, contamination results in the issuance of FCAs and anglers are able to continue accessing a contaminated waterbody if they wish. Since sites are not usually closed due to contamination in fish, anglers tend to lose a fraction of their total trip value rather than the entire trip value.

Exhibit 5 presents estimates of total trip values for recreational fishing to contextualize the estimates in Exhibit 4.[8] These estimates are derived from data generated by U.S. federal government agencies, and are broadly applied to a range of analyses used to support policy evaluations and environmental damage assessments. Combining the user day estimates from Exhibit 3 with the value per day estimates from Exhibit 5 yields an estimate in the billions of dollars (regardless of which value(s) is applied).

[8] To the extent that the reported estimates of trip values are for sites that have mercury advisories, either site specific or statewide, the value of these trips may be even greater.

For example, if we assume that the average fishing trip creates a value of $50 to the participant, the estimated economic welfare value of recreational fishing in the 12 states would be approximately $7.5 billion. This represents the full value of fishing across the 12 states that would be realized absent the effects of FCAs (see Exhibit 4). While we do not have information to precisely account for the effects of the MATS Rule on FCAs, and therefore on recreational fishing trip values, we consider the potential for the Rule to generate recreational fishing benefits on the order of $1 billion. Specifically, if the MATS Rule improves the value per recreational fishing trip by $6.70, the aggregate value of recreational fishing across the 12 states would be increased by approximately $1 billion. Given the effects of FCAs on the value of recreational fishing trips described in Exhibit 4 (ranging up to a reduction in $34 per trip), we find that it is reasonable that the benefits of the MATS Rule could easily be $6.70 per trip or greater. Thus, we expect that the MATS Rule results in recreational fishing benefits of $1 billion or more annually.

EXHIBIT 5. SELECTED STUDIES WITH ESTIMATES OF VALUE PER FISHING DAY

STUDY	SUMMARY	VALUE PER USER DAY (2019$)
Rosenberger (2016)	The Recreation Use Values Database (RUVD) summarizes literature on the value of outdoor recreation on public lands. It is the result of seven literature reviews dating back to 1984. The most recent review, sponsored by the USDA Forest Service, was completed in 2016 and contains nearly 3,200 value estimates in per person per activity day units. These estimates are based on over 400 studies of recreation activities in the U.S. and Canada from 1958 to 2015. The database provides value estimates for different activities by census region.	Northeastern U.S. Census Region, freshwater fishing: $83.81 Northeastern U.S. Census Region, saltwater fishing: $86.22 Midwestern U.S. Census Region, freshwater fishing: $50.25
USFWS (2016)	The addendum to the 2011 National Survey of Fishing Hunting and Wildlife-Associated Recreation contains economic values per fishing day by state for bass, trout, or walleye. The survey is conducted every five years by the US Census Bureau and sponsored by the United States Fish and Wildlife Service (USFWS). The 2016 survey did not contain these estimates due to budget constraints.	*Bass* Illinois: $51.58 Massachusetts: $31.40 Rhode Island: $15.70 *Trout* Connecticut: $33.64 Maine: $43.73 New Hampshire: $48.22 New Jersey: $21.31 New York: $65.04 Vermont: $30.28 *Walleye* Michigan: $16.82 Minnesota: $63.92 Wisconsin: $35.88

Lost Regional Economic Activity Associated with Recreational Fishing

While the preceding sections summarize impacts to recreational anglers themselves in the form of lost economic value, there are also negative consequences for regional economic activity when anglers take fewer trips or spend less on the trips they take due to FCAs (e.g., shorter trips). Expenditures on recreational fishing provide sales for businesses (e.g., bait shops, gear outfitters, gas stations), and in turn, these businesses make purchases from other firms in the region to support their operations. Furthermore, employees of these firms make additional purchases with their wages. The summation of these effects represents the total economic contribution of recreational activities to a region, which can be measured in terms of jobs and income, though other measures may be used. Estimates of the regional economic importance of the recreational fishing sector in select states is presented in the next section.

COMMERCIAL FISHING

As noted above, consumers have a range of sources of information on the risks posed by consuming mercury in fish and shellfish purchased in markets. While studies have not been published that estimate the change in demand for seafood products (or the price of these products), we would expect that efforts by some consumers to (1) limit the quantity of fish consumed, and/or (2) to substitute away from certain species of fish will impact both the quantity of fish demanded and the price obtained by this industry for some products. As discussed in the next section, landings of commercial fish and shellfish generate over $1.6 billion dollars in sales in the 12 states considered in this analysis. As such, even modest changes in market demand could have a significant impact on the income of harvesters and processors, with subsequent impacts on the economies of the 12 states considered in this report.

THE IMPORTANCE OF RECREATIONAL FISHING AND COMMERCIAL FISH AND SHELLFISH HARVEST AND PROCESSING IN THE NORTHEAST AND MIDWEST

To understand the potential benefits of reductions in mercury levels in fish and shellfish, we consider the regional economic importance of both recreational fishing behavior and commercial fish harvest and processing. Specifically, this analysis applies input-output multipliers along with publicly available data on recreational angling expenditures and commercial landings to evaluate the regional economic impacts associated with recreational fishing and commercial harvest in select states.

INPUT-OUTPUT MULTIPLIERS

The Regional Input-Output Modeling System (RIMS II or "RIMS") applies a standard input-output modeling approach to analyze the economic impacts or multiplier effects associated with a change in demand within one or more sectors of the economy.[9] Developed by the U.S. Bureau of Economic Analysis, RIMS uses data on national input-output accounts to model the relationships and spending patterns between different industries. Based on these relationships, RIMS provides sector-specific and geographic-specific multipliers that evaluate how a change in economic activity (i.e., spending or demand) in one sector results in economic activity in other sectors within a geographic region (U.S. BEA 2013).

The RIMS multipliers translate changes in economic activity into economic impacts across four metrics: employment, earnings, value added, and output.

- **Employment**: This reflects a mix of full-time and part-time job-years (defined as one job lasting one year) that result from employment demand created by spending activity.
- **Earnings**: This captures all employment-related income received as part of the employment demand, including employee compensation and proprietor income.
- **Value Added**: This reflects the total value of all output or production, minus the cost of intermediate outputs (i.e., Gross Domestic Product).
- **Output**: This reflects the total value of all output or production, including the costs of intermediate and final outputs (i.e., sales).

This analysis applied RIMS Type II multipliers, which incorporate direct, indirect, and induced effects:

- **Direct Effects**: These are production changes that directly result from an activity or policy. In this analysis, the direct effects are equal to the recreational angling expenditures or commercial fish landings, which we allocate to appropriate economic sectors.
- **Indirect Effects**: The multiplier effects that result from changes in the output of industries that supply goods and services to those industries that are directly affected (i.e., impacts on the factors of production for the directly affected sectors).
- **Induced Effects**: Changes in household consumption arising from changes in employment and associated income that result from direct and indirect effects.

To understand these effects, consider an example where recreational anglers buy additional equipment from a local bait shop (direct effects). That bait shop may in turn increase its purchases of supplies from other businesses in the region to support its

[9] To conduct the input-output modeling, this analysis used state-specific RIMS Type II multipliers from the RIMS 2016 dataset, which was the most current version of these data that are publicly available.

operations (indirect effects). Employees benefiting from these increases in spending may then spend more themselves (induced effects).

RECREATIONAL FISHING

To analyze the regional economic impacts associated with recreational fishing, this analysis gathered recreational angling expenditure data from state-specific reports published as part of the 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (USFWS and U.S. Census Bureau 2018).[10] Exhibit 6 summarizes the annual recreational fishing expenditure data by state for trip-related, equipment-related, and total spending, as reported in the state-specific reports. All expenditure estimates have been converted to 2019 dollars using the Consumer Price Index.

EXHIBIT 6. ESTIMATES OF ANNUAL RECREATIONAL FISHING EXPENDITURES BY STATE (2019$)[11]

STATE	ANGLERS	ANNUAL TRIP-RELATED EXPENDITURES	ANNUAL EQUIPMENT-RELATED EXPENDITURES	ANNUAL TOTAL EXPENDITURES
Connecticut	342,000	$290,070,461	$199,384,964	$489,455,425
Illinois	1,044,000	$417,561,021	$673,245,251	$1,090,806,272
Massachusetts	532,000	$284,501,650	$226,181,643	$510,683,293
Maine	341,000	$240,746,226	$176,218,217	$416,964,443
Michigan	1,744,000	$1,225,379,517	$1,496,351,625	$2,721,731,141
Minnesota	1,562,000	$1,036,804,729	$1,670,513,217	$2,707,317,946
New Hampshire	228,000	$169,765,753	$64,070,482	$233,836,235
New Jersey	766,000	$546,091,107	$710,127,691	$1,256,218,798
New York	1,882,000	$1,186,333,921	$1,014,431,925	$2,200,765,845
Rhode Island	175,000	$94,123,671	$51,708,305	$145,831,976
Vermont	207,000	$101,202,991	$46,054,269	$147,257,259.99
Wisconsin	1,247,000	$681,205,982	$909,584,424	$1,590,790,406
Total	10,070,000	$6,273,787,028	$7,237,872,012	$13,511,659,041

[10] The 2011 report is the latest version to report state-specific values.

[11] The regional economic analysis in this report relies on recreational angling expenditure estimates broken out into detailed line items for trip-related, equipment-related, and other expenses (e.g., food, lodging, boating costs, artificial lures and flies). These reported disaggregated estimates by line item do not always sum to the total expenditure estimates for each state, as reported in Exhibit 6. For example, the detailed expenditure line items for Connecticut sum to 83 percent of the total recreational angling expenditures estimated for the state (91 percent for Illinois and New Hampshire; 92 percent for Vermont; 99 percent for Wisconsin; and approximately 100 percent for all other states). To the extent that the detailed expenditure data do not sum to the total recreational angling expenditure estimates for a state, this analysis may underestimate the regional economic impacts associated with recreational angling in that state.

In the appendix of each state-specific report, these total annual trip-related and equipment-related expenditures are broken down into more detailed expenditure line items. Trip-related spending categories include line items such as food, lodging, and transportation, while equipment-related categories include line items such as "reels, rods, and rod-making components" and "artificial lures and flies." This analysis mapped each of these detailed expenditure line items to corresponding RIMS sectors, which included industries defined as "food services and drinking places," "accommodations," and "other retail."

The analysis then applied state-specific and sector-specific RIMS multipliers to the corresponding state-by-state total spending amounts for each RIMS sector. These RIMS multipliers translate the expenditure amounts into estimates of regional economic impacts on employment demand, value added, and output.

Exhibit 7 summarizes the state-by-state results of this analysis. These regional economic impact estimates for recreational angling include direct, indirect, and induced effects.

EXHIBIT 7. ANNUAL REGIONAL ECONOMIC IMPACTS OF RECREATIONAL FISHING EXPENDITURES BY STATE (2019$)

STATE	EMPLOYMENT (JOBS)	EARNINGS ($)	VALUE ADDED ($)	OUTPUT ($)
Connecticut	6,666	$228,243,642	$460,834,368	$748,478,095
Illinois	19,983	$665,317,305	$1,305,284,266	$2,164,735,554
Massachusetts	8,842	$292,655,175	$593,491,314	$968,345,102
Maine	8,989	$239,954,740	$453,171,787	$739,109,734
Michigan	59,161	$1,697,413,376	$3,178,958,350	$5,240,046,989
Minnesota	55,065	$1,687,013,209	$3,239,786,409	$5,369,380,086
New Hampshire	3,538	$111,389,124	$230,329,220	$374,447,756
New Jersey	22,194	$754,204,825	$1,560,657,028	$2,557,479,074
New York	35,359	$1,196,860,993	$2,524,234,433	$4,105,442,367
Rhode Island	2,249	$71,039,141	$154,530,617	$251,997,610
Vermont	2,519	$68,381,808	$135,742,775	$222,127,681
Wisconsin	34,336	$944,406,087	$1,767,276,300	$2,924,547,680
Total	258,902	$7,956,879,425	$15,604,296,867	$25,666,137,726

The results suggest that the $13.5 billion in total annual recreational fishing expenditures across these 12 states generate total regional economic impacts of 258,902 full-time and part-time jobs, $8.0 billion in earnings, $15.6 billion in value added, and $25.7 billion in output (2019 dollars)

COMMERCIAL FISHING

To analyze the regional economic impacts associated with commercial fishing, this analysis gathered commercial seafood landings data published by the NOAA Fisheries, Fisheries Statistics Division (NOAA 2019). This NOAA division collects and publishes commercial landings data on a state-by-state basis, and has separate databases for ocean landings and Midwest landings.[12] We collected the most recent annual landings data from both databases, which consisted of 2017 estimates for ocean landings and 2016 estimates for Midwest landings. The estimated landings and values for Vermont are based on a white paper focused on the scope and value of commercial fish harvest and sales in Vermont.[13] Exhibit 8 summarizes the combined annual commercial landings by state in terms of whole weight (pounds) and dollar value. The dollar value estimates have been converted to 2019 dollars using the Consumer Price Index.

EXHIBIT 8. ESTIMATES OF ANNUAL COMMERCIAL FISH AND SHELLFISH LANDINGS BY STATE (2019$)

STATE	WHOLE WEIGHT (POUNDS)	DOLLAR VALUE ($)
Connecticut	10,118,122	$14,116,116
Illinois	No Data	No Data
Massachusetts	242,136,690	$622,841,959
Maine	208,677,144	$526,176,214
Michigan	6,200,910	$8,561,092
Minnesota	244,714	$225,037
New Hampshire	10,621,078	$36,028,922
New Jersey	198,601,927	$196,087,550
New York	24,904,141	$49,555,181
Rhode Island	84,107,764	$103,697,265
Vermont	459,432	$966,991
Wisconsin	2,670,112	$3,167,164
Total	788,742,034	$1,561,423,491

12 For the state-by-state breakdown, the "landings data do not indicate the physical location of harvest but the location at which the landings either first crossed the dock or were reported from" (NOAA 2019).

13 The estimates for Vermont account for 2012 landings and estimated value from January through September and, therefore, likely underestimate the total value of landings for that year. The values are adjusted to 2019 dollars using the Consumer Price Index. The white paper of landings and values in Vermont collected by the Vermont Department of Fish and Wildlife was provided to IEc on April 12, 2019.

This analysis mapped the dollar value of commercial fish and shellfish landings (i.e., total sales) to the corresponding RIMS sector of "fishing, hunting and trapping."[14] State-specific RIMS multipliers for this industry were then applied to the state-by-state annual commercial landings values. These RIMS multipliers translate the dollar value of landings into estimates of regional economic impacts on employment demand, value added, and output.

Exhibit 9 summarizes the state-by-state results of this analysis. These regional economic impact estimates for commercial fishing include direct, indirect, and induced effects.

The results suggest that the $1.6 billion in annual commercial fish landings for these 12 states generate total regional economic impacts of 17,794 full-time and part-time jobs, $700 million in earnings, $1.6 billion in value added, and $2.4 billion in output.

EXHIBIT 9. ANNUAL REGIONAL ECONOMIC IMPACTS OF COMMERCIAL FISH LANDINGS BY STATE

STATE	EMPLOYMENT (JOBS)	EARNINGS ($)	VALUE ADDED ($)	OUTPUT ($)
Connecticut	151	$6,415,775	$14,449,256	$22,320,402
Illinois	No Data	No Data	No Data	No Data
Massachusetts	6,495	$269,752,852	$627,762,410	$961,294,279
Maine	6,520	$250,617,731	$533,700,534	$823,991,952
Michigan	164	$4,288,251	$9,079,038	$14,303,016
Minnesota	4	$114,589	$244,885	$393,387
New Hampshire	No Data	No Data	No Data	$36,028,922
New Jersey	2,334	$98,710,472	$219,500,403	$347,388,703
New York	911	$22,047,100	$50,189,488	$77,206,972
Rhode Island	1,155	$45,906,779	$104,153,533	$160,544,105
Vermont	No Data	No Data	No Data	$966,991
Wisconsin	60	$1,536,708	$3,273,898	$5,151,392
Total	17,794	$699,390,257	$1,562,353,445	$2,449,590,123

RECREATIONAL AND COMMERCIAL FISHING

Recreational and commercial fishing activities in these 12 states generate significant regional economic activity. This analysis finds that the $12.0 billion in annual recreational fishing expenditures and the $1.6 billion in annual commercial fish landings for these 12 states result in a regional economic contribution of 276,696 full-time and part-time jobs, $8.7 billion in earnings, $17.2 billion in value added, and $28.1 billion in output. At this scale of economic activity, even small shifts in recreational fishing

[14] The primary economic activity within this sector is fish harvesting.

behavior or consumer purchasing as a result of elevated mercury concentrations could result in substantial economic impacts to related economic industries at the state or regional level. For example, if recreational anglers reduce their equipment- and trip-related expenditures by ten percent per year across the 12 states, the economic impact on value-added (equivalent to a GDP reduction) could be on the order of *$1.5 billion annually.*

ASSUMPTIONS, LIMITATIONS, AND CAVEATS

The following assumptions, limitations, and caveats apply to interpreting the results of this analysis:

- This analysis applied state-specific RIMS multipliers. As a result, it does not capture indirect and induced economic impacts that may have occurred outside each state (for example, if certain indirect or induced economic activity "leaked" beyond a state into neighboring states). To the extent that any economic activity produced by recreational or commercial fishing expenditures resulted in increases in regional economic activity outside each state, the output results may be understated.
- This analysis assumed that all sales and business activity related to commercial landings occurred within the state where landings were reported. In practice, commercial fishing businesses may operate in those states but be based in other states. For example, the analysis estimates that New Hampshire had approximately $36.0 million in commercial landings, but the RIMS multipliers suggest that did not generate any jobs, earnings, or value added for the state. Similarly, data from Vermont identify approximately $1 million in commercial landings, although the RIMS multipliers do not identify any associated indirect and induced impacts for the state. This may be because these economic impacts accrued to businesses that operate in New Hampshire and Vermont but are based in other states or that the U.S. Bureau of Economic Analysis (BEA) did not have sufficient industry-specific data to estimate the multiplier effects. In either case, the economic impact results reported may be understated for New Hampshire and Vermont.

IMPACTS OF FCAS TO HOUSING VALUES

Recent evidence demonstrates that mercury-based FCAs have a negative impact on property values. Tang *et al.* (2018) used the hedonic pricing method to estimate that New York State property values within one mile of an FCA-designated lake due to mercury decrease by an average of six to seven percent. The method uses property transaction data and information about various attributes of properties (i.e., size of house, quality of schools, proximity to open space for recreation and urban centers for work) to estimate a model that can be used to deduce the contribution of a given attribute to the sales price. Numerous published studies have estimated the impact of various measures of environmental quality on property values, though this is the only study we are aware of that estimates the impact of mercury-based FCAs on nearby property values. Since property values should capitalize the value of recreational opportunities, at least for occupants of the property, the estimates presented in Tang *et al*. (2018) should not be considered unique from the estimates of lost value to recreationists presented in a previous section, but as additional evidence that elevated mercury levels in fish have broad economic consequences.

WELL ACCEPTED AND WIDELY USED METHODS EXIST THAT EPA COULD USE TO QUANTIFY THE ECONOMIC BENEFITS ASSOCIATED WITH THE MATS RULE ON RECREATIONAL AND COMMERCIAL FISHERIES

As described above, there is ample evidence of the contribution of coal-fired EGUs to mercury levels in fish and shellfish. Elevated mercury levels lead to changes in consumer and recreator behavior, informed by state and federal health advisories and other information provided by non-governmental entities. These behavioral changes generate losses in consumer surplus and adverse impacts on regional economic activity.

In both EPA's 2011 Regulatory Impact Analysis (RIA) for the MATS Rule (U.S. EPA 2011) and the current proposed rule (U.S. EPA 2019) there was no attempt to quantify or monetize the social welfare or regional economic benefits resulting from changes in recreator or consumer behavior due to reductions in mercury emissions from the MATS Rule. Conversely, with the proposed rule, EPA has made no effort to account for the costs to states associated with changes in recreator and consumer behavior should EPA's reversal of its appropriate and necessary finding ultimately lead to abolishment of the standards (emissions limits) themselves, and a subsequent increase in mercury fish tissue concentrations.

Recreational and subsistence fishing as well as commercial fish harvest and processing play a substantial role in the economies and cultures of the Northeast and the Midwest. As such, even modest changes in mercury levels could have significant economic implications. Widely utilized and well accepted methods are available to place monetary values on the reduction in mercury concentrations in fish and shellfish that have and are expected to result from the MATS Rule. These are the same economic methods frequently applied by federal agencies bringing damage claims when acting as trustee for natural resources under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the1990 Oil Pollution Act, as well as the same methods widely used in the context of benefit analyses conducted under 316(b) of the Clean Water Act. Application of these methods to the MATS Rule would provide a more complete and transparent understanding of the actual benefits of the MATS Rule, and as such an understanding of the social and regional economic cost that would result from removing these requirements.

REFERENCES

Bienkowski, Brian, *Cleaner Bluefish Suggest Coal Rules Work,* Scientific American (Jul. 20, 2015), *available at* http://www.scientificamerican.com/article/cleaner-bluefish-suggest-coal-rules-work/.

Carrington, C.D., Montwill, B., and Bolger, P.M. 2004. An Interventional Analysis for the Reduction of Exposure to Methylmercury from the Consumption of Seafood by Women of Child-bearing Age. *Center for Food Safety and Applied Nutrition, U.S. Food and Drug Administration*.

Chan, H.M., A.M. Scheuhammer, A. Ferran, C. Loupelle, J. Holloway, and S. Weech. 2003. Impacts of mercury on freshwater fish-eating wildlife and humans. *Human and Ecological Risk Assessment* 9(4):867-883.

Chen, H.Z. and S.R. Cosslett. 1998. Environmental Quality Preference and Benefit Estimation in Multinomial Probit Models: A Simulation Approach. *American Journal of Agricultural Economics* 80(3): 512-520.

Confederated Tribes of the Colville Reservation, Spokane Tribe of Indians, U.S. Department of the Interior, and State of Washington. 2012. Injury Assessment Plan for the Upper Columbia River Site, Washington. Prepared for the Upper Columbia River Trustee Council. May.

Connelly, N.A., B.A. Knuth, and C.A. Bisogni. 1990. New York Statewide Angler Survey 1988. Prepared by the New York State Department of Environmental Conservation, Division of Fish and Wildlife, Albany, NY. April.

Connelly, N.A., B.A. Knuth, and C.A. Bisogni. 1992. Effects of the Health Advisory and Advisory Changes on Fishing Habits and Fish Consumption in New York Sport Fisheries. Report for the New York Sea Grant Institute Project No. R/FHD-2-PD. Human Dimensions Research Unit, New York DNR. Series No 92-9. September.

Connelly, N.A., B.A. Knuth, and T.L. Brown. 1996. "Sportfish Consumption Patterns of Lake Ontario Anglers and the Relationship to Health Advisories." North American Journal of Fisheries Management 16:90-101.

Cristol, D.A., Brasso, R.L., Condon, A.M., Fovargue, R.E., Friedman, S.L., Hallinger, K.K., Monroe, A.P., and A.E. White. 2008. The movement of aquatic mercury through terrestrial food webs. *Science* 320:335.

Cross, F.A., Evans, D.W. and Barber, R.T., 2015. Decadal declines of mercury in adult bluefish (1972–2011) from the mid-Atlantic coast of the USA. *Environmental science & technology*, 49(15), pp.9064-9072.

Driscoll, C.T., Mason, R.P., Chan, H.M., Jacob, D.J. and Pirrone, N., 2013. Mercury as a global pollutant: sources, pathways, and effects. *Environmental science & technology*, 47(10), pp.4967-4983.

Driscoll, C.T., Han, Y.J., Chen, C.Y., Evers, D.C., Lambert, K.F., Holsen, T.M., Kamman, N.C. and Munson, R.K., 2007. Mercury contamination in forest and freshwater ecosystems in the northeastern United States. *BioScience*, 57(1), pp.17-28.

Eisler, R. 2000. Handbook of Chemical Risk Assessment: Health Hazards to Humans, Plants and Animals, Volume I: Metals. Lewis Publishers, Boca Raton, London, New York, Washington, DC.

EPRI (Electric Power Research Institute). 2004. Atmospheric Mercury Research Update. Palo Alto, CA. 1005500.

Evers, D.C., Wiener, J.G., Driscoll, C.T., Gay, D.A., Basu, N., Monson, B.A., Lambert, K.F., Morrison, H.A., Morgan, J.T., Williams, K.A. and Soehl, A.G., 2011. Great Lakes mercury connections: the extent and effects of mercury pollution in the Great Lakes region. Report BR1, 18.

Fitzgerald, W. F., Engstrom, D. R., Mason, R. P., & Nater, E. A. 1998. The case for atmospheric mercury contamination in remote areas. *Environmental science & technology*, *32*(1), 1-7.

Giang, A., & Selin, N. E. 2016. Benefits of mercury controls for the United States. *Proceedings of the National Academy of Sciences*, *113*(2), 286-291.

Hagen, D.A., J.W. Vincent, and P.G. Welle. 1999. Economics Benefits of Reducing Mercury Deposition in Minnesota. Report to the Minnesota Pollution Control Agency and the Legislative Commission on Minnesota Resources. June.

Harris, R.C., Rudd, J.W., Amyot, M., Babiarz, C.L., Beaty, K.G., Blanchfield, P.J., Bodaly, R.A., Branfireun, B.A., Gilmour, C.C., Graydon, J.A. and Heyes, A., 2007. Whole-ecosystem study shows rapid fish-mercury response to changes in mercury deposition. *Proceedings of the National Academy of Sciences*, 104(42), pp.16586-16591.

Hauber, A. B. and G. R. Parsons. 2000. The Effect of Nesting Structure Specification on Welfare Estimation in a Random Utility Model of Recreation Demand: An Application to the Demand for Recreational Fishing. *American Journal of Agricultural Economics* 82(3): 501-514.

Industrial Economics, Inc. (IEc). 2017. Onondaga Lake Natural Resource Damage Assessment Restoration Plan and Environmental Assessment. Draft Report prepared for the United States Fish and Wildlife Service and the State of New York Department of Environmental Conservation. April.

Jakus, P. M. and W.D. Shaw. 2003. Perceived Hazard and Product Choice: An Application to Recreational Site Choice. *The Journal of Risk and Uncertainty* 26(1): 77-92.

Jakus, P., M. McGuinness, and A. Krupnick. 2002. The Benefits and Costs of Fish Consumption Advisories for Mercury. Discussion Paper 02-55, October.

Jakus, P.M., D. Dadakas, and J.M. Fly. 1998. Fish consumption advisories: Incorporating angler-specific knowledge, habits, and catch rates in a site choice model. *American Journal of Agricultural Economics* 80(5), Proceedings Issue: 1019-1024.

Jakus, P.M., M. Downing, M.S. Bevelhimer, and J.M. Fly. 1997. Do sportfish consumption advisories affect reservoir anglers' site choice? *Agricultural and Resource Economics Review* 26: 196–204.

Knightes, C.D., Sunderland, E.M., Barber, M.C., Johnston, J.M. and Ambrose, R.B., 2009. Application of ecosystem-scale fate and bioaccumulation models to predict fish mercury response times to changes in atmospheric deposition. *Environmental Toxicology and Chemistry*, 28(4), pp.881-893.

Knuth, B.A., N.A. Connelly, and M.A. Shapiro. 1993. Angler Attitudes and Behavior Associated with Ohio River Health Advisories. Human Dimensions Research Unit, Department of Natural Resources, New York State College of Agriculture and Life Sciences, A Statutory College of the State University, Fernow Hall, Cornell University, Ithaca, NY.

Krabbenhoft, D.P., & Sunderland, E.M. 2013. Global change and mercury. *Science*, 341(6153), 1457-1458.

Lee, C.S., Lutcavage, M.E., Chandler, E., Madigan, D.J., Cerrato, R.M. and Fisher, N.S., 2016. Declining mercury concentrations in bluefin tuna reflect reduced emissions to the North Atlantic Ocean. *Environmental science & technology*, 50(23), pp.12825-12830.

MacDonald, H.F. and K.J. Boyle. 1997. Effect of a Statewide Sport Fish Consumption Advisory on Open-Water Fishing in Maine. *North American Journal of Fisheries Management* 17(3): 687-695.

MacNair, D.J. and W.H. Desvousges. 2007. The economics of fish consumption advisories: Insights from revealed and stated preference data. *Land Economics* 83 (4): 600–616, ISS 0023-7639; E-ISS 1543-8325.

Mason, R.P., Choi, A.L., Fitzgerald, W.F., Hammerschmidt, C.R., Lamborg, C.H., Soerensen, A.L. and Sunderland, E.M., 2012. Mercury biogeochemical cycling in the ocean and policy implications. Environmental research, 119, pp.101-117.

Mason, R.P., J.-M. Laporte, and S. Andres. 2000. Factors controlling the bioaccumulation of mercury, methylmercury, arsenic, selenium, and cadmium by freshwater invertebrates and fish. *Archives of Environmental Contamination and Toxicology* 38:283-297.

Montgomery, M. and M. Needelman. 1997. The welfare effects of toxic contamination in freshwater fish. *Land Economics* 73(2): 212-223.

Morey, E.R. and W.S. Breffle. 2006. Valuing a change in a fishing site without collecting characteristics data on all fishing sites: a complete but minimal model. *American Journal of Agricultural Economics* 88(1): 150–161.

NOAA (National Oceanic and Atmospheric Administration). 2019. Annual Commercial Landing Statistics. Available online at: https://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings/annual-landings/index.

NOAA (National Oceanic and Atmospheric Administration). 2019. Great Lakes Commercial Fishery Landings. Available online at: https://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings/other-specialized-programs/great-lakes-landings/index.

Pacyna, E.G., Pacyna, J.M., Sundseth, K., Munthe, J., Kindbom, K., Wilson, S., Steenhuisen, F. and Maxson, P., 2010. Global emission of mercury to the atmosphere from anthropogenic sources in 2005 and projections to 2020. Atmospheric Environment, 44(20), pp.2487-2499.

Parsons, G.R., T. Tomasi, and P. Jakus. 1999. A comparison of welfare estimates from four models for linking seasonal recreational trips to multinomial models of site choice. *Journal of Environmental Economics and Management* 38(2): 143-157.

Rosenberger, R. 2016. Recreation Use Values Database (RUVD). Corvallis, OR: Oregon State University, College of Forestry. Available online at: http://recvaluation.forestry.oregonstate.edu/. Accessed 7/11/2016.

Scheuhammer, A.M. and M.B. Sandheinrich. 2008. Recent advances in the toxicology of methylmercury in wildlife. *Ecotoxicology* 17(2):67-68.

Seigneur, C., K. Vijayaraghavan, K. Lohman, P. Karamchandani, and C. Scott. 2004. Global source attribution for mercury deposition in the United States. *Environmental Science and Technology* 38(2):555-569.

Selin, N.E., D.J. Jacob, R.J. Park, R.M. Yantosca, S. Strode, L. Jaegle, and D. Jaffe. 2007. Chemical cycling of atmospheric mercury: Global constraints from observations. *Journal of Geophysical Research* 112(D2).

Selin, N.E., Sunderland, E.M., Knightes, C.D. and Mason, R.P., 2010. Sources of mercury exposure for US seafood consumers: implications for policy. *Environmental health perspectives*, 118(1), pp.137-143.

Shimshack, J., Ward, M., and Beatty, T. 2007. Mercury advisories: Information, education, and fish consumption. *Journal of Environmental Economics and Management.* Volume 53(2), p. 158 – 179.

Silverman, W.M. 1990. Michigan's Sport Fish Consumption Advisory: A Study in Risk Communication. Masters thesis. University of Michigan, Ann Arbor.

Swain, E. B., Engstrom, D. R., Brigham, M. E., Henning, T. A., & Brezonik, P. L. 1992. Increasing rates of atmospheric mercury deposition in midcontinental North America. *Science*, *257*(5071), 784-787.

Tang, C., M.D. Heintzelman, and T.M. Holsen. 2018. Mercury pollution, information, and property values. *Journal of Environmental Economics and Management* 92: 418-432.

Texas General Land Office; Texas Parks and Wildlife Department; Texas Natural Resource Conservation Commission; National Oceanic and Atmospheric Administration; and the U.S. Fish and Wildlife Service, U.S. Department of the Interior. 2001. Damage Assessment and Restoration Plan and Environmental Assessment for the Point Comfort/Lavaca Bay NPL Site Recreational Fishing Service Losses. June.

Tilden, J., Hanrahan, L., Anderson, H., Palit, C., Olson, J., Mac Kenszie, W., and the Great Lakes Sport Fish Consortium. 1997. Health Advisories for Consumers of Great Lakes Sport Fish: Is the Message Being Received? *Environmental Health Perspectives,* Volume 105(12).

U.S. BEA (Bureau of Economic Analysis). 2013. RIMS II. An essential tool for regional developers and planners.

U.S. EPA. 1997. Mercury study report to Congress. Volume I: Executive Summary. Office of Air Quality Planning and Standards, Office of Research and Development. EPA-452/R-97-003. December.

U.S. EPA. 2005. Regulatory impact analysis of the Clean Air Mercury Rule. EPA-425/R-05-003. March.

U.S. EPA. 2017. EPA-FDA Advice about Eating Fish and Shellfish. https://www.epa.gov/fish-tech/2017-epa-fda-advice-about-eating-fish-and-shellfish

U.S. EPA. 2018. "EPA Releases Proposal to Revise MATS Supplemental Cost Finding and "Risk and Technology Review" News Releases from Headquarters Air and Radiation. Found on April 8, 2019 at https://www.epa.gov/newsreleases/epa-releases-proposal-revise-mats-supplemental-cost-finding-and-risk-and-technology. December 28.

U.S. EPA. 2019. 40 CFR Part 63 [EPA–HQ–OAR–2018–0794; FRL–9988–93–OAR], RIN 2060–AT99 National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units—Reconsideration of Supplemental Finding and Residual Risk and Technology Review. February 7.

United Nations Environment Programme (UNEP). 2019. Global Mercury Assessment 2018. UN Environment Programme, Chemicals and Health Branch, Geneva, Switzerland.

United States Environmental Protection Agency. Health Effects of Exposures to Mercury. https://www.epa.gov/mercury/health-effects-exposures-mercury

United States Fish and Wildlife Service (USFWS). 2016. Net Economic Values for Wildlife-Related Recreation in 2011. Addendum to the 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. Report 2011-8. Available online at: https://digitalmedia.fws.gov/cdm/ref/collection/document/id/2125. Accessed 3/22/2019.

USFWS and Stratus Consulting (USFWS). 1999. Recreational Fishing Damages from Fish Consumption Advisories in the Waters of Green Bay. Prepared for U.S. Fish and Wildlife Service, U.S. Department of Justice, and U.S. Department of Interior. Stratus Consulting I

USFWS and U.S. Census Bureau. 2018. 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation: State Reports. U.S. Department of the Interior Fish and Wildlife Service and U.S. Department of Commerce Census Bureau

Vena, J.E. 1992. Risk, Perception, Reproductive Health Risk and Consumption of Contaminated Fish in a Cohort of New York State Anglers. New York State Angler Study Year One Progress Report.

Vijayaraghavan, K., Levin, L., Parker, L., Yarwood, G. and Streets, D., 2014. Response of fish tissue mercury in a freshwater lake to local, regional, and global changes in mercury emissions. *Environmental toxicology and chemistry*, 33(6), pp.1238-1247.

West, P.C., J.M. Fly, R. Marans, F. Larkin, and D. Rosenblatt. 1993. 1991-92 Michigan Sport Angler Fish Consumption Study. University of Michigan, Natural Resource Sociology Research Lab Technical Report No. 6.

Wiener, J.G. and D.J. Spry. 1996. Toxicological significance of mercury in freshwater fish. In: W.N. Beyer, G.H. Heinz, and A.W. Redmon-Norwood (eds.). Environmental Contaminants in Wildlife. Lewis Publishers, Boca Raton, FL.

APPENDIX A:

EXAMPLES OF GENERAL STATEWIDE SAFE FISH GUIDELINES

HEALTH ALERT

The Vermont Department of Health recommends that people limit eating some fish caught in Vermont waters.

These advisories are based on tests of fish caught in Vermont waters and scientific information about the harmful effects of mercury and, in the case of large lake trout in Lake Champlain and all fish in the Hoosic River, PCBs (poly-chlorinated biphenyls).

You can mix and match fish (you catch or buy) with the same limits, but once you meet the lowest limit eat no more fish that month. Do not eat the monthly limit within a single week.

Store bought fresh and canned fish—including tuna—have mercury levels that are about the same as many Vermont-caught fish. Add in store bought fish when you decide how many fish meals to eat each month.

One fish meal = 8 ounces uncooked fish

For more information call
1-800-439-8550
healthvermont.gov

VERMONT
DEPARTMENT OF HEALTH

	Women of childbearing age and children age 6 and under	Everyone else
GENERAL ADVISORY:		
Brown Bullhead Pumpkinseed	No more than 5 meals/month	No Restrictions
Walleye	0 Meals	No more than 1 meal/month
American Eel Chain Pickerel Lake Trout Smallmouth Bass	No more than 1 meal/month	No more than 3 meals/month
Largemouth Bass Northern Pike Yellow Perch (10 inches and larger)	No more than 2 meals/month	No more than 6 meals/month
Brook Trout Brown Trout Rainbow Trout White Perch Yellow Perch (smaller than 10 inches)	No more than 3-4 meals/month	No Restrictions
All Other Fish	No more than 2-3 meals/month	No more than 9 meals/month
SPECIAL ADVISORIES:		
Lake Carmi - Walleye	No more than 4 meals/month	No Restrictions
Lake Champlain Lake Trout (larger than 25 inches)	0 meals (includes all children under 15)	No more than 1 meal/month
Smallmouth Bass (19 inches and larger)	0 meals	No more than 1 meal/month
Yellow Perch (smaller than 10 inches)	No more than 5 meals/month	No Restrictions
Shelburne Pond Yellow Perch (smaller than 10 inches)	No more than 5 meals/month	No Restrictions
Hoosic River - All Fish	0 meals	0 meals
Deerfield Chain (Grout Pond, Somerset Reservoir, Harriman Reservoir, Sherman Reservoir, and Searsburg Reservoir)		
Brook Trout Brown Bullhead	No more than 5 meals/month	No Restrictions
Brown Trout (14 inches and smaller) Rainbow Smelt Rainbow Trout Rock Bass Yellow Perch	No more than 1 meal/month	No more than 3 meals/month
Brown Trout (larger than 14 inches) All Other Fish	0 meals	No more than 1 meal/month
15 Mile Falls Chain (Comerford Reservoir and Moore Reservoir)		
White Sucker	No more than 1 meal/month	No more than 3 meals/month
All Fish	0 meals	No more than 2 meals/month
15 Mile Falls Chain (McIndoes Reservoir)		
Yellow Perch	No more than 2 meals/month	No more than 6 meals/month
All Other Fish	No more than 1 meal/month	No more than 3 meals/month

v.May 2013

Statewide Safe Fish Guidelines

Michigan Department of Community Health

- Michigan is lucky to have over 11,000 lakes, rivers, and streams. Because of that huge number, it is not possible to test every fish species from every lake, river, or stream in the state.
- These general guidelines are based on the typical amount of chemicals found in fish filets tested from around the state. Some fish may be higher or lower.
- If any of these fish are listed in the *Eat Safe Fish Guide* for the lake or river you are fishing in, use those guidelines instead of the Statewide Safe Fish Guidelines. The *MI Servings* recommendation will be more exact for that lake or river because those filets have been tested.
- These general guidelines can be used for lakes, rivers, and fish species not included in the *Eat Safe Fish Guide*.

To get a free copy of the *Eat Safe Fish Guide*, visit www.michigan.gov/eatsafefish or call 1-800-648-6942.

eat safe fish

Michigan Department of Community Health

MDCH

Use the Statewide Safe Fish Guidelines ONLY if:

STOP

- **your lake or river is not listed in the *Eat Safe Fish Guide*, OR**
- **your lake or river is listed in the *Eat Safe Fish Guide*, but the fish species is not listed.**

Type of Fish	Chemical of Concern	Size of Fish (length in inches)	MI Servings per Month*
Black Crappie	Mercury	Any Size	4
Bluegill	Mercury	Any Size	8
Carp	PCBs	Any Size	2
Catfish	PCBs & Mercury	Any Size	4
Largemouth Bass	Mercury	Under 18"	2
		Over 18"	1
Muskellunge (Muskie)	Mercury	Any Size	1
Northern Pike	Mercury	Under 30"	2
		Over 30"	1
Rock Bass	Mercury	Any Size	4
Smallmouth Bass	Mercury	Under 18"	2
		Over 18"	1
Suckers	Mercury	Any Size	8
Sunfish	Mercury	Any Size	8
Walleye	Mercury	Under 20"	2
		Over 20"	1
White Crappie	Mercury	Any Size	4
Yellow Perch	Mercury	Any Size	4

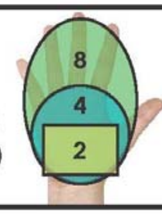
See page 2 to learn about *MI Servings

What is *MI Serving*?

You can use the information below to find out how much fish is in a *MI Serving* ("my serving") for you. If you're planning on eating more than 1 *MI Serving* of fish at a single meal, aim to eat fish that are listed as 2-8 *MI Servings* per month to be sure you're within the safe range.

My Michigan, *MI Serving* Size

- ☑ 8 ounces of fish = size of an adult's hand (large oval)
- ☑ 4 ounces of fish = size of the palm of an adult's hand (small circle)
- ☑ 2 ounces of fish = size of half a palm of an adult's hand (rectangle)



How much is *MI Serving*?

Weight of Person	*MI Serving* Size
45 pounds	2 ounces
90 pounds	4 ounces
180 pounds	8 ounces

Weigh Less?

For every 20 pounds <u>less</u> than the weight listed in the table, subtract 1 ounce of fish.

For example, a 70 pound child's *MI Serving* size is 3 ounces of fish.
90 pounds - 20 pounds = 70 pounds
4 ounces - 1 ounce = a *MI Serving* size of 3 ounces

Weigh More?

For every 20 pounds <u>more</u> than the weight listed in the table, add 1 ounce of fish.

For example, a 110 pound person's *MI Serving* size is 5 ounces of fish.
90 pounds + 20 pounds = 110 pounds
4 ounces + 1 ounce = a *MI Serving* size of 5 ounces

Are you pregnant? Fish is good for you and your baby! Use your pre-pregnancy weight to find your *MI Serving* size. It is best to avoid eating fish labeled as "Limited" if you're pregnant or breastfeeding.

About the Statewide Safe Fish Guidelines

- The Statewide Safe Fish Guidelines are set to provide safe options for everyone.
- They can be used by children, pregnant or breastfeeding women, and people who have health problems, like cancer, heart disease, or diabetes.
- The Statewide Safe Fish Guidelines can also be used by healthy adults to avoid getting too much of the chemicals in their bodies.
- Chemicals like PCBs and dioxins are linked to cancer, diabetes, and other illnesses.
- Mercury can cause damage to your brain, heart, and nerves.
- MDCH tests only the filet of the fish, and they use science-based calculations to find how much fish is safe to eat. With the Statewide Safe Fish Guidelines and the *Eat Safe Fish Guide*, everyone can now choose safer fish.

Questions? Please visit <u>www.michigan.gov/eatsafefish</u> or call 1-800-648-6942 for more information.

Freshwater Fish Consumption Advisory List

Massachusetts Department of Public Health
Bureau of Environmental Health
(617) 624-5757
November 2018

WATER BODY	TOWN(s)	FISH ADVISORY*	HAZARD*
Aaron River Reservoir	Cohasset, Hingham, Scituate	P1 (all species), P2 (CP, YP), P4	Mercury
Alewife Brook	Arlington, Belmont, Cambridge,Somerville	P1 (C), P3 (C)	PCBs
Ames Pond	Tewksbury	P1 (LMB), P3 (LMB)	Mercury
Ashland Reservoir	Ashland	P1 (all species), P5	Mercury
Ashley Lake	Washington	P1 (YP), P3 (YP)	Mercury
Ashfield Pond	Ashfield	P1 (LMB), P3 (LMB)	Mercury
Ashumet Pond	Mashpee, Falmouth	P1 (LMB), P3 (LMB)	Mercury
Atkins Reservoir	Amherst, Shutesbury	P1 (all species), P5	Mercury
Attitash, Lake	Amesbury, Merrimac	P1 (all species), P2 (LMB), P4	Mercury
Badluck Lake	Douglas	P6	Mercury
Baker Pond	Brewster, Orleans	P1 (YP), P3 (YP)	Mercury
Baldpate Pond	Boxford	P1 (all species), P2 (LMB), P4	Mercury
Ballardvale Impoundment of Shawsheen River	Andover	P1 (LMB & BC), P3 (LMB & BC)	Mercury
Bare Hill Pond	Harvard	P1 (LMB), P3 (LMB)	Mercury
Bearse Pond	Barnstable	P1 (LMB, SMB), P3 (LMB, SMB)	Mercury
Beaver Pond	Bellingham, Milford	P1 (CP, LMB), P3 (CP, LMB)	Mercury
Big Pond	Otis	P1 (all species), P2 (LMB), P4	Mercury
Boon, Lake	Hudson, Stow	P1 (LMB & BC), P3 (LMB & BC)	Mercury
Box Pond	Bellingham, Mendon	P1 (WS), P2 (WS)	DDT
Bracket Reservoir (Framingham Reservoir #2) – See Sudbury River			
Browning Pond	Oakham, Spencer	P1 (LMB, YP), P3 (LMB, YP)	Mercury
Buckley Dunton Lake	Becket	P1 (LMB), P3 (LMB)	Mercury
Buffomville Lake	Charlton, Oxford	P1 (all species), P5	Mercury
Burr's Pond	Seekonk	P1 (LMB), P3 (LMB)	Mercury
Cabot Pond – See Rumford River			
Canton River (between the Neponset River and Neponset Street dam)	Canton	P1 (all species), P2 (AE, WS), P4	PCBs, DDT
Cedar Swamp Pond	Milford	P1 (all species), P5	Mercury
Chadwicks Pond	Boxford, Haverhill	P6	Mercury
Charles River (between the South Natick Dam in Natick and the Museum of Science Dam in Boston/ Cambridge)	Boston, Cambridge, Dedham, Dover, Natick, Needham, Newton, Watertown, Wellesley, Weston, Waltham	P1 (C, LMB), P2 (C), P3 (LMB)	PCBs, Pesticides
Charles River (between the Medway Dam in Franklin and Medway and the South Natick Dam in Natick)	Dover, Franklin, Medfield, Medway, Millis, Natick, Norfolk, Sherborn	P1 (all species), P5	Mercury, Chlordane, DDT
Chebacco Lake	Essex, Hamilton	P1 (LMB), P3 (LMB)	Mercury
Clay Pit Pond	Belmont	P6	Chlordane
Cochato River, Ice Pond and Sylvan Lake	Randolph, Holbrook, Braintree	P1 (all species), P2 (BB & C & AE), P4	Pesticides
Cochichewick, Lake	North Andover	P1 (LMB, SMB), P3 (LMB, SMB)	Mercury
Cochituate, Lake (including Middle, North, South, and Carling Basins)	Framingham, Natick, Wayland	P1 (all species), P2 (AE)	PCBs

* See page 7 for codes.

WATER BODY	TOWN(s)	FISH ADVISORY*	HAZARD*
Concord River (from confluence with Sudbury and Assabet Rivers to the Faulkner Dam in Billerica)	Concord, Carlisle, Bedford, Billerica	P1 (all species), P2 (LMB), P4	Mercury
Connecticut River	Entire length of Massachusetts, including all towns from Northfield through Longmeadow	P1 (all species), P2 (CC & WC & AE & YP)	PCBs
Copicut Reservoir	Dartmouth, Fall River	P6	Mercury
Copicut River	Dartmouth, Fall River	P1 (all species), P2 (AE), P3 (LMB)	PCBs, Mercury
Cornell Pond	Dartmouth	P1 (all species), P2 (AE), P3 (LMB)	PCBs, Mercury
Crystal Lake	Haverhill	P1 (all species), P2 (LMB), P4	Mercury
Damon Pond	Chesterfield, Goshen	P1 (CP, LMB), P3 (CP, LMB)	Mercury
Dennison, Lake	Winchendon	P1 (LMB), P3 (LMB)	Mercury
Dodgeville Pond - See Mechanics Pond			
Drinkwater River/ Indian Head River/North River (Betweeen the Forge Pond Dam in Hanover and Route 3 in Norwell/ Pembroke) and Factory Pond	Hanson, Hanover, Norwell, Pembroke	P6	Mercury
Duck Pond	Wellfleet	P6	Mercury
Dyer Pond	Wellfleet	P6	Mercury
East Brimfield Reservoir	Brimfield, Sturbridge	P1 (all species), P5	Mercury
East Monponsett Pond	Halifax	P1 (LMB), P3 (LMB)	Mercury
Echo Lake	Hopkinton, Milford	P1 (all species), P2 (LMB), P4	Mercury
Factory Pond - See Drinkwater River			
Fall Brook Reservoir	Leominster	P1 (all species), P5	Mercury
Farrar Pond	Lincoln	P1 (BC, CP, LMB), P3 (BC, CP, LMB)	Mercury
Flax Pond	Lynn	P1 (AE, WP), P2 (AE)	DDT, Chlordane
Flint Pond	Tyngsborough	P1 (all species), P2 (LMB), P4	Mercury
Forest Lake	Methuen	P1 (LMB), P3 (LMB)	Mercury
Forge Pond	Littleton, Westford	P1 (LMB), P3 (LMB)	Mercury
Fort Meadow Reservoir	Hudson, Marlborough	P1 (WS), P3 (WS)	Chlordane
Foster Pond	Swampscott	P1 (AE), P2 (AE)	DDT
Fosters Pond	Andover, Wilmington	P1 (all species), P5	Mercury
Freeman Lake – See Newfield Pond			
French River (Between the Hodges Village Dam in Oxford and the North Webster Village Pond Dam in Webster)	Oxford, Webster	P1 (all species), P2 (LMB), P4	Mercury
Fulton Pond - See Rumford River			
Gales Pond	Warwick	P1 (YP), P3 (YP)	Mercury
Garfield, Lake	Monterey	P1 (LMB), P3 (LMB)	Mercury
Gibbs Pond	Nantucket	P1 (all species), P5	Mercury
Goodrich Pond	Pittsfield	P6	PCBs
Great Herring Pond	Bourne, Plymouth	P1 (SMB), P3 (SMB)	Mercury
Great Pond	Truro	P1 (all species), P5	Mercury
Great Pond	Wellfleet	P6	Mercury
Great South Pond	Plymouth	P1 (all species), P5	Mercury
Grove Pond	Ft. Devens, Ayer	P6	Mercury
Haggetts Pond	Andover	P1 (all species), P2 (LMB), P4	Mercury
Hamblin Pond	Barnstable	P1 (SMB), P3 (SMB)	Mercury
Hardwick Pond	Hardwick	P1 (LMB), P3 (LMB)	Mercury
Heard Pond	Wayland	P6	Mercury
Heart Pond	Chelmsford, Westford	P1 (LMB), P3 (LMB)	Mercury
Hickory Hills Lake	Lunenburg	P1 (all species), P5	Mercury

2

WATER BODY	TOWN(s)	FISH ADVISORY*	HAZARD*
Hocomonco Pond	Westborough	P6	PAHs
Holland Pond	Brimfield, Holland, Sturbridge	P1 (all species), P5	Mercury
Hood (or Hoods) Pond	Topsfield, Ipswich	P1 (all species), P2 (LMB, YP), P4	Mercury
Hoosic River (from the channelized section in North Adams to the MA/VT state line)	N. Adams, Williamstown	P6	PCBs
Horn Pond	Woburn	P1 (LMB), P3 (LMB)	DDT
Horseleech Pond	Truro	P1 (LMB), P3 (LMB)	Mercury
Hovey's Pond	Boxford	P1 (all species), P5	Mercury
Housatonic River (See footnote 1)	All towns from Dalton through Sheffield	P6 (also includes frogs and turtles)	PCBs
Ice Pond – See Cochato River			
Indian Head River – See Drinkwater River			
Ipswich River (between the Bostik Findley Dam in Middleton and the Sylvania Dam in Ipswich)	Boxford, Danvers, Hamilton, Ipswich, Middleton, Peabody, Topsfield, Wenham	P1 (all species), P5	Mercury
Johns Pond	Mashpee	P1 (all species), P2 (SMB), P4	Mercury
Johnsons Pond	Groveland, Boxford	P1 (LMB), P3 (LMB)	Mercury
Kenoza Lake	Haverhill	P6	Mercury
Kingman Pond – See Rumford River			
Knops Pond	Groton	P1 (LMB), P3 (LMB)	Mercury
Konkapot River (From the Mill River Dam in New Marlborough to its confluence with the Housatonic River)	Sheffield, New Marlborough	P1 (all species), P5	Mercury
Lakes whose names begin with "Lake" are listed under the second word in their name (so that Lake Pentucket is listed under "Pentucket," etc.)			
Lashaway, Lake	North Brookfield, East Brookfield	P1 (LMB, SMB), P3 (LMB, SMB)	Mercury
Lawrence Pond	Sandwich	P1 (LMB), P3 (LMB)	Mercury
Leverett Pond	Boston, Brookline	P1 (C), P2 (C)	DDT
Lewin Brook Pond	Swansea	P1 (BC, LMB), P3 (BC, LMB)	Mercury
Little Chauncy Pond	Northborough	P1 (BC, LMB), P3 (BC, LMB)	Mercury
Locust Pond	Tyngsborough	P1 (all species), P5	Mercury
Long Pond	Brimfield, Sturbridge	P1 (all species), P5	Mercury
Long Pond	Dracut, Tyngsboro	P1 (all species), P5	Mercury
Long Pond	Rutland	P1 (all species), P5	Mercury
Long Pond	Wellfleet	P6	Mercury
Long Pond (Rochester) – See Snipituit Pond			
Lost Lake	Groton	P1 (LMB), P3 (LMB)	Mercury
Lowe Pond	Boxford	P1 (all species), P2 (LMB), P4	Mercury
Lowell Canals (see footnote 2)	Lowell	P1 (all species), P2 (AE), P4	Mercury, Lead, PCBs, DDT
Lower Mystic Lake	Arlington, Medford	P1 (WS), P2 (WS)	PCBs, DDT
Malden River	Everett, Malden, Medford	P6	PCBs, Chlordane, DDT
Manchaug Pond	Douglas, Sutton	P1 (LMB), P3 (LMB)	Mercury
Martins Pond	North Reading	P1 (LMB & BC & YP), P3 (LMB & BC& YP)	Mercury
Mashpee Pond	Mashpee, Sandwich	P1 (SMB), P3 (SMB)	Mercury
Massapoag Lake	Sharon	P1 (LMB), P3 (LMB)	Mercury
Massapoag Pond	Dunstable, Groton, Tyngsboro	P1 (all species), P5	Mercury

1 Fish taken from feeder streams to the Housatonic River should be trimmed of fatty tissue prior to cooking.
2 For Lowell Canals, the public is advised to consume only the fillet of those species not specifically listed in the advisory.

3

WATER BODY	TOWN(s)	FISH ADVISORY*	HAZARD*
Mechanics Pond, Dodgeville Pond, and the section of the Ten Mile River that connects them	Attleboro	P1 (WP), P3 (WP)	Chlordane
Merrimack River (from the MA/NH state line to Broadway Dam in Lawrence)	All towns from Tyngsborough through Lawrence	P1 (WS & LMB), P3 (WS & LMB)	Mercury
Miacomet Pond	Nantucket	P1 (all species), P2 (WP), P4	Mercury
Mill Pond	Burlington	P1 (LMB), P3 (LMB)	Mercury
Mill Pond (SuAsCo Reservoir) above GH Nichols Dam	Westborough	P1 (all species), P2 (LMB)	Mercury
Mill River	Hopedale	P1 (all species), P5	PCBs
Millers River and its tributaries (between the confluence with the Otter River in Winchendon and the Connecticut River in Erving/Montague)	Athol, Erving, Montague, Orange, Phillipston, Royalston, Wendell, Winchendon	P1 (all species), P2 (AE, BT), P4	PCBs
Millvale Reservoir	Haverhill	P1 (all species), P2 (LMB)	Mercury
Mirror Lake	Ft. Devens, Harvard	P1 (LMB), P3 (LMB)	Mercury
Monomonac, Lake and the North branch of Millers River (Between the outlet of Lake Monomonac and the inlet of Whitney Pond)	Winchendon	P1 (all species), P5	Mercury
Moores Pond	Warwick	P1 (AE, CP), P3 (AE, CP)	Mercury
Morewood Lake	Pittsfield	P6	PCBs
Mother Brook (between Charles River and Knight Street Dam)	Dedham, Boston	P1 (C, LMB, WS), P3 (C, LMB, WS)	Mercury, DDT
Mother Brook (between the Knight Street Dam and the Neponset River)	Boston	P1 (all species), P2 (AE, WS), P4	PCBs, DDT
Muddy River	Boston, Brookline	P1 (all species), P2 (BB & C & AE), P4	PCBs
Mystic River (between outlet of Lower Mystic Lake and Amelia Earhart Dam)	Arlington, Everett, Medford, Somerville	P6	PCBs, Chlordane, DDT
Nabnasset Pond	Westford	P1 (LMB), P3 (LMB)	Mercury
Neponset River (between the Hollingsworth & Vose Dam in Walpole and the Walter Baker Dam in Boston)	Boston, Canton, Dedham, Milton, Norwood, Sharon, Walpole, Westwood	P1 (all species), P2 (AE, WS), P4	PCBs, DDT
New Bedford Reservoir	Acushnet	P1 (AE, LMB), P3 (AE, LMB)	Mercury, DDT
Newfield Pond (= Freeman Lake)	Chelmsford	P1 (LMB), P3 (LMB)	Mercury
Nippenicket, Lake	Bridgewater, Raynham	P1 (all species), P2 (LMB), P4	Mercury
Noquochoke Lake	Dartmouth	P1 (all species), P2 (LMB & AE), P4	Mercury, PCBs
North River – see Drinkwater River			
Norton Reservoir – See Rumford River			
Nutting Lake	Billerica	P1 (all species), P5	Mercury
Otis Reservoir	Otis, Tolland	P1 (all species), P5	Mercury
Otter River (between the Seaman Paper Dam in Templeton and the confluence with the Millers River in Winchendon)	Templeton, Winchendon	P1 (all species), P2 (BB & WS), P4	PCBs
Pelham Lake	Rowe	P1 (LMB), P3 (LMB)	Mercury
Pentucket Pond	Georgetown	P1 (all species), P2 (LMB & BC), P4	Mercury
Pentucket, Lake	Haverhill	P6	Mercury
Pepperell Pond	Pepperell, Groton	P1 (all species), P2 (LMB), P4	Mercury
Peters Pond	Sandwich	P1 (all species), P5	Mercury
Pettee Pond	Walpole, Westwood	P1 (LMB), P3 (LMB)	Mercury
Plainfield Pond	Plainfield	P1 (LMB), P3 (LMB)	Mercury
Pleasant Pond	Hamilton, Wenham	P1 (LMB), P3 (LMB)	Mercury
Plowshop Pond	Ft. Devens, Ayer	P6	Mercury
Pomps Pond	Andover	P1 (all species), P2 (LMB), P4	Mercury

4

WATER BODY	TOWN(s)	FISH ADVISORY*	HAZARD*
Ponkapoag Pond	Canton, Randolph	P1 (all species), P5	Mercury
Pontoosuc Lake	Pittsfield, Lanesborough	P1 (LMB), P3 (LMB)	Mercury
Populatic Pond	Franklin, Medway, Norfolk	P1 (all species), P5	Mercury, Chlordane, DDT
Powder Mill Pond	Barre	P1 (all species), P5	Mercury
Puffer Pond	Ft. Devens Sudbury Training Annex, Maynard	P6	Mercury
Quabbin & Wachusett Reservoirs (See footnote 3)	New Salem, Shutesbury, Petersham, Hardwick, Ware, Pelham, Belchertown, Boylston, West Boylston, Sterling, Clinton	See footnote 3	Mercury
Quaboag Pond	E. Brookfield, Brookfield	P1 (all species), P2 (LMB), P4	Mercury
Quannapowitt, Lake	Wakefield	P1 (C), P3 (C)	DDT
Quinebaug River (from dam at Hamilton Reservoir through East Brimfield Reservoir/Long Pond, including Holland Pond)	Brimfield, Holland, Sturbridge	P1 (all species), P5	Mercury
Red Bridge Pond	Wilbraham	P1 (BC, LMB), P3 (BC, LMB)	Mercury
Reservoir #6	Sutton	P1 (all species), P5	Mercury
Reservoir Pond	Canton	P1 (LMB, WP), P3 (LMB, WP)	Mercury
Rice City Pond	Northbridge, Uxbridge	P1 (all species), P2 (C, WS), P4	PCBs, DDT
Riverdale Pond	Northbridge	P1 (all species), P5	PCBs
Rock Pond	Georgetown	P1 (all species), P2 (LMB), P4	Mercury
Rohunta, Lake (Middle, North, and South Basins)	Orange, Athol, New Salem	P1 (all species), P5	Mercury
Rolling Dam Impoundment	Blackstone	P1 (all species), P2 (C, WS), P4	PCBs, DDT
Round Pond East	Truro	P1 (all species), P2 (LMB), P4	Mercury
Round Pond West	Truro	P1 (YP), P3 (YP)	Mercury
Rumford River (from Glue Factory Pond Dam; Fulton, Kingman, & Cabot ponds; Norton reservoir)	Foxborough, Mansfield, Norton	P6	Dioxin, Pesticides
Ryder Pond	Truro	P6	Mercury
Saltonstall, Lake	Haverhill	P1 (LMB), P3 (LMB)	Mercury
Sampsons Pond	Carver	P1 (BB, WP), P3 (BB, WP)	Mercury, DDT
Sargent Pond	Leicester	P1 (LMB), P3 (LMB)	Mercury
Sawdy Pond	Fall River, Westport	P1 (LMB), P3 (LMB)	Mercury
Shawsheen River - See Ballardvale Impoundment			
Sheep Pond	Brewster	P1 (all species), P5	Mercury
Sherman Reservoir	Rowe, Monroe	P1 (all species), P2 (YP), P4	Mercury
Shirley Lake	Lunenburg	P1 (all species), P5	Mercury
Silver Lake	Pittsfield	P6	PCBs
Silver Lake	Wilmington	P1 (LMB, YB), P3 (LMB, YB)	Mercury, DDT
Slough Pond	Truro	P1 (all species), P2 (LMB), P4	Mercury
Snake Pond	Sandwich	P1 (all species), P2 (SMB), P4	Mercury
Snipituit Pond and Long Pond	Rochester	P1 (BC & LMB), P3 (BC & LMB)	Mercury
Snow Pond	Truro	P1 (LMB), P3 (LMB)	Mercury

3 Children younger than 12 years, pregnant women, and nursing women should not consume fish except for lake trout less than 24 inches long and salmon. All other people should not eat smallmouth bass, largemouth bass, or lake trout greater than 24 inches long; may eat unlimited amounts of salmon and lake trout less than 24 inches long; and should limit consumption of all other Quabbin and Wachusett Reservoir fish species to one five-ounce meal per week.

WATER BODY	TOWN(s)	FISH ADVISORY*	HAZARD*
South Pond (= Quacumquasit Pond)	Sturbridge, Brookfield, E. Brookfield	P1 (all species), P5	Mercury
Spectacle Pond	Sandwich	P1 (all species), P5	Mercury
Spectacle Pond	Wellfleet	P1 (YP), P3 (YP)	Mercury
Spicket River - See Stevens Pond & Spicket River			
Spy Pond	Arlington	P1 (C), P2 (C)	DDT, Chlordane
Stern Reservoir (Framingham Reservoir #1) – See Sudbury River			
Stevens Pond & Spicket River (from Stevens Pond to Music Hall Dam in Methuen)	Lawrence, Methuen	P1 (C, LMB, WS), P3 (C, LMB, WS)	Mercury, DDT
Stevens Pond	North Andover	P1 (LMB), P3 (LMB)	Mercury
Stockbridge Bowl	Stockbridge	P1 (LMB), P3 (LMB)	Mercury
Sudbury Reservoir	Marlborough, Southborough	P1 (all species), P2 (Bass)	Mercury
Sudbury River (from Ashland to its confluence with the Assabet and Concord Rivers), Stern Reservoir, and Bracket Reservoir	All towns from Ashland through Concord	P6	Mercury
Sylvan Lake – See Cochato River			
Ten Mile River – see Mechanics Pond			
Texas Pond (= Thayer Pond)	Oxford	P1 (LMB), P3 (LMB)	Mercury
Thayer Pond – see Texas Pond			
Tom Nevers Pond	Nantucket	P1 (all species), P5	Mercury
Turner Pond	Dartmouth, New Bedford	P1 (all species), P5	Mercury
Upper Naukeag Lake	Ashburnham	P1 (all species), P2 (LMB, SMB), P4	Mercury
Upper Reservoir	Westminster	P1 (all species), P2 (LMB), P4	Mercury
Wachusett Lake	Princeton, Westminster	P1 (LMB), P3 (LMB)	Mercury
Wachusett Reservoir – See Quabbin Reservoir			
Waite Pond	Leicester	P1 (all species), P2 (CP), P4	Mercury
Wakeby Pond	Mashpee, Sandwich	P1 (SMB), P3 (SMB)	Mercury
Walden Pond	Concord	P1 (LMB & SMB), P3 (LMB & SMB)	Mercury
Walden Pond	Lynn, Lynnfield, Saugus	P1 (LMB), P3 (LMB)	Mercury
Wampanoag, Lake	Ashburnam, Gardner	P1 (all species), P5	Mercury
Warner's Pond	Concord	P1 (LMB), P3 (LMB)	Mercury
Wenham Lake	Beverly, Wenham	P1 (all species), P2 (AE, LMB), P4	Mercury, DDT
Wequaquet Lake	Barnstable	P1 (LMB, SMB), P3 (LMB, SMB)	Mercury
West Monponsett Pond	Halifax, Hanson	P1 (LMB), P3 (LMB)	Mercury
Whitehall Reservoir	Hopkinton	P1 (all species), P2 (YB), P4	Mercury
Whitings Pond	North Attleborough, Plainville	P1 (B, LMB), P3 (B, LMB)	Mercury
Whitmans Pond	Weymouth	P1 (AE), P2 (AE)	DDT
Whitney Pond	Winchendon	P1 (all species), P2 (CP), P4	Mercury
Windsor Lake	Windsor	P1 (LMB), P2 (LMB)	Mercury
Willet Pond	Walpole, Norwood, Westwood	P1 (LMB), P3 (LMB)	Mercury
Winthrop, Lake	Holliston	P6	Dioxin
Wrights Reservoir	Gardner, Westminster	P1 (all species), P5	Mercury

Advice Codes

P1 (all species)	Children younger than 12 years or age, pregnant women, women of childbearing age who may become pregnant, and nursing mothers should not eat any fish from this water body.
P1 (species)	Children younger than 12 years or age, pregnant women, women of childbearing age who may become pregnant, and nursing mothers should not eat any of the affected fish species (in parenthesis) from this water body.
P2 (species)	The general public should not consume any of the affected fish species (in parenthesis) from this water body.
P3 (species)	The general public should limit consumption of affected fish species (in parenthesis) to two meals per month.
P4	The general public should limit consumption of non-affected fish from this water body to two meals per month.
P5	The general public should limit consumption of all fish from this water body to two meals per month.
P6	No one should consume any fish from this water body.

Fish Codes

AE	American Eel	CCS	Creek C hubsucker	SMB	Smallmouth Bass
B	Bluegill	CP	Chain Pickerel	WC	White Catfish
BB	Brown Bullhead	FF	Fallfish	WP	White Perch
BC	Black Crappie	GRS	Green Sunfish	WS	White Sucker
BT	Brown Trout	LMB	Largemouth Bass	YB	Yellow Bullhead
C	Carp	LNS	Longnose Sucker	YP	Yellow Perch
CB	Calico Bass	P	Pumpkinseed		
CC	Channel Catfish	RT	Rainbow Trout		

Hazard Codes

PCB=polychlorinated biphenyls
PAHs=polycyclic aromatic hydrocarbons

7

Exhibit B

THE COMMONWEALTH OF MASSACHUSETTS
OFFICE OF THE ATTORNEY GENERAL
ONE ASHBURTON PLACE
BOSTON, MASSACHUSETTS 02108

MAURA HEALEY
ATTORNEY GENERAL

(617) 727-2200
(617) 727-4765 TTY
www.mass.gov/ago

July 26, 2021

Via Electronic Mail

Erika Sasser, Director
Health and Environmental Impacts Division
sasser.erika@epa.gov

Nick Hutson, Group Leader
Energy Strategies
hutson.nick@epa.gov

Office of Air Quality Planning and Standards
U.S. Environmental Protection Agency
109 T.W. Alexander Drive
Mail Code D243-01
Research Triangle Park, North Carolina 27711

Re: Supplemental Comments on "National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units—Reconsideration of Supplemental Finding and Residual Risk and Technology Review," RIN: 2060-AV12,
Doc. ID No. EPA–HQ–OAR–2018–0794

Dear Director Sasser and Mr. Hutson:

Thank you to you and your Environmental Protection Agency ("EPA") colleagues for meeting on June 9, 2021 with representatives of the Attorney General's Offices of Massachusetts, California, and New York, along with our public health and environmental organization partners, to discuss EPA's review of the final action entitled "National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units—Reconsideration of Supplemental Finding and Residual Risk and Technology Review," 85 Fed. Reg. 31,286 (May 22, 2020) ("Revised Finding"). We appreciated the opportunity to discuss the significant and continuing public health, environmental, and economic benefits of the national hazardous air pollutant emissions limitations for power plants, commonly known as the Mercury and Air Toxics Standards or "MATS Rule," 77 Fed. Reg. 9304 (Feb. 16, 2012), and the urgent need for EPA to reverse its unlawful Revised Finding.[1]

As we mentioned at our meeting, compliance with the MATS Rule has generated enormous reductions in hazardous air pollutant emissions that are vital to protecting public health and the environment and leveling the regulatory playing field across the country. Power-plant mercury emissions, for instance, declined eighty-six percent between 2006 and 2017, mainly as a result of the MATS Rule and other emissions-control policies. 84 Fed. Reg. 2670, 2689 tbl.4 (Feb. 7, 2019).

As we discussed, a wide array of studies and data published since the MATS Rule was promulgated demonstrate that the Rule's environmental, health, and economic benefits are substantially greater than initially anticipated, and that the costs of the MATS Rule are lower than originally estimated. These data confirm that the MATS Rule's benefits far exceed its costs. For your reference and consideration, below please find a compilation of notable post-2011 sources that are relevant to assessing the benefits and costs of the MATS Rule, including sources regarding: fisheries and aquatic systems, human health and welfare, and compliance costs.

POST-2011 SOURCES RELEVANT TO THE BENEFITS AND COSTS OF THE MATS RULE FOR EPA'S CONSIDERATION

Fisheries and Aquatic Systems

Robert E. Unsworth et al., Industrial Economics, Inc., *The Economic Benefits of the Mercury and Air Toxics Standards (MATS) Rule to the Commercial and Recreational Fishery Sectors of Northeast and Midwest States* (2019), Doc. ID No. EPA–HQ–OAR–2018–0794–1175 Att. 2.

> Concluding that the MATS Rule has reduced mercury loadings to aquatic ecosystems and reduced mercury levels in recreationally caught and commercially harvested fish. "Given the importance of recreational fishing and the commercial fishing and processing sectors to the economies of the Northeast and Midwest, even modest changes in recreator and consumer behavior in response to reductions in mercury concentrations from the MATS Rule are likely to result in substantial benefits to the economies and residents of these states and the Nation as a whole. . . . [I]t is reasonable to conclude that the Rule may generate recreational and commercial fishing benefits in excess of $1 billion *annually*." Finding also that "[t]here are

[1] *See* Comments of the Attorneys General of Massachusetts, et al. on EPA's Proposed "National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units—Reconsideration of Supplemental Finding and Residual Risk and Technology Review," 84 Fed. Reg. 2670 (Feb. 7, 2019) (Apr. 17, 2019), Doc. ID No. EPA–HQ–OAR–2018–0794–1175 (arguing that EPA's action to revise its prior finding that regulation of power-plant hazardous air pollutants is "appropriate and necessary" is unlawful and *ultra vires*).

widely accepted methods that EPA could have used to monetize the benefits of reduced mercury concentrations in recreationally caught and commercially harvested fish. These benefits would include both regional economic performance (including jobs and expenditures) as well as social welfare benefits."

Elsie M. Sunderland, Miling Li, & Kurt Bullard, *Decadal Changes in the Edible Supply of Seafood and Methylmercury Exposure in the United States*, 126(1) Envtl. Health Perspectives 017006-1 (2018), https://ehp.niehs.nih.gov/doi/pdf/10.1289/EHP2644.

Estimating the geographic origins of seafood consumed in the United States and how shifts in edible supply impacted methylmercury exposures. Finding that "[c]oastal ecosystems account for 37% of U.S. population-wide MeHg intake and can be expected to respond to domestic efforts to curb mercury pollution."

Christopher R. DeSorbo et al. *Mercury Concentrations in Bald Eagles Across an Impacted Watershed in Maine, USA*, 627 Sci. of the Total Env't 1515 (2018), https://www.ncbi.nlm.nih.gov/pubmed/30857113.

Finding that bald eagles in interior Maine and in the Catskill Park region of southeastern New York State are commonly exposed to mercury, primarily from atmospheric deposition, at concentrations associated with neurological and reproductive impacts in birds.

Cheng-Shiuan Lee et al., *Declining Mercury Concentrations in Bluefin Tuna Reflect Reduced Emissions to the North Atlantic Ocean*, 50(23) Sci. & Tech. 12,825 (2016), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5161346/.

Finding that mercury concentrations in bluefin tuna from the Northwest Atlantic "declined significantly" at a rate of 19% from 2004 to 2012. The decrease paralleled declining mercury emissions in North America and reductions in North Atlantic atmospheric mercury concentrations, demonstrating connection between efforts to reduce mercury emissions and meaningfully lower mercury concentrations in commercially important fish.

Ford A. Cross et al., *Decadal Declines of Mercury in Adult Bluefish (1972-2011) from the Mid-Atlantic Coast of the U.S.A.*, 49 Envtl. Sci. Tech. 9064 (2015), https://pubmed.ncbi.nlm.nih.gov/26148053/.

Measuring concentrations of total mercury in adult bluefish collected in 2011 off North Carolina and comparing those measurements with similar measurements made in 1972. Finding that mercury levels decreased by 43% between 1972 and 2011, similar to the estimated reductions of mercury observed in atmospheric deposition and aquatic ecosystems over that time. Also citing additional studies conducted between 1973 and 2007 that confirm a correlation between lower mercury levels in bluefish and decreasing U.S. mercury air emissions, and concluding that reduced mercury emissions have likely resulted in reduced human mercury exposures.

Ryan F. Lepak et al., *Use of Stable Isotope Signatures to Determine Mercury Sources in the Great Lakes*, 2(12) Envtl. Sci. & Tech. Letters 335 (2015), https://pubs.acs.org/doi/abs/10.1021/acs.estlett.5b00277.

Identifying three primary sources of mercury in Great Lakes sediment: atmospheric, industrial, and watershed-derived. Findings suggest "that atmospheric sources, rather than contaminated historical sediments, may be an important source of bioaccumulative Hg in Great Lakes fish."

Michael S. Hutcheson et al., *Temporal and Spatial Trends in Freshwater Fish Tissue Mercury Concentrations Associated with Mercury Emissions Reductions*, 48 Envtl. Sci. Tech. 2193 (2014), https://www.ncbi.nlm.nih.gov/pubmed/24494622.[2]

Analyzing mercury concentrations monitored from 1999 to 2011 in largemouth bass and yellow perch in 23 lakes in Massachusetts during a significant period of reductions in local and regional mercury emissions. Finding that average tissue mercury concentration in largemouth bass decreased 44% in most lakes in a regional mercury "hotspot" area, and average tissue mercury concentration in yellow perch in all sampled lakes in the same area decreased 43%. During a similar time period, mercury emissions from major point sources decreased 98% in the hotspot area, and 93% in the rest of the state, demonstrating a correlation between emissions reductions and decreased mercury concentrations in aquatic species.

Paul E. Drevnick et al., *Spatial and Temporal Patterns of Mercury Accumulation in Lacustrine Sediments across the Laurentian Great Lakes Region*, 161 Envtl. Pollution 252 (2012), https://surface.syr.edu/cie/6/.[3]

Analyzing core sediment samples from the Great Lakes and nearby lakes to assess historical and recent changes in mercury deposition. Finding that sedimentary mercury is declining in the region and that "atmospheric Hg deposition appears uniform across the Great Lakes airshed," which "suggests that local and regional sources of atmospheric Hg emissions are important sources of Hg deposition compared to global sources" and "that regional and local controls on atmospheric emissions have been effective in decreasing the delivery of Hg to lakes."

[2] Exhibit 7, Appendix to Comments of Environmental, Public Health, and Civil Rights Organizations on the Proposed National Emissions Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units—Reconsideration of Supplemental Finding and Residual Risk and Technology Review, 84 Fed. Reg. 2670 (Feb. 7, 2019) (Apr. 17, 2019) (hereinafter "Comments of Environmental, Public Health, and Civil Rights Organizations"), Doc. ID No. EPA–HQ–OAR–2018–0794–1267.

[3] Exhibit 8, Appendix to Comments of Environmental, Public Health, and Civil Rights Organizations, Doc. ID No. EPA–HQ–OAR–2018–0794–1267.

David C. Depew et al., *Toxicity of Dietary Methylmercury to Fish: Derivation of Ecologically Meaningful Threshold Concentrations*, 31(7) Envtl. Toxicology & Chemistry 1536 (2012), https://deepblue.lib.umich.edu/bitstream/handle/2027.42/92130/1859_ftp.pdf?sequence=2&isAllowed=y.

Finding adverse effects on the reproductive and behavioral health of wild fish populations at low levels of environmental methylmercury exposure.

David C. Depew et al., *Derivation of Screening Benchmarks for Dietary Methylmercury Exposure for the Common Loon (*Gavia Immer*): Rationale for Use in Ecological Risk Assessment*, 31(10) Envtl. Toxicology & Chemistry 2399 (2012), https://deepblue.lib.umich.edu/bitstream/handle/2027.42/93756/1971_ftp.pdf?sequence=1&isAllowed=y.

Surveying literature and summarizing effects of dietary methylmercury on the common loon.

Human Health and Welfare Benefits

David G. Streets et al., *Global and Regional Trends in Mercury Emissions and Concentrations, 2010-2015*, 201 Atmospheric Env't 417 (2019), http://bgc.seas.harvard.edu/assets/ae-paper.pdf.

Analyzing global and regional trends in mercury concentrations in the period 2010 to 2015. Finding that U.S. emissions declined during this period.

Vivian E. Thomson, Kelsey Huelsman, & Dominique Ong, *Coal-fired power plant regulatory rollback in the United States: Implications for local and regional public health*, 123 Energy Pol'y 558 (2018), https://www.sciencedirect.com/science/article/pii/S030142151830627X.

Analyzing which U.S. regions benefited from air quality improvements due to the MATS Rule and transport rule by modeling estimated differences between the impacts of pre-regulatory emissions and current emissions on fine particulate matter ($PM_{2.5}$) concentrations and on public health. Finding that annual average $PM_{2.5}$ concentrations are lower by 1–5 μg/m3, and 17,176–39,291 premature mortalities are avoided for each year of lower emissions.

Xue Feng Hu, Kavita Singh, & Hing Man Chan, *Mercury Exposure, Blood Pressure, and Hypertension: A Systematic Review and Dose-Response Meta-analysis*, 126(7) Envtl. Health Perspectives 076002 (2018), https://ehp.niehs.nih.gov/doi/10.1289/EHP2863.

Reviewing 29 studies, covering more than 55,000 participants from 17 countries, and finding a significant positive association between mercury and hypertension and between mercury and blood pressure. Noting that "MeHg is generally considered to be the most toxic form [of mercury] and a dose-response relationship has been proposed between MeHg and cardiovascular outcomes."

Noah Kittner et al., *Trace Metal Content of Coal Exacerbates Air-Pollution-Related Health Risks: The Case of Lignite Coal in Kosovo*, 52(4) Environ. Sci. & Technol. 2359 (2018), https://pubmed.ncbi.nlm.nih.gov/29301089/.

Finding significant trace metal content in lignite coal from Obilic, Kosovo.

Giuseppe Genchi et al., *Mercury Exposure and Heart Diseases*, 14(1) Int'l J. Envtl. Research & Pub. Health 1 (2017), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5295325/pdf/ijerph-14-00074.pdf.[4]

Finding that high levels of methylmercury exposure in adults have been associated with adverse cardiovascular effects, including increased risk of fatal heart attacks.

Philippe Grandjean & Martine Bellanger, *Calculation of the disease burden associated with environmental chemical exposures: application of toxicological information in health economic estimation*, 16(123) Envtl. Health 1 (2017), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5715994/pdf/12940_2017_Article_340.pdf.[5]

Estimating the societal costs of the cognitive deficits associated with methylmercury exposure in the United States amount to approximately $4.8 billion annually.

Ki-Hyun Kim et al., *A Review on the Distribution of Hg in the Environment and Its Human Health Impacts*, J. Hazardous Materials 306 (2016), https://www.ncbi.nlm.nih.gov/pubmed/26826963.

Reviewing the route of mercury exposure to humans, its health impacts, and the associated risk assessment based on recent studies.

Vincent Nedellec & Ari Rabl, *Costs of Health Damage from Atmospheric Emissions of Toxic Metals: Part 2—Analysis for Mercury and Lead*, Risk Analysis 1 (2016), https://pubmed.ncbi.nlm.nih.gov/26992113/.

Estimating the damage cost associated with one kilogram of emitted mercury pollution, with 91% of the cost due to mortality from heart disease and the rest from IQ loss.

[4] Exhibit 16, Appendix to Comments of Environmental, Public Health, and Civil Rights Organizations, Doc. ID No. EPA–HQ–OAR–2018–0794–1267.

[5] Exhibit 3, Appendix to Comments of Environmental, Public Health, and Civil Rights Organizations, Doc. ID No. EPA–HQ–OAR–2018–0794–1267.

Elsie M. Sunderland et al., *Benefits of Regulating Hazardous Air Pollutants from Coal and Oil-Fired Utilities in the United States*, 50 Envtl. Sci. & Tech. 2117 (2016), https://pubs.acs.org/doi/pdf/10.1021/acs.est.6b00239.

Concluding that the monetized benefits in EPA's 2011 Regulatory Impact Analysis for the MATS Rule underestimated power plants' contribution to local mercury deposition as well as the benefits associated with reductions of power-plant emissions. Concluding also that "as-yet-unquantified benefits to human health and wildlife from reductions in EGU mercury emissions are substantial."

Amanda Giang & Noelle E. Selin, *Benefits of mercury controls for the United States*, 113(2) Proceedings of the Nat'l Acad. of Sci. 286 (2016), https://www.pnas.org/content/pnas/113/2/286.full.pdf.[6]

Projecting that the total economy-wide benefits associated with the continued implementation of the MATS Rule through 2050 would amount to at least $43 billion based on reductions in mercury emissions alone. Providing a dose-response function quantifying the effect of methylmercury exposure on heart attacks.

Yanxu Zhang et al., *Observed Decrease in Atmospheric Mercury Explained by Global Decline in Anthropogenic Emissions*, 113(3) Proceedings of the Nat'l Acad. of Sci. 526 (2016), https://www.pnas.org/content/113/3/526.

Showing that spatial and temporal trends in atmospheric mercury concentrations and deposition are influenced by local and regional actions. "This implies that prior policy assessments underestimated the regional benefits of declines in mercury emissions from coal-fired utilities."

Aisha S. Dickerson et al., *Autism Spectrum Disorder Prevalence and Associations with Air Concentrations of Lead, Mercury, and Arsenic*, 188(7) Envtl. Monitoring & Assessment 407 (2016), https://www.ncbi.nlm.nih.gov/pubmed/27301968.

Examining associations between autism spectrum disorder prevalence and ambient concentrations of arsenic, lead, and mercury, and finding that tracts in the highest quartile of lead and mercury air concentrations had significantly higher autism prevalence than tracts in the lowest quartile for each of these pollutants, once the researchers adjusted for confounding factors.

---

[6] Exhibit 2, Appendix to Comments of Environmental, Public Health, and Civil Rights Organizations, Doc. ID No. EPA–HQ–OAR–2018–0794–1267.

T.I. Fortoul et al., "Health Effects of Metals in Particulate Matter," in *Current Air Quality Issues* (Farhad Nejadkoorki ed. 2015), https://www.intechopen.com/chapters/48145.

Describing the health impacts, and mechanisms underlying the health impacts, of toxic metals in particulate matter.

Ahmed Zaky et al., *Chlorine Inhalation-induced Myocardial Depression and Failure*, 3(6) Physiol. Rep. 1 (2015), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4510636/.

Observing cardiac pathology in rats exposed to chlorine gas.

Sara T.C. Orenstein et al., *Prenatal Organochlorine and Methylmercury Exposure and Memory and Learning in School-Age Children in Communities Near the New Bedford Harbor Superfund Site, Massachusetts*, 122(11) Envtl. Health Perspectives 1253 (2014), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4216164/.

Finding that increases in maternal hair concentrations of mercury were associated with decreases in childhood memory and learning, particularly visual memory.

Lisa M. Sweeney et al., Naval Medical Research Unit Dayton, *Acute Lethality of Inhaled Hydrogen Cyanide in the Laboratory Rat: Impact of Concentration x Time Profile and Evaluation of the Predictivity of "Toxic Load" Models*, Rep. No. NAMRU-D-13-35 (2013), https://apps.dtic.mil/sti/pdfs/ADA579551.pdf.

Reporting acute effects of exposure to hydrogen cyanide in animals.

K. He et al., *Mercury Exposure in Young Adulthood and Incidence of Diabetes Later in Life: The CARDIA Trace Element Study*, 36(6) Diabetes Care 1584 (2013), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3661833/pdf/1584.pdf.

Finding that toenail mercury levels are associated with incidence of diabetes in a dose-response manner among American young adults.

Martine Bellanger et al., *Economic Benefits of Methylmercury Exposure Control in Europe: Monetary Value of Neurotoxicity Prevention*, 12(3) Envtl. Health 1 (2013), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3599906/.

Documenting neurodevelopmental impacts of methylmercury at exposure levels below EPA's reference dose.

Sofia Jonasson, Bo Koch, & Anders Bucht, *Inhalation of Chlorine Causes Long-standing Lung Inflammation and Airway Hyperresponsiveness in a Murine Model of Chemical-Induced Lung Injury*, 303 Toxicology 34 (2013), https://pubmed.ncbi.nlm.nih.gov/23146759/.

> Exposing mice to chlorine one time and finding an acute response that subsided after 48 hours and a sustained airway hyperresponsiveness for at least 28 days.

Philippe Grandjean et al., *Calculation of Mercury's Effects on Neurodevelopment*, 120(12) Envtl. Health Persp. A452 (2012), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3548290/pdf/ehp.1206033.pdf.

> Suggesting an updated dose-response relationship for prenatal methylmercury, with a lower threshold Hg level corresponding to 50% of the previous reference dose.

Compliance Costs

James E. Staudt, *Andover Technology Partners, Update of the Cost of Compliance with MATS – Ongoing Cost of Controls* 7, 8 tbl.8 (2019), Doc. ID No. EPA–HQ–OAR–2018–0794–1175 Att. 3.

> Finding that annual incremental operating costs associated with the MATS Rule are approximately $203 million.

Declaration of James E. Staudt, attached to Comments of Calpine Corp. et al. on EPA's Proposed Supplemental Finding (Dec. 1, 2015), Doc. ID No. EPA–HQ–OAR–2009–0234–20549.

> Finding that EPA's projection of compliance costs in 2015, $9.6 billion, was nearly five times higher than the actual estimated cost of approximately $2 billion incurred through 2016.

* * * *

Please do not hesitate to reach out to us should you have any questions about this information or like to discuss further. Our contact information is below. Thank you again for your time and consideration.

Respectfully Submitted,

FOR THE COMMONWEALTH OF MASSACHUSETTS

MAURA HEALEY
ATTORNEY GENERAL

MEGAN M. HERZOG
DAVID FRANKEL
Special Assistant Attorneys General
TRACY TRIPLETT
Assistant Attorney General
Environmental Protection Division
Office of the Attorney General
One Ashburton Place, 18th Floor
Boston, Massachusetts 02108
Tel: (617) 963-2674
Fax: (617) 727-9665
megan.herzog@mass.gov
david.frankel@mass.gov
tracy.triplett@mass.gov

Cc: Joseph Goffman, Acting Assistant Administrator, EPA
goffman.joseph@epa.gov

Tomás Elias Carbonell, Deputy Assistant Administrator for Stationary Sources, EPA
carbonell.tomas@epa.gov

EPA Docket Clerk
a-and-r-docket@epa.gov