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Casting a Wide Net: Why it is Incumbent Upon the Environmental Protection Agency to Expand the Scope of its Cost- Benefit Analysis to Include Native American Populations and Cultural Fishing Practices in the Aftermath of Michigan v. EPA

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**Casting a Wide Net: Why it is Incumbent
Upon the Environmental Protection
Agency to Expand the Scope of its Cost-
Benefit Analysis to Include Native
American Populations and Cultural
Fishing Practices in the Aftermath of
*Michigan v. EPA***

Gretel Lee[†]

“I think it is incredibly presumptuous and elitist for political scientists to conclude that the American people’s cultural values in fact are not ones that lend themselves to a cost-benefit analysis and to presume that [the American people] would change their cultural values if in fact they were aware of the cost-benefit analysis.”¹ — Joseph Biden

Introduction

On June 29, 2015, the Supreme Court of the United States struck down the Mercury and Air Toxics Standard (MATS) provision under the Clean Air Act in a landmark 5-4 decision.² The Court held that the Environmental Protection Agency (EPA) acted unreasonably by implementing the MATS provision when it determined that regulation of mercury emissions from electric utility steam generating units (EGUs) was “appropriate and necessary,”³ because the EPA did not take the cost of compliance

†. J.D. Candidate 2017, University of Minnesota Law School. I would like to thank Professors Brad Karkkainen and June Carbone for their assistance, edits, and suggestions as I wrote and re-wrote this piece. I also want to thank my family for helping me solidify my thinking and for supporting me through this process. It is an honor and a privilege to be able to share my thoughts and ideas on this very important set of issues in this manner.

1. *Nomination of Stephen G. Breyer to be an Associate Justice of the Supreme Court of the United States: Hearing Before the Comm. on the Judiciary*, 103d Cong. 310 (1994) (statement of Hon. Joseph Biden, Chairman, Comm. on the Judiciary).

2. *Michigan v. EPA*, 135 S. Ct. 2699, 2711–12 (2015).

3. Clean Air Act § 112(n)(1)(A), 42 U.S.C. § 7412(n)(1)(A) (2012). For the purposes of clarity, please note that § 7412 is used interchangeably in court documents and supplemental sources with its common citation, Clean Air Act (CAA) § 112(n)(1)(A). “Appropriate and necessary” as interpreted by the EPA serves as the rationale for regulation “after studying hazards to public health posed by power-plant emissions.” *Michigan*, 135 S. Ct. at 2701. Furthermore, the “EPA found power-plant regulation ‘appropriate’ because the plants’ emissions pose risks

by the industry into account in the initial stages of regulation.⁴ In addition to an already tumultuous history of regulating (and not regulating) EGU emissions,⁵ the Supreme Court unanimously moved in the direction of requiring cost-benefit analysis (CBA) for major regulatory actions.⁶ This occurred despite differing opinions on how CBA can and should be implemented, ultimately affecting the outcome of the merits of the case. While CBA serving as a justification for the implementation of a regulation is by no means unheard of, the implications of this unanimous move are serious and far-reaching, requiring each agency to conduct an in-depth analysis of the costs and benefits of the proposed action. The Supreme Court has effectively held that the direct⁷ benefits of new proposed regulations must outweigh the direct costs of complying with the new regulation. The EPA, in this case, used the monetized benefits of preventing the reduction of IQ points in recreational anglers and their children who consumed their catch, an amount totaling four to six million dollars annually in direct benefits (despite the tens of billions of dollars in ancillary benefits).⁸ The Court contrasted these benefits with the costs of compliance, an amount totaling approximately \$9.6 billion annually.⁹ These figures stand in stark, obvious contrast to one another. In order for new regulations to withstand this latest

to public health and the environment and because controls capable of reducing these emissions were available. It found regulation 'necessary' because the imposition of other Clean Air Act requirements did not eliminate those risks." *Id.*

4. *Id.* at 2705 (noting that although § 112(d) requires the consideration of cost for "beyond-the-floor standards," the statute does not note the manner in which the costs are to be considered).

5. The EPA's various mercury regulations have been subject to much litigation, and have been enacted, vacated, overruled, and reenacted. A history of these regulations is discussed in Section I(A).

6. *See Michigan*, 135 S. Ct. at 2712; *see also id.* at 2714 (Kagan, J., dissenting) (describing how the EPA considered costs in creating the MATS provision); Exec. Order No. 12,866, 58 Fed. Reg. 51,735 (Sept. 30, 1993) (describing how agencies must consider the costs and benefits of new regulations in addition to non-regulatory means of achieving regulatory goals).

7. Direct benefits are those that can be completely quantified and result from the purpose of the rule; in *Michigan v. EPA*, it is the benefits from mercury reduction. *Michigan*, 135 S. Ct. at 2721. Direct benefits do not include ancillary benefits, which are benefits derived from the manner in which the mercury is monitored. *Id.* at 2711. In *Michigan v. EPA*, ancillary benefits included reductions in other harmful emissions, like particulate matter. *See Michigan*, 135 S. Ct. at 2714 (Kagan, J., dissenting).

8. *Id.* at 2706 ("The Agency could not fully quantify the benefits of reducing power plants' emissions of hazardous air pollutants; to the extent it could, it estimated that these benefits were worth \$4 to \$6 million per year.").

9. *Id.*

requirement, these figures need to stand on the opposite ends of the CBA spectrum from where they presently reside.

On remand to the Court of Appeals for the District of Columbia Circuit, the EPA can improve its intentions in regulating EGUs. This includes taking impacts on populations other than recreational anglers into account, in particular taking into account Native American peoples with the appropriated rights to fisheries. These peoples attach cultural significance to fishing and consuming fish, and yet their interests were left out of the EPA's analysis. Currently, the EPA is moving forward with the claim that there is no mandatory formal CBA, which the Supreme Court has also claimed.¹⁰ Thus, the MATS regulation remains within the realm of requirements under the "appropriate and necessary" regulation umbrella, despite the Supreme Court overruling their regulation.¹¹ Seeing as the Supreme Court is unanimously moving in the direction of mandating that agencies consider costs in a more formalized manner (though claiming it is still up to the agencies to decide how to quantify them),¹² agencies need to expand the scope of the possible direct benefits of proposed regulations. The weight given to Executive Order 12,866 also brings attention to other pertinent Executive Orders, which need to be given weight by agencies and courts alike, including Executive Order 12,898 on environmental justice, ordered by President Clinton.¹³

The Supreme Court's decision in *Michigan v. EPA* is part of a growing insistence on CBA as necessary to justify regulatory actions. These legal developments have worked to hamstringing regulatory efforts to protect less powerful groups, especially with respect to environmental concerns. While a growing literature addresses the limitation of CBA,¹⁴ the majority of literature published on the subject does not address the specific impacts on

10. *Id.* at 2711.

11. Supplemental Finding That it is Appropriate and Necessary to Regulate Hazardous Air Pollutants from Coal- and Oil- Fired Electric Utility Steam Generating Units, 80 Fed. Reg. 75025 (proposed Dec. 1, 2015) (to be codified at 40 C.F.R. pt. 63).

12. *Michigan*, 135 S. Ct. at 2711.

13. Exec. Order No. 12,866, 58 Fed. Reg. 51,735 (Sept. 30, 1993); Exec. Order No. 12,898, 59 Fed. Reg. 7629 (Feb. 16, 1994).

14. See Matthew D. Adler & Eric A. Posner, *Rethinking Cost-Benefit Analysis*, 109 YALE L.J. 165 (1999); Xavier Dupuis, *Applications and Limitations of Cost-Benefit Analysis as Applied to Cultural Development*, UNESCO (1985), <http://unesdoc.unesco.org/images/0008/000819/081977eo.pdf>; Jonathan Masur & Eric A. Posner, *Unquantified Benefits and Bayesian Cost-Benefit Analysis*, 102 CORNELL L. REV. 87 (2016).

Native American concerns. This is particularly true where the loss is a threat to broad-based environmental interests (loss of fish, for example, across a broad area rather than effects concentrated on reservations), Native American cultural concerns, as opposed to strict economic concerns, or where the impact affects a relatively small number of Native Americans in comparison with a larger group of non-Native Americans. All of these factors are present in *Michigan v. EPA*.

The purpose of this Article is to encourage the EPA and, in a larger sense, all federal agencies to reform the manner in which they conduct CBA in order to give greater weight to benefits that are inherently harder to quantify, and extend beyond the single dimension of strict monetization. In particular, the EPA should move in the direction of including more wide-scale benefits in regulatory decision-making, as exemplified by inclusion of the benefits faced by mercury reduction in Native American populations, and in manners previously deemed “unquantifiable” through the inclusion of Bayesian CBA.¹⁵ The Supreme Court has claimed that ancillary benefits cannot be included in the primary CBA.¹⁶ Thus, with the inclusion of the effects of hazardous air pollutants (HAP) on a wider scale (specifically here, mercury and its impacts on subsistence fishing populations), the benefits in the reduction of mercury pollution forces the scale of costs versus benefits towards a balanced proportion, bringing the agency closer to being within the boundaries of compliance under the requirements set forth by the Supreme Court.

Part I provides a brief background in the *Michigan v. EPA* regulation battle, and an explanation as to why these regulations are being challenged. Part II discusses the effects of methylmercury on the human body and the reasoning that went into the decision to regulate mercury emissions. Part III consists of an analysis of the impacts of environmental regulation on Native American communities across the United States, their constitutional and treaty rights to apportionment fishing and legal protection, and how this has been and continues to be largely ignored in the EPA’s analysis. This section will conclude with a brief discussion on federalism constraints and related ongoing

15. This raises the issue of whether Native Americans can successfully argue that the EPA had independent authority to address this issue without CBA at all. This discussion, however, is outside the scope of this Article.

16. *Michigan*, 135 S. Ct. at 2711 (“Even if the Agency *could* have considered ancillary benefits when deciding whether regulation is appropriate and necessary—a point we need not address—it plainly did not do so here.”) (emphasis in original).

litigation. Part IV is comprised of a discussion on Bayesian CBA, and how the EPA, and other agencies, moving forward, can implement previous “unquantifiable” benefits into their own analyses. This particular analysis will use the effects on Native American communities as an area where the EPA could have shown significant benefits in regulating harmful mercury emissions.

I. Background—*Michigan v. EPA* and Regulations

*a. Regulation of EGUs Under the Clean Air Act—It is “Appropriate and Necessary” to Regulate Mercury Emissions*¹⁷

*“The Administrator [of the EPA] shall regulate [EGUs] under this section, if the Administrator finds such regulation is appropriate and necessary after considering the results of the study required by this subparagraph.”*¹⁸

EGUs are major stationary sources, and thus are regulated differently than other sources under § 112 of the Clean Air Act (CAA).¹⁹ Under the 1990 CAA Amendments, EGUs were singled out for their large emissions and for the resulting impact on surrounding communities and, as a result, had stricter regulations imposed on them.²⁰ They were required to implement new forms

17. See Clean Air Act, 42 U.S.C. § 7412(n)(1)(A) (2012); Petition for Writ of Certiorari for Petitioner, *Michigan v. EPA*, 135 S. Ct. 2699 (2015) (No. 14-46) [hereinafter Petition for Writ of Certiorari] (citing Regulatory Finding on the Emissions of Hazardous Air Pollutants From Electric Utility Steam Generating Units, 65 Fed. Reg. 79,825, 79,830) (stating that the EPA found it appropriate to regulate EGUs and noting that EGUs “are the largest domestic source of mercury emissions, and mercury in the environment presents significant hazards to public health and the environment.”). Note that the following section is a brief and simplified summary of the legal proceedings as understood by the author. For a more in-depth summary of the background leading up to the decision in *Michigan v. EPA*, see the EPA’s Remand Legal Memorandum, summarizing the statutory and legal history of EGU regulations.

18. Clean Air Act, 42 U.S.C. § 7412(n)(1)(A) (2012) (emphasis added).

19. Clean Air Act, 42 U.S.C. § 7412(a)(1) (2012) (“The term ‘major source’ means any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any hazardous air pollutants or 25 tons per year or more of any combination of hazardous air pollutants.”).

20. Clean Air Act, 42 U.S.C. § 7412(n)(1)(B) (2012) (“The Administrator shall conduct, and transmit to the Congress not later than 4 years after November 15, 1990, a study of mercury emissions from electric utility steam generating units, municipal waste combustion units, and other sources, including area sources. Such study shall consider the rate and mass of such emissions, the health and

of technology, including flue scrubbers under the Acid Rain Provisions.²¹ The EPA published a list of these sources under § 112(c) of the CAA.²² The EPA first found regulation of coal- and oil-fired EGUs “appropriate and necessary” in 2000 after conducting two and evaluating three studies together under § 112(n)(1).

Section 112(n)(1)(A) required the EPA to conduct a study of the hazards to public health from HAP emissions from EGUs that will remain after imposition of the other provisions of the CAA and determine whether there are controls available to reduce HAP emissions from EGUs (Utility Study). Section 112(n)(1)(B) required the EPA to study mercury emissions from EGUs and all other sources of mercury, and to determine the rate and mass of the mercury emissions, the health and environmental effects of such emissions, and the availability and cost of controls to reduce such emissions (Mercury Study). Section 112(n)(1)(C) required the National Institute of Environmental Health Sciences (NIEHS) to conduct a third study related to the threshold level of mercury in fish tissue that can be consumed without adverse effects to public health (NIEHS Study).²³

The EPA issued its finding in light of the results of these three studies in 2000, concluding that it was “appropriate and necessary” to regulate mercury emissions from EGUs. “[B]ased on particular facts and circumstances, including its determination that EGUs ‘are the largest domestic source of mercury emissions, and mercury in the environment presents significant hazards to public health and the environment.’”²⁴

The EPA changed course in 2005, and reversed their initial finding. “At that time, EPA interpreted § 7412(n)(1)(A)’s phrase ‘after imposition of the requirements’ of the Act to include both requirements already in effect and those that EPA ‘reasonably anticipates will be implemented and will result in reductions of

environmental effects of such emissions, technologies which are available to control such emissions, and the costs of such technologies.”)

21. 42 U.S.C. § 7651 (2012).

22. Clean Air Act, 42 U.S.C. § 7412(c). The EGUs of importance to this analysis are the coal- and oil-fired EGUs.

23. Legal Memorandum Accompanying the Proposed Supplemental Finding that it is Appropriate and Necessary to Regulate Hazardous Air Pollutants from Coal- and Oil-Fired Electric Utility Steam Generating Units (EGUs) (Nov. 20, 2015), https://www.epa.gov/sites/production/files/2016-05/documents/20151120legal_memo.pdf.

24. Petition for Writ of Certiorari, *supra* note 18, at 5 (citing Regulatory Finding on the Emissions of Hazardous Air Pollutants From Electric Utility Steam Generating Units, 65 Fed. Reg. 79,825, 79,830) (Dec. 20, 2000)).

utility HAP emissions.”²⁵ The EPA found the regulation redundant in light of other statutory safeguards under the CAA, and brought into focus the high cost of compliance and the underlying inefficiency of regulating EGUs at such a high cost with a seemingly low demonstrated benefit.²⁶ The EPA subsequently removed EGUs from regulation under CAA § 112(c). Instead, the EPA issued the Clean Air Mercury Rule (CAMR), which served as a form of “cap-and trade” regulation.²⁷

In 2008, the Court of Appeals for the D.C. Circuit ruled that the attempt to remove the EGUs from the § 7412(c) list was unlawful after individual States challenged the EPA’s 2005 decision to delist EGU regulation.²⁸ More specifically, the court held that “Congress required EPA to make specific determinations about the health effects of HAP emissions from EGUs before deleting them from the list, and EPA had not satisfied those requirements.”²⁹ This ruling vacated the CAMR.³⁰

In 2012, the EPA determined it was not authorized to consider costs in deciding whether regulation was appropriate under § 112 of the CAA, and deemed regulation of EGUs to be appropriate if any single HAP emitted from EGUs is hazardous to public health or the environment, effectively reaffirming its 2000 finding.³¹ This decision led to the challenges brought by individual

25. Petition for Writ of Certiorari, *supra* note 18, at 6 (citing Revision of December 2000 Regulatory Finding on the Emissions of Hazardous Air Pollutants From Electric Utility Steam Generating Units and the Removal of Coal- and Oil-Fired Electric Utility Steam Generating Units From the Section 112(c) List, 70 Fed. Reg. 15,994, 15,999) (Mar. 29, 2005) (to be codified at 40 C.F.R. pt. 63)).

26. *See New Jersey v. EPA*, 517 F.3d 574 (D.C. Cir. 2008) (describing the reason for the overruling of the Clean Air Mercury Rule (CAMR)).

27. Neb. Dep’t of Env’tl. Quality, *EPA Vacates Clean Air Mercury Rule*, AIR WAVES (July 2008), <http://www.deq.state.ne.us/AirWaves.nsf/cf7e4bdd49c643bf8625747f005a1515/9de6c40a1a1c49688625747f005bc786>; *see also New Jersey*, 517 F.3d at 577. “Cap-and-Trade” is a market-based regulation, which allows polluters to buy and sell pollution credits after the market is set at a certain limit. *See* Robert N. Stavins, *A Meaningful U.S. Cap-and-Trade System to Address Climate Change*, 32 HARV. ENVTL. L. REV. 293 (2008). While “cap-and-trade” is still a form of regulation, it is a market-based regulation that the Court vacated because the EPA, by implementing the market-based incentives, took mercury out from under regulation of CAA § 112, Hazardous Air Pollutants, which require Maximum Achievable Control Technology (MACT), and regulation in order to protect human health. *New Jersey*, 517 F.3d at 579–80.

28. *New Jersey*, 517 F.3d at 582–83.

29. Petition for Writ of Certiorari, *supra* note 18, at 7 (citing *New Jersey v. EPA*, 517 F.3d 574, 581–82) (D.C. Cir. 2008)).

30. *See New Jersey*, 517 F.3d at 578 (vacating the Clean Air Mercury Rule).

31. National Emission Standards for Hazardous Air Pollutants From Coal- and Oil-Fired Electric Utility Steam Generating Units and Standards of Performance for Fossil Fuel-Fired Electric Utility, Industrial-Commercial-Institutional, and

states and utilities in *White Stallion Energy v. EPA*³² and *Michigan v. EPA*.³³

b. The March of White Stallion—Individual States and Utilities Brought Suit Claiming that Costs of Compliance Must be Considered When Promulgating Regulatory Schemes

In *White Stallion Energy*, state, industry, and labor parties challenged the EPA's decision reaffirming the outcome of the 2000 case.³⁴ Twenty-two states challenged the regulations along with industry and labor petitioners,³⁵ while sixteen states and the District of Columbia, along with environmental and public health intervenors, supported the regulations.³⁶ The petitioners listed a number of oppositions to the relisting of the 2000 finding; a number of which the court did not rule on.³⁷ The most pertinent objection is the second one listed, regarding the petitioners' objection to the EPA's interpretation of "appropriate and necessary," and it not including the costs of compliance due to regulation, i.e. objection ultimately ruled on and reversed by the Supreme Court.³⁸ Specifically, the petitioners refer to the 2005 decision, which allowed considerations of cost to be included into the greater regulatory analysis of "appropriate;"³⁹ they objected to the new decision not to include costs in a strict manner⁴⁰ (as opposed to them being brought into the greater consideration through best available implemented technology).⁴¹ Petitioners contend that not including costs "unreasonably constrains the language of § 112(n)(1)(A),"⁴² citing a dictionary definition of "appropriate" and the differences inherent in the regulation of EGUs under § 112(n)(1)(A), and other sources under § 112(c).⁴³ Most pertinently, the petitioners pointed to precedent, citing "only

Small Industrial-Commercial-Institutional Steam Generating Units, 77 Fed. Reg. 9304, 9310–11 (Feb. 16, 2012) (to be codified at 40 C.F.R. pts. 60 and 63).

32. 748 F.3d 1222 (D.C. Cir. 2014).

33. 135 S. Ct. 2699 (2015).

34. *White Stallion Energy*, 748 F.3d at 1229.

35. *Id.* at 1226–29.

36. *Id.* at 1230–32.

37. *See id.* at 1234.

38. *Id.* at 1236–41.

39. *Id.* at 1236.

40. *Id.*

41. *See Michigan v. EPA*, 135 S. Ct. 2699 (2015).

42. *White Stallion Energy*, 748 F.3d at 1236 (internal citation omitted).

43. *Id.*

where there is ‘clear congressional intent to preclude consideration of cost’ [do] we find agencies barred from considering costs.”⁴⁴ The court ultimately ruled that the EPA was correct in their interpretation of “appropriate and necessary” and did not need to consider cost in their analysis for EGU emission regulation, claiming that “[o]n its face, § 112(n)(1)(A) neither requires EPA to consider costs nor prohibits EPA from doing so.”⁴⁵

Judge Kavanaugh dissented as to Part I of the opinion, foreshadowing the Supreme Court’s ultimate decision on the matter.⁴⁶ Judge Kavanaugh begins his analysis with the Maximum Achievable Control Technology (MACT) standard for EGUs under § 112(d),⁴⁷ and allows his analysis to evolve into a discussion over “appropriate”; claiming that regulation of EGUs has already been deemed “necessary” in response to the studies required under § 112(n)(1).⁴⁸ Judge Kavanaugh claims that the MACT program requires the consideration of costs, even for EGUs, and thus it was wrong for the EPA to find otherwise.⁴⁹

II. Effects of Methylmercury (MeHg)

a. Background on the Emissions of Mercury

Mercury is a naturally occurring element found in the environment, most commonly in rock-like substances.⁵⁰ According

44. *Id.* (quoting *Michigan v. EPA*, 213 F.3d 663, 678 (D.C. Cir. 2000), *cert. denied*, 532 U.S. 904 (2001)).

45. *Id.* at 1237.

46. *Id.* at 1258 (Kavanaugh, J., dissenting).

47. *Id.* at 1259–60 (Kavanaugh, J., dissenting). In explaining the MACT standards and the listing process, Judge Kavanaugh stated:

EPA uses a two-step process for setting MACT standards. It begins by setting a minimum stringency level, or “floor,” based on the performance of the best-performing units in a particular source category. At that first step, EPA may not consider costs. Once the agency sets the statutory floor, it then determines, considering cost and other factors listed in Section 112(d)(2), whether an even more restrictive standard is “achievable.” . . . [T]he MACT program[] applies automatically to most sources of hazardous air pollutants. But for . . . [EGUs], Congress devised an alternative system as set forth in Section 112(n)(1)(A) of the [CAA]. The alternative system erects two threshold hurdles *before* EPA may regulate [EGUs] under the MACT program. (internal citations omitted).

Id. at 1259 (J. Kavanaugh, dissenting). These steps are the studies mandated under § 112(n). As previously discussed, the next step is the “appropriate and necessary” determination by the administrator.

48. *Id.* at 1260 (J. Kavanaugh, dissenting).

49. *Id.* at 1261 (J. Kavanaugh, dissenting) (“It is entirely unreasonable for EPA to exclude consideration of costs in determining whether it is ‘appropriate’ to regulate electric utilities under the MACT program.”).

50. ENVTL. PROT. AGENCY, BASIC INFORMATION ABOUT MERCURY,

to the EPA, methylmercury is an elemental mercury that methylizes; it is “a[n] organic mercury compound[] . . . [and is] formed when mercury combines with carbon[] . . . [and] is the most common organic mercury compound found in the environment.”⁵¹ Nearly all of the mercury found in fish and their tissues is methylmercury.⁵² It is found naturally in coal deposits and emitted into the air when coal is burned in EGUs.⁵³ Utilities operate at temperatures above 2000 degrees Fahrenheit, and thus the mercury present in the “coal and oil is vaporized and exhausted as a gas[,]” resulting in the emissions.⁵⁴ One of the reasons that methylmercury is of such high concern to the EPA and experts is because of its ability and tendency to travel and settle in soil composites and water, resulting in bioaccumulation in natural beings, primarily fish and other aquatic animals.⁵⁵ Bioaccumulation occurs when fish consume smaller organisms in which mercury has carbonated, and the toxicity works its way through the food chain, resulting in consumption of the larger (and thus more highly concentrated) fish by humans.⁵⁶ Human consumption of fish and other seafood is the largest reason for the accumulation of methylmercury in humans, and the resulting harms that come from it.⁵⁷

<http://www.epa.gov/mercury/basic-information-about-mercury> (last visited Mar. 30, 2017) [hereinafter BASIC INFORMATION ABOUT MERCURY].

51. *Id.*

52. U.S. GEOLOGICAL SURVEY, MERCURY IN THE ENVIRONMENT, <https://www2.usgs.gov/themes/factsheet/146-00/> (last visited Mar. 2, 2016).

53. BASIC INFORMATION ABOUT MERCURY, *supra* note 51.

54. ENVTL. PROT. AGENCY: OFFICE OF AIR QUALITY PLANNING & STANDARDS & OFFICE OF RESEARCH & DEV., MERCURY STUDY REPORT TO CONGRESS, VOL. II: AN INVENTORY OF ANTHROPOGENIC MERCURY EMISSIONS IN THE UNITED STATES 4–6 (December 1997), <http://www3.epa.gov/airtoxics/112nmerc/volume2.pdf> [hereinafter INVENTORY OF ANTHROPOGENIC MERCURY EMISSIONS].

55. *Toxicological Effects of Methylmercury*, COMM. ON THE TOXICOLOGICAL EFFECTS OF METHYLMERCURY, NAT'L RES. COUNCIL 16 (2000), <http://www.nap.edu/read/9899/chapter/1>. [hereinafter *Toxicological Effects of Methylmercury*].

56. Regulatory Finding on the Emissions of Hazardous Air Pollutants From Electric Utility Steam Generating Units, 65 Fed. Reg. 79,827, 79,827–829 (Dec. 20, 2000).

57. *See Toxicological Effects of Methylmercury*, *supra* note 56, at 16 (stating that human exposure to methylmercury “from contaminated fish and seafood can pose a variety of health risks.”).

b. *Effects of Methylmercury on the Human Body—Through the Developing Brain and Beyond*

As stated above, one of the primary problems that stems from mercury emissions is the negative effect on the human body, which primarily comes through the consumption of fish.⁵⁸

Studies indicate that there is no positive role mercury plays in the human body and that even very low doses have adverse impacts on people.⁵⁹ Damage from mercury ingestion and exposure has resulted in harm to the cardiovascular, immune, and reproductive systems,⁶⁰ and severely inhibits the performance of the liver, kidneys, and—of most pertinence importance to this analysis—the nervous system.⁶¹ These impacts result in tremors, impaired vision and hearing, paralysis, insomnia, and emotional instability.⁶²

Throughout its mercury studies and as justification for their efforts to regulate mercury emissions, the EPA has focused on the impacts that methylmercury has on the developing brain, and ultimately the impacts of lower IQ points that will be explained below.⁶³ If the mercury is ingested by the mother while she is pregnant, it remains in her body for approximately forty-four to eighty days⁶⁴ and hinders the healthy development of the fetus's brain.⁶⁵ The mercury moves through the body as it is absorbed by the gastrointestinal tract and enters the bloodstream, and ultimately may enter the fetal brain.⁶⁶ In a pregnant woman, it

58. BASIC INFORMATION ABOUT MERCURY, *supra* note 51.

59. Génon Jensen & Karolina Ruzickova, *Halting the Child Brain Drain: Why We Need to Tackle Global Mercury Contamination* 18 (2006), http://www.env-health.org/IMG/pdf/2-Halting_the_child_brain_drain_Why_we_need_to_tackle_global_mercury_contamination.pdf.

60. *Toxicological Effects of Methylmercury*, *supra* note 56, at 147–250 (discussing the human health effects of the consumption of methylmercury as derived from various study designs).

61. *Id.*

62. *Id.*

63. ENVTL. PROT. AGENCY: OFFICE OF AIR QUALITY PLANNING & STANDARDS, REGULATORY IMPACT ANALYSIS FOR THE FINAL MERCURY AND AIR TOXICS STANDARDS (2011), <http://www3.epa.gov/ttnecas1/regdata/RIAs/matsriafinal.pdf> [hereinafter FINAL REGULATORY IMPACT ANALYSIS].

64. WORLD TRADE ORGANIZATION, GUIDANCE FOR IDENTIFYING POPULATIONS AT RISK FROM MERCURY EXPOSURE 27 (2008), <http://www.who.int/foodsafety/publications/chem/mercuryexposure.pdf> (noting that the half-life of mercury is approximately forty-four to eighty days).

65. *Id.* at 29 (“Because methylmercury-cysteine conjugate readily passes both the placental barrier and the blood-brain barrier and the developing fetus is especially sensitive to the toxic effects of methylmercury, exposures during pregnancy are of highest concern.”).

66. *Id.* at 27.

can eventually find its way into cord blood and placental tissue, resulting in even higher mercury concentrations; some studies indicate mercury levels in the fetus up to twice as high as maternal blood mercury levels.⁶⁷ This is particularly concerning because methylmercury cannot break down into less harmful subcomponents. Many of the disorders caused by methylmercury come to light after the babies are born, as they grow and develop into young children.⁶⁸ High methylmercury levels can result in Attention Deficit Disorder and in particularly low scores on tests of fine-motor skills, neurobehavioral tests, attention, language, verbal memory, and visual-spatial abilities.⁶⁹

Perhaps the most concerning effect, as evidenced by the EPA's assessment,⁷⁰ is the measured drop in IQ in children. This is perhaps evidenced by the symptoms listed above, though it does fall somewhat into its own category. IQ drops have historically been measured in loss of potential income, which has been subject to criticism,⁷¹ as it excludes and effectively devalues nonworking populations such as the elderly and retired,⁷² and excludes a host of other potential monetary costs (resulting in monetized benefits of regulation), and other social and cultural concerns. These are discussed in the next section.

67. Sharon D. Wallace, Using Information Technology to Reduce a Health Risk: Effect of a Mercury Calculator on Consumer Fish Choices and Test of a Model for Technology Acceptance by Fish Consumers 16–17 (Sept. 7, 2012) (Ph.D. Dissertation, Trident University International). Related studies have indicated a “statistically significant relationship existed between frequency of fish meals and level of MeHg in cord blood.” *Id.* at 17.

68. See Jensen & Ruzickova, *supra* note 60, at 12 (indicating that “[c]hildren and fetuses appear to be more affected than the population as a whole[]” from the consumption of mercury in fish).

69. *Id.* at 18.

70. Michigan v. EPA, 135 S. Ct. 2699, 2716 (2015) (Kagan, J., dissenting) (stating that the “EPA found that children of mothers exposed to high doses of mercury during pregnancy ‘have exhibited a variety of developmental neurological abnormalities,’ including delayed walking and talking, altered muscles, and cerebral palsy.”).

71. See Catherine A. O’Neill, *Environmental Justice in the Tribal Context: A Madness to EPA’s Method*, 38 ENVTL. L. 495, 514 (2008) [hereinafter O’Neill, *Environmental Justice in the Tribal Context*].

72. *Id.* at 528 (stating that CBA studies using a loss-in-earnings approach imply that “the lives of retired people are worth nothing—or perhaps less than nothing, since they consume scarce goods and services without earning or producing any marketed goods themselves.”).

III. Cultural Significance—Apportionment of Fishing Rights to Tribes and Related Effects

a. The Majority of Elevated Mercury Levels are Found in Communities that Consume Large Amounts of Fish, Like Native American Communities, Many of Which Place Cultural Significance in Fishing or Live Subsistence Lifestyles

Professor Catherine O'Neill captures the stark reality of mercury consumption in Native American communities nearly perfectly:

This widespread [mercury] contamination poses a particular threat to many Native American peoples. Historically and in contemporary times, members of these fishing peoples consume more fish, at greater frequency, and in accordance with different cultural practices than the general population.⁷³

Many surveys conducted historically and into the modern day do not take into account the cultural and subsistence significance of activities such as fishing.⁷⁴

While the Supreme Court has given effective weight and consideration to CBA,⁷⁵ as has the EPA (though not entirely to the Court's satisfaction),⁷⁶ environmental justice issues have largely been ignored to the EPA's detriment.⁷⁷ The EPA had an

73. Catherine A. O'Neill, *Protecting the Tribal Harvest: The Right to Catch and Consume Fish*, 22 J. ENVTL. L. & LITIG. 131, 132 (2007) [hereinafter O'Neill, *Protecting the Tribal Harvest*].

74. *Id.* at 134.

75. See *Michigan v. EPA*, 135 S. Ct. 2699, 2706 (2015).

76. *Clean Air Act—Cost Benefit Analysis—Michigan v. EPA*, 129 HARV. L. REV. 311, 312–13 (2015). The Regulatory Impact Analysis, which included a calculation of costs and benefits, was issued alongside the final rule in order to comply with Executive Order 12,866. *Id.* at 312. The Executive Order required that agencies conduct CBA for “significant regulatory actions.” Exec. Order No. 12,866, 58 Fed. Reg. 51,735 (Sept. 30, 1993). “Significant regulatory actions” are defined (in pertinent part) as:

“Hav[ing] an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities[.]”

Exec. Order No. 12,866, 58 Fed. Reg. 51,735, 51,738 (Sept. 30, 1993).

77. Executive Order No. 12,898 was issued by President Bill Clinton. It requires,

To the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review, each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and

opportunity to include the impacts on Native American communities, some of which were brought directly before them in earnest opposition to the overruled CAMR. During the notice and comment period for the final CAMR, the National Congress of American Indians and Treaty Tribes issued comments discussing the harmful effects of un- and under-regulated mercury emissions, and the resulting havoc wrought on their communities.⁷⁸

The most problematic part about this is that the EPA issued a RIA quantifying the costs of industry compliance, discussing the dangers of mercury pollution in general terms, and specifically quantifying only the harms to recreational anglers who consumed their catch as the purported benefits.⁷⁹ This is the same route taken by the EPA seven years later, still armed with the same information from tribal members, and still largely ignoring the impacts and harms their communities face by solely incorporating the harms of methylmercury consumption by recreational anglers and their children calculated through IQ loss.⁸⁰ In fact, the EPA conceded that Native American populations would remain vulnerable when CAMR was proposed.⁸¹ Specifically, forty-five percent of the entire Native American population subject to the reach of the government of the United States (and thus the impacts of its regulations) would be exposed to “unsafe levels of utility-attributable mercury”⁸²

The effects on individual tribes and communities have come to light through studies conducted by legal scholars, and by the outcry of many tribal and community members themselves. In particular, tribes from coastal areas, specifically the Pacific Northwest, Great Lakes region, and the Northeastern United States have expressed concern over the bioaccumulation in the fish and the problems that persist because of its infiltration. In the Pacific Northwest, the Columbia River Basin is a vital resource for tribal fishing; one study (based on figures gathered by

possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of the Mariana Islands.

Exec. Order No. 12,898, 59 Fed. Reg. 7629 (Feb. 16, 1994).

78. The EPA was aware of the impacts in Native American Populations, which arose under the notice and comment period for CAMR, which was effectively invalidated under the decision *New Jersey v. EPA*. See O’Neill, *Environmental Justice in the Tribal Context*, *supra* note 72, at 516, 534.

79. See FINAL REGULATORY IMPACT ANALYSIS, *supra* note 64.

80. See *id.* at 7–25.

81. O’Neill, *Protecting the Tribal Harvest*, *supra* note 74, at 136 (citing Proposed National Emissions Standards for Hazardous Air Pollutants, 69 Fed. Reg. 4652, 4709) (Jan. 30, 2004) (to be codified at 40 CFR pts. 60, 63).

82. O’Neill, *Environmental Justice in the Tribal Context*, *supra* note 72, at 517.

the EPA)⁸³ captured the increased risk of contamination in Native American peoples versus the general population:

Whereas someone consuming at the general population average rate (here, 7.5 grams [of fish]/day) is currently exposed to excess cancer risks ranging from 1 in 100,000 to 1 in 10,000, a tribal member consuming subsistence rates as documented by Harris and Harper (540 grams/day) is currently exposed to cancer risks up to nearly 1 in 100. The disparity is stark, *with tribal members facing risks perhaps 100 times that of the general population.*⁸⁴

Another study conducted by the California Department of Natural Resources takes note of the detrimental effect that the loss of traditional food sources has on tribal members. Focusing on the Karuk Tribe, a subsistence fishing tribe, the study demonstrated that the lack of availability of fish, due in part to contamination, has led to a “host of diet related illnesses among Native Americans . . .”⁸⁵

In other circumstances, the EPA gave figures that were misleading and not representative of true consumption levels of subsistence fishing populations. In the CAMR RIA, the EPA assumes an average fish consumption rate of twenty grams a day,⁸⁶ a figure far below that of the Harris and Harper study noted above. Though the figures come from studies conducted on different tribes, the EPA considered this an accurate figure for a subsistence fishing population.⁸⁷

Contamination and increasingly limited access to a vital resource impacts a tribe’s ability to practice their traditional subsistence lifestyle, and presents further harms that fall into quantifiable categories. Increased medical costs for a population that undoubtedly suffers a higher risk of IQ loss, behavioral disorders, and the host of other disorders, diseases, and symptoms highly associated with increased mercury levels is just one area of would-be quantifiable risk assessment. This can result in loss of future opportunities in the form of skilled jobs and ultimate

83. O’Neill, *Protecting the Tribal Harvest*, *supra* note 74, at 137.

84. *Id.* (emphasis added).

85. KARI MARIE NORGAARD, THE EFFECTS OF ALTERED DIET ON THE HEALTH OF THE KARUK 9 (2005). These diet-related illnesses include “diabetes, obesity, heart disease, tuberculosis, hypertension, kidney troubles, and strokes.” *Id.* See also *Health Disparities Experienced by American Indians and Alaska Natives*, MORBIDITY & MORTALITY WKLY. REP. 1 (Aug. 1, 2003), <https://www.cdc.gov/mmwr/pdf/wk/mm5230.pdf> (indicating that Native Americans and Alaskan Natives are two to three times as likely as all other ethnic populations combined to face these types of illnesses and symptoms).

86. O’Neill, *Environmental Justice in the Tribal Context*, *supra* note 72, at 524.

87. *Id.* at 524–25.

earning potential, setting affected children behind their peers and keeping them there. Other impacts could be quantified in loss of potential fish sales as well. There are some aspects of this injustice that are not quantifiable per se, but instead embody substantive legal rights that should extend far beyond the reach of CBA. These are discussed below.

b. Native American Communities Have Legal Rights to Apportioned Fisheries That Have Been Largely Ignored in Modern Environmental Regulation

Many Native American communities, especially across the Northeastern, Great Lakes, and Pacific Northwest regions of the United States have apportioned fishing rights that have been secured through treaty agreements and rights.⁸⁸

Perhaps the most glaring and relevant omission in the EPA's final RIA for the mercury ruling challenged in *Michigan v. EPA* is the exclusion of Native American peoples in their final calculation for the benefits of regulating mercury.⁸⁹ In a dominant society, as the EPA clearly established, activities such as fishing and consuming catch are considered primarily recreational and economic in nature.⁹⁰ While this is true on a large scale, this school of thought blatantly erases communities that subsist on fish, not only by consumption, but also through their ability to sell their catch.⁹¹

Professor Catherine O'Neill makes an interesting point regarding this large area of United States law that remains relatively ignored, especially in regards to environmental justice. O'Neill notes that many Native American tribes were granted treaty rights, which often included access to vast swaths of land and, in the case of fishing tribes, access and apportionment rights to catch fish and consume as needed.⁹² Though not all tribes gained their rights through treaties,⁹³ many tribes did. Two very pertinent examples include tribes in the Pacific Northwest region and the Great Lakes region, in particular the Lake Superior

88. O'Neill, *Environmental Justice in the Tribal Context*, *supra* note 72, at 499.

89. See FINAL REGULATORY IMPACT ANALYSIS, *supra* note 64.

90. See *id.*

91. See O'Neill, *Environmental Justice in the Tribal Context*, *supra* note 72, at 506 (stating that treaties protecting fishing rights have been recognized to include both "tribal members' right to fish in the ceded area, but also their right to consume the fish they catch or to sell it to others for others' consumption").

92. *Id.* at 505–06 n.47.

93. *Id.* (noting that some tribes gained right through "executive orders and other federal laws").

Chippewa.⁹⁴ These treaties granted rights to the Chippewa to catch, consume, and sell or trade fish.⁹⁵ Professor O'Neill importantly notes that treaties are considered laws that deserve the highest deference; they reside in the hierarchy of laws just below the Constitution, are considered "the supreme law of the land", and ultimately fall beyond the scope of CBA.⁹⁶ Unfortunately, consideration of these treaties and their importance failed to make the cut in the EPA's final promulgated regulation.

One of best opportunities that the EPA had when quantifying the benefits of increased regulation of mercury emissions was to consider the inability to replace fish, the industries, and lifestyles that they comprise and complement. Although the fishing industry could likely be quantified, the cultural significance of a bygone resource upon which a population has been dependent for centuries is harder to quantify. The fact of the matter is, fishing for subsistence populations is an activity that cannot be replaced. Fishing is an activity of identity, and it serves as a very important tradition to the people who practice it.⁹⁷ There are some things that simply have no replacement; once they are gone or impaired, they cannot be fixed or returned.⁹⁸ Put bluntly, subsistence fishing tribes cannot go fishing for tofu cubes in Lake Superior or Puget Sound. A right with such high cultural importance has no substitute.

Professor O'Neill coins an interesting phrase and accompanying concept, which is specifically applicable in a situation such as this. She notes that agencies punt the issue; they practice "risk avoidance" as opposed to either "risk reduction," or attacking the impacts of a particular problem from the source.⁹⁹ For example, the EPA issues fish consumption advisories, warning people about the dangers of high fish consumption and essentially telling the population to consume less

94. *Id.* at 506.

95. *Id.*

96. *Id.* (citing *Worcester v. Georgia*, 31 U.S. 515, 531 (1832)).

97. O'Neill, *Environmental Justice in the Tribal Context*, *supra* note 72, at 509.

98. O'Neill, *Protecting the Tribal Harvest Fish*, *supra* note 74, at 139.

99. O'Neill, *Environmental Justice in the Tribal Context*, *supra* note 72, at 512; *see also* Catherine A. O'Neill, *Risk Avoidance, Cultural Discrimination, and Environmental Justice for Native Peoples*, 30 *ECOLOGY L.Q.* 1 (2003) (describing the detrimental impacts of risk avoidance in Native American communities); Catherine A. O'Neill, *Variable Justice: Environmental Standards, Contaminated Fish, and "Acceptable" Risk to Native Peoples*, 19 *STAN. ENVTL. L. J.* 3 (2000); Catherine A. O'Neill, *Mercury, Risk, and Justice*, 34 *ENVTL. L. REP.* 11070 (2004).

fish, especially larger, predatory fish.¹⁰⁰ As Professor O'Neill notes, such risk avoidance fails to integrate other ecological and environmental effects, such as the bioaccumulation of the food chain in other mammals, the presence in the water and soil, and the fish themselves.¹⁰¹ Risk avoidance fails to incorporate the other harmful impacts of pollution and results in further detriment not only to Native American populations, but society at large.

Furthermore, there are some federalism issues at play regarding the regulatory structure of hazardous pollutants and where they should be regulated.¹⁰² In recent years, the EPA has struck down beneficial use regulations regulated under the Clean Water Act.¹⁰³ The Clean Water Act gives much more deference to individual states than does the Clean Air Act, which controls air quality regulation, primarily from a federal standpoint.¹⁰⁴ While the Clean Water Act is largely outside of the scope of this analysis, it warrants inclusion here as there is pending litigation over where beneficial uses, primarily regarding subsistence fishing and the rights of Native American peoples.¹⁰⁵ Instead of bolstering CBA under the Clean Air Act regulations, as was the issue in *Michigan v. EPA*, the EPA is forcing the individual states to essentially rewrite their water quality standards in order to combat the effects of mercury poisoning and the effects on fish-consuming populations.¹⁰⁶ Not only does this frustrate the already complex federalism structure, but it is only a reactionary measure as much of the mercury found in water and fish comes from air

100. O'Neill, *Environmental Justice in the Tribal Context*, *supra* note 72, at 512.

101. *Id.* (stating that risk avoidance fails to measure "the harms that contamination visits on non-human species, such as loons and mink, who obviously cannot read fish consumption advisories.").

102. The federalism issues discussed in this section are strictly vertical; they apply to the cooperative federalism structure that comprises the Clean Air Act and the Clean Water Act. Although important to mention in this note, a more in-depth analysis is beyond the scope of the argument presented in this Article.

103. 33 U.S.C. § 1313(c)(2)(b) (2012).

104. *Id.* Under the Clean Air Act, states submit State Implementation Plans that must be approved by the EPA. 33 U.S.C. § 1313(e) (2012). In contrast, the Clean Water Act grants deference to states on how to monitor and allocate water resources subject to overarching federal oversight.

105. See Sean McLernon, *Maine Sues EPA Over Control of State's Tribal Waters*, LAW 360, (July 7, 2014), <http://www.law360.com/articles/555064/maine-sues-epa-over-control-of-state-s-tribal-waters> (indicating that Maine has brought a lawsuit against the EPA seeking a "declaration that its environmental jurisdiction applies uniformly throughout the state, including waters within Indian territories.").

106. *Id.*

pollution.¹⁰⁷ Moreover, it places the states into a hard position by forcing them to regulate something that they cannot necessarily control,¹⁰⁸ and punts the issue by not regulating the issue at the source.¹⁰⁹

IV. Bayesian Cost-Benefit Analysis Including the Impacts on Cultural Fish Consumption

The primary idea behind Bayesian¹¹⁰ Cost-Benefit Analysis is the incorporation of previously “unquantified” benefits into the overall equation of CBA.¹¹¹ This requires the agency experts to “make reasonable guesses about the harms or benefits from regulations” despite occasions “where they lack complete data”¹¹² According to Professors Jonathan Masur and Eric Posner, these preliminary guesses constitute Bayesian prior probabilities. “While agencies should be permitted to ‘guess’—that is, supply a subjective prior probability—they must also be required to update their estimates as they gain new information.”¹¹³ This is especially appropriate given the administrative law principles surrounding *Chevron* deference;¹¹⁴ the court system defers to agencies as they make these kinds of decisions.

The primary problem with the EPA’s analysis is that they did not update their primary monetized benefits with which they marched through the courtroom door. The recreational angler and

107. John Myers, *Study: Most Mercury in Lake Superior Comes from Atmosphere*, DULUTH NEWS TRIB. (Jan. 13, 2016), <http://www.duluthnews-tribune.com/news/3924020-study-most-mercury-lake-superior-comes-atmosphere>.

108. ENVIRONMENTAL PROTECTION AGENCY: CROSS-STATE AIR POLLUTION RULE (CSAPR), <https://www.epa.gov/csapr> (last visited Feb. 26, 2017).

109. See BASIC INFORMATION ABOUT MERCURY, *supra* note 51.

110. Eric W. Weisstein, *Bayesian Analysis*, MATH WORLD—A WOLFRAM WEB RESOURCE, <http://mathworld.wolfram.com/BayesianAnalysis.html> (last visited Feb. 26, 2017) (“Bayesian analysis is a statistical procedure which endeavors to estimate parameters of an underlying distribution based on the observed distribution.”).

111. Masur & Posner, *supra* note 15, at 100–13.

112. *Id.* at 92.

113. *Id.* Professors Masur and Posner went on to list clarifying recommendations for agencies engaging in Bayesian CBA:

In particular, agencies should be required (1) to provide a mechanism for empirically evaluating their estimates after the regulation is issued; (2) to revisit and update their earlier estimates in light of what subsequent studies reveal; and (3) to use consistent estimates across agencies. We describe our proposal as loosely “Bayesian” because of the emphasis on the importance of updating priors as an institutional solution to the problem of regulatory uncertainty.

Id. at 92–93.

114. See *Chevron U.S.A., Inc. v. Nat. Res. Def. Council, Inc.*, 467 U.S. 837 (1984).

fish consumption category had been put through the fire, so to speak, as it was the basis for the previous mercury standards that were overruled.¹¹⁵ The most heavily impacted communities presented the EPA with concerns about mercury contamination, yet these communities were effectively left out of the solution equation.¹¹⁶ While some studies have shown that recreational fishing can pose an increased risk because of elevated levels of methylmercury,¹¹⁷ this remains only one area of quantified risk, as shown by the EPA,¹¹⁸ in a country where many of the citizens consume fish.

Some commentators believe that while CBA is a popular tool that has been utilized in legislation and rulemaking, the constraints of its rigid application need to be recognized, in addition to what exactly CBA does, and is intended to do.¹¹⁹ Simply put, CBA is a decision procedure that can be used as a less expensive alternative to other tools.¹²⁰ With this critique comes the urging, that because CBA is a decision procedure, and not a moral one, CBA needs to be kept in context as it is utilized.¹²¹ CBA also needs to be accommodating to alternative means in which to measure unquantified benefits and non-monetized values, like the benefits of protecting resources of high cultural significance, among others.¹²²

There are conflicting views on how best to monetize unquantified benefits, or how to value them in a non-monetary manner. While Bayesian analysis relies on experts' relevant experiences and estimates, it is still difficult to assign a price value to something that does not have a monetized value. Natural resources often fall into this category. A rather simple example would include forest preservation and the associated health benefits with cleaner air. While it is possible to monetize, at least to some extent, the improved health benefits associated with clean air, it is much harder to assign a monetary value to something like

115. Standards for Performance for New and Existing Sources: Electric Utility Steam Generating Units, 70 Fed. Reg. 28,606 (May 18, 2005) (to be codified at 40 C.F.R. pts. 60, 72, 75).

116. O'Neill, *Environmental Justice in the Tribal Context*, *supra* note 72, at 534–36.

117. Wallace, *supra* note 68, at 13.

118. See *Michigan v. EPA*, 135 S. Ct. 2699, 2706 (2015).

119. Adler & Posner, *supra* note 15, at 168.

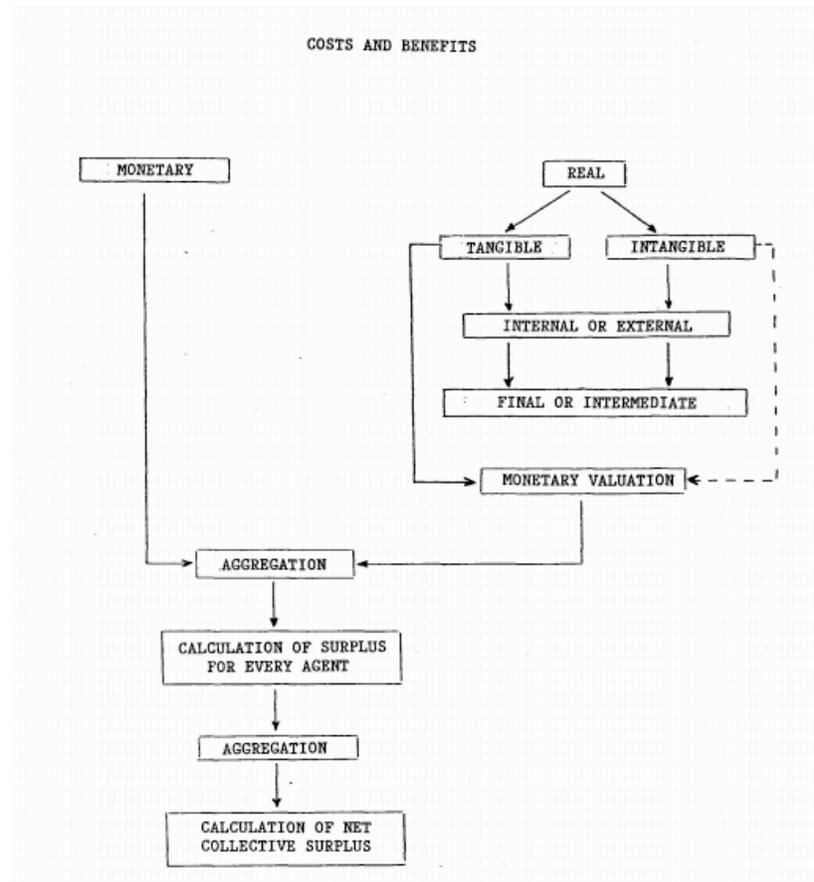
120. *Id.*

121. *Id.* The Supreme Court's (and federal government at large) move towards the use of CBA is pertinent to this analysis, an in-depth look at the structure of it at large is outside the scope.

122. *Id.*

the aesthetics of a forest. The clean air can be accounted for with the preservation of a forest, but individual values on larger resources vary. Some people place value in simply knowing such a place exists. The waters of CBA begin to get murky in these areas of analysis; in relation to this note, it is cultural value associated with cultural practices that are hard to quantify, and are thus simply left out of CBA.

One commentator has suggested that the best way to account for benefits is to split them into categories. He laid them out in the following chart, specifically pertaining to cultural examples of costs and benefits:¹²³



123. Dupuis, *supra* note 15, at 10.

The categorical separation occurs in four primary arenas (monetary/real,¹²⁴ tangible/intangible,¹²⁵ internal/external,¹²⁶ final/immediate¹²⁷) as exemplified above, and breaks the costs and benefits down into a more representative example, as these categories include the preciously unquantified benefits.¹²⁸ Admittedly, identification into each of these categories can be extremely difficult, which is one of the reasons that so many of them are not included in larger cost-benefit analyses. Professor Dupuis noted:

The fact is that the implications of projects in practically every case concern far larger areas and populations than those under the direct responsibility of the authorities concerned . . . [Additionally], [t]he various implications of a project may vary in the time they take to appear or disappear.¹²⁹

These categories bolster the framework of Bayesian CBA, by allowing the previously unquantified benefits to be exemplified and presented, instead of simply allowing agencies to exclude benefits that could not be monetized from CBA. Unfortunately, this was the route taken by the EPA in the case at issue in *Michigan v. EPA*, and has been a route taken by the EPA for many years.¹³⁰

124. *Id.* Further:

Real costs and benefits, for their part, are not expressed in money terms. They are real in the sense that it is they that affect the general level of satisfaction of society. Since they relate to the development of individual and social values their nature is complex. Sometimes impossible to quantify they are, in most cases, difficult at the very least even to identify clearly.

Id. at 7 (emphasis in original).

125. *Id.* at 7–8 (“Tangible costs and benefits refer to those to which a market value can be assigned, either directly or indirectly, by the various methods we have described. Intangible costs and benefits are those for which a market valuation proves impossible or is completely meaningless.”).

126. *Id.* at 8. Dupuis describes internal and external costs and benefits as vital to analyses that include qualitative components, such as cultural value and significance. *Id.* Specifically, “an externality is considered to exist where there is interdependence but no compensation Internal costs and benefits are those directly related to the implementation of the project whereas external costs and benefits are all those inferred by the project.” *Id.*

127. *Id.* at 9 (“A cost or benefit is ‘final’ if it is borne by or directly benefits the end consumer. An intermediate cost or benefit arises at the level of the production of other goods or services and will therefore affect the welfare of consumers (measured in terms of surplus) only in an indirect manner.”).

128. *Id.* at 10.

129. *Id.* at 8. While calculation of unquantified benefits is important, actual calculation of the unquantified benefits at issue here are beyond the scope of this analysis.

130. Adler & Posner, *supra* note 15, at 175–76.

a. *The EPA Only Quantified the Costs to Recreational Anglers Who Consume Their Catch; Other Non-Monetized Benefits Should Be Assumed and Accounted For, and as a Result, the Direct Benefits Would Greatly Increase*

According to the Supreme Court in *Michigan v. EPA*, some form of CBA must be conducted; however, as Justice Scalia noted in the opinion, it need not be completely formalized.¹³¹ In *Michigan*, the EPA described their quantified benefits as follows:

The monetized benefits from reductions in mercury emissions, calculated only for children exposed to recreationally caught freshwater fish, are expected to be \$0.004 to \$0.006 billion in 2016 using a 3% discount rate and \$0.0005 to \$0.001 billion using a 7% discount rate. The annual social costs, approximated by the compliance costs, are \$9.6 billion (2007\$) and the annual monetized net benefits are \$27 to \$80 billion using 3% discount rate or \$24 to \$71 billion using a 7% discount rate.¹³²

This process, while used by most agencies in regulatory CBA, presents a limited perception of the direct benefits derived from mercury regulation, with the glaring omissions of benefits to other human activity and well-being. In fact, the EPA acknowledges this:

EPA was unable to quantify or monetize all of the health and environmental benefits associated with the final MATS Rule. EPA believes these unquantified benefits could be substantial, including the overall value associated with HAP reductions, value of increased agricultural crop and commercial forest yields, visibility improvements, and reductions in nitrogen and acid deposition and the resulting changes in ecosystem functions.¹³³

Professors Masur and Posner very candidly note that benefits are often much harder to identify and quantify than the costs of something like industry compliance, and they hint at the internal biases of CBA when it is applied in a very strict form (as it often is in regulatory measures).¹³⁴ Unfortunately, this often results in leaving very important benefits by the wayside, which gives only a fractured picture of what should be an otherwise holistic analysis.

131. *Michigan v. EPA*, 135 S. Ct. 2699, 2711 (2015) (“We need not and do not hold that the law unambiguously required the Agency, when making this preliminary estimate, to conduct a formal cost-benefit analysis in which each advantage and disadvantage is assigned a monetary value.”).

132. FINAL REGULATORY IMPACT ANALYSIS, *supra* note 64, at ES-1.

133. *Id.* at ES-9.

134. Masur & Posner, *supra* note 15, at 184.

What about the host of other problems that stem from methylmercury ingestion? While a loss in IQ points is certainly a large concern, and in some circumstances may even encompass other problems associated with a drop in IQ, the EPA did not calculate these other impacts. As mentioned earlier, the EPA only calculated the impacts anticipated from a drop in potential income.¹³⁵ Thus, the EPA's analysis left out the benefits in curbing the effects on other organs and decreasing behavioral disorders, impaired motor skills, and other identified impacts.¹³⁶

Professor O'Neill discusses a few problems with this analysis, especially when examining the traditions and livelihoods that are incorporated in many Native American communities. These values do not capture the importance of other roles filled in the community. For instance, things like lost productivity are not measured, which is something that other agencies have measured.¹³⁷ While there may be an argument that this figure is rolled into the loss of potential income, the addition of this calculation would no doubt bolster the EPA's analysis. These two calculations provide just two examples of other areas in which the EPA could have expanded their calculations to close in on the CBA balance threshold, and in a major way. By including a population that requires vital attention due to cultural significance with a threatened resource and increased threats to this resource, their values could have (and still can) climb higher than a similar comparison with a subset of dominant society.

The EPA quantified the loss in individual IQ points in both the CAMR RIA and the Final RIA, and used the same criteria for each. The 2005 CAMR RIA quantified each lost IQ point at \$8,807 (adjusted for inflation for the year 2015, the value reaches \$10,688.22 per IQ point).¹³⁸ This is the bare minimum; it is only one subsection of the greater population of the United States, and only one quantified benefit calculated for one negative impact of methylmercury (otherwise a benefit for regulation). In addition, the EPA stated that, though the Native American communities would be adversely affected by the methylmercury accumulation in a primary food source, the impacts would not be very large

135. FINAL REGULATORY IMPACT ANALYSIS, *supra* note 64, at 4-2.

136. See Jensen & Ruzickova, *supra* note 60, at 18 (describing the effects of methylmercury poisoning on children around the world).

137. See Masur & Posner, *supra* note 15 (discussing the different routes government agencies having taken when quantifying costs and benefits in the past).

138. O'Neill, *Environmental Justice in the Tribal Context*, *supra* note 72, at 514.

because of their location; most Native American communities were not located next to large EGUs.¹³⁹ It is important to note that to claim this is to ignore the global impacts of emissions, which have become an increasing problem since the rise of the industrial age.

b. Issues to Consider Going Forward: The Participation of the United States in International Emissions Standards.

Not all of the emissions come directly from utilities and industrial sites in the United States. In fact, some recent studies show that some mercury emissions in the Upper Great Lakes¹⁴⁰ could be coming from as far away as China.¹⁴¹ Emissions do not obey political or jurisdictional boundaries just because a smokestack points skyward and it does not mean the contents it carries remain suspended there.

One study applied the lens of the widespread effects of mercury pollution; the results indicated decreased IQ levels in children, with costs ranging anywhere from \$2.2–\$43.8 billion in lost productivity annually (\$2.64 billion–\$52.5 billion when adjusted for inflation in the year 2014). While these numbers clearly exceed populations of Native American children alone, these figures provide one example of some of the available information that could have been analyzed alongside the information the EPA ended up using. Put into a larger context, this one measurement begins to give a shape to the vast, negative impacts that require a global solution. While jurisdictional constraints require the EPA to regulate within the borders of the United States, the global impacts of mercury emissions (among others) should begin to prompt global discussions in the future.¹⁴²

Conclusion

Seeing as the Supreme Court has unanimously moved in the direction of mandating CBA for major regulations, the EPA (and other agencies) need to expand the scope of their CBA, including those benefits not previously considered “quantifiable” through Bayesian CBA. So far, the EPA has largely ignored this new

139. *Id.* at 523.

140. Upper Great Lakes have historically been used to refer to Lakes Superior, Huron, and parts of Lake Michigan. *See Myers, supra* note 108.

141. *See id.*

142. While the Paris Climate Talks focused primarily on greenhouse gas emissions, the talks provided an excellent drawing board for approaching emissions control on a global scale.

requirement. Specifically, the EPA issued a legal memorandum claiming that they followed the required regulations by including the cost of compliance incrementally and inherently through the MACT standards (despite being overruled).¹⁴³ The primary problem with this is that the Court has already ruled that this is an inadequate way to conduct CBA, thus the EPA is setting themselves up to be overruled again. The EPA has an excellent opportunity to include more benefits resulting from heightened regulations of mercury, and should do so in order to avoid being overruled in the future.

One of the best opportunities that the EPA has to expand its analysis with regards to benefits is Native American populations that rely on subsistence fishing; the impacts that accrue with populations that consume higher concentrations of fish yield higher benefits. This one area could greatly bolster the EPA's analysis in the future, and may serve as a catalyst for other federal agencies moving forward. As explained above, this is primarily done through Bayesian CBA, a school of thought that works to quantify benefits that are by their very nature (and the existing structure of law and economics) unquantifiable. These analyses will help the government and the regulations promulgated by agencies, particularly in regards to environmental impacts, to keep vulnerable populations and issues of deep cultural significance protected. These issues are part of the equation and should be treated as such.

For better or for worse, regulation increases when negative impacts of processes, products, and activities in daily life are discovered. Individuals and communities certainly want to limit, to the extent possible, the vague and sometimes unforeseen problems that could arise in the future. This is especially true in regards to finite and precious resources, and ultimately human life and its quality. These important things are threatened by permanent change for which there is no remedy. It is incumbent upon the United States as a nation to address these problems up front for what they are, and work to mitigate the negative impacts as much as possible. This work includes the most vulnerable among us; despite perceived population size and location, acceptable risk is ultimately no greater for one person than it is another. Incorporating their risk and the value of their traditions is vital as the United States moves forward in the twenty-first century.

143. *Michigan v. EPA*, 135 S. Ct. 2699 (2015).