

SOLVING THE PUZZLE OF NUTRIENT OVERLOAD PIECE BY PIECE

Mary Beth Blauser*

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Introduction

Nutrient overload in waterbodies is a pressing issue around the globe. Excess nutrients lead to dead zones and toxic algae, both of which endanger human and aquatic health. In the United States, a few strategies for addressing nutrient overload, such as narrative and numeric nutrient standards, are already in place. However, there are many missing pieces to the puzzle of nutrient

overload. The first is the need for state numeric nutrient standards. The second missing piece is the need for regulation of nonpoint sources. The last missing piece is the need for better local land use regulations.

Section 303(c)(4)(B) of the Clean Water Act (“CWA”) authorizes the U.S. Environmental Protection Agency (EPA) to promulgate rules to achieve water quality standards consistent with the CWA. The purpose of the CWA is to “restore and maintain the chemical, physical, and biological integrity” of the waters of the United States.¹

At the time the CWA was drafted, it lacked specific language addressing numeric nutrient standards for phosphorus and nitrogen.² The EPA Administrator relies on the broad language in the CWA to promulgate rules to achieve the stated goal of the CWA.³ Under this broad language, the EPA Administrator promulgates numeric nutrient standards. Nationwide numeric nutrient standards are impractical because different waterbodies are capable of supporting varying concentrations of nutrients, and one size does not fit all. Therefore, the EPA charged each state with formulating its own numeric nutrient standards based on each distinctive waterbody.⁴

* J.D. candidate, Vermont Law School, 2011; B.B.A., Ohio University, 2008. Special thanks to Trent Dougherty and Will Reisinger, staff attorneys for the Ohio Environmental Council, for assistance in writing this article.

¹ Federal Water Pollution Control Act Amendments of 1972 § 101(a), 33 U.S.C. § 1251(a) (2010).

² See Clean Water Act of 1977, Pub. L. No. 95-217, 91 Stat. 1566 (1977).

³ The Administrator shall prepare new water quality standards for navigable waters “in any case where the Administrator determines that a revised or new standard is necessary to meet the requirements of this Act.” Clean Water Act of 1977 § 303(C)(4)(B), 33 U.S.C. § 1313(c)(4)(B).

⁴ Throughout this paper, when the phrase nutrient standard is used, nitrogen and phosphorus are the only two nutrients intended. Technically the phrase nutrient standard includes four parameters. These four parameters include total nitrogen, total phosphorus, chlorophyll-a, and clarity. An EPA study from 2008 reports

However, under the CWA, the ultimate responsibility of rulemaking for numeric nutrient standards falls on the EPA if individual states fail to take action.⁵ While it is more convenient for a state to initiate the rulemaking process, states are not legally required to do so under the CWA.⁶

Phosphorus and nitrogen are particularly problematic for water quality standards. Increased levels of nitrogen and phosphorus in water lead to “nutrient loading.”⁷ Nutrient loading results in harmful algae blooms, fish kills, impaired drinking water and “dead zones.”⁸ Under CWA section 303(c)(4)(B), the EPA Administrator has the power to regulate nitrogen and phosphorus levels in U.S. waters if individual states fail to do so.⁹

The complexity of the problem is exacerbated by the lack of nonpoint source regulation. Nonpoint sources include agricultural runoff, construction runoff, and residential fertilizer use.¹⁰ The CWA does not regulate these sources as strictly as

that “18 states had adopted numeric nutrient standards for one or more parameters for part of one or more waterbody types.” As of July 2010, no state had numeric nutrient standards for phosphorus and nitrogen, although several states had rule packages in the legislative and administrative process. The EPA can make the above statements because it is true that 18 states have “numeric standards” for clarity and chlorophyll-a, or a combination of nitrogen and/or phosphorus. But no state had numeric standards for all four parameters. EPA, OFFICE OF WATER, STATE ADOPTION OF NUMERIC NUTRIENT STANDARDS, EPA-821-f-08-007, 6 (Dec. 2008).

⁵ 33 U.S.C. § 1313(c)(4)(B).

⁶ *See id.*

⁷ *See* WORLD RESOURCES INSTITUTE, NUTRIENT OVERLOAD: UNBALANCING THE GLOBAL NITROGEN CYCLE (2007), available at http://earthtrends.wri.org/features/view_feature.php?fid=1&theme=2 (hereinafter “WRI”).

⁸ Cheryl Lyn Dybas, *Dead Zones Spreading in World Oceans*, 55 (7) *BIOSCIENCE* 552, 553 (July 2005).

⁹ CWA, *supra* note 3.

¹⁰ EPA, WHAT IS NONPOINT SOURCE POLLUTION? <http://water.epa.gov/polwaste/nps/whatis.cfm> (last visited September 5, 2010).

point sources.¹¹ Point sources must comply with the CWA and obtain a National Pollutant Discharge Elimination System (NPDES) permit to discharge pollutants.¹² The nonpoint sources increase the total amount of pollution that point sources must cleanup.

This article will examine the need for phosphorus and nitrogen numeric nutrient standards in Ohio. Ohio plays a vital role in reducing nutrient overload in the Gulf of Mexico and Lake Erie, two of the nation's most significant dead zones.¹³ Ohio has yet to promulgate numeric nutrient standards for nitrogen and phosphorus.

Part I of the article provides an overview of the CWA and the broad authority granted to the EPA Administrator to address the problem of nitrogen and phosphorus loading. Part II examines the problem of nutrient loading and the common sources of nitrogen and phosphorus pollution. Finally, Part III studies Florida's success in establishing numeric nutrient standards to uphold the purpose of the CWA and argues that similar action is needed in Ohio to address the urgent condition of Grand Lake St. Marys and Lake Erie. While this article is focused on action needed in Ohio, action in one or a few states is insufficient. Since this is a national problem, action must be taken by all states. For example, the Gulf of Mexico receives water from 41 percent of the

¹¹ See 33 U.S.C § 1329.

¹² *Id.* at § 1342.

¹³ Purdue University, Lake Erie Hypoxic Zone Doesn't Affect All Fish the Same, SCIENCE DAILY (Jan. 10, 2011) *available at* <http://www.sciencedaily.com/releases/2011/01/110110142001.htm>.

country,¹⁴ while the Chesapeake Bay receives flow from six surrounding states.¹⁵

I. The Clean Water Act: A Deceptive Name

One of America's greatest natural resources is water. The United States contains over 3.5 million miles of rivers and streams; 40.8 million acres of lakes, ponds, and reservoirs; 58,421 miles of ocean shoreline; and 5,559 miles of shoreline along the Great Lakes.¹⁶ However, no federal laws protected America's vast waters from pollution and degradation until 1948.¹⁷ The first federal law attempting to regulate water pollution was the Federal Water Pollution Control Act.¹⁸ In 1972, with science having grown more sophisticated and pollution having become more prevalent, Congress drastically amended the Federal Water Pollution Control Act.¹⁹ In 1977, the Act was amended again and dubbed the Clean Water Act.²⁰

¹⁴ STATE-EPA NUTRIENT INNOVATIONS TASK GROUP, AN URGENT CALL TO ACTION: REPORT OF THE STATE-EPA NUTRIENT INNOVATIONS TASK GROUP 11 (2009) [hereinafter STATE-EPA TASK GROUP] *available at* <http://www.epa.gov/waterscience/criteria/nutrient/nitgreport.pdf>.

¹⁵ *Id.*

¹⁶ STEVEN FERREY, ENVIRONMENTAL LAW 219 (Erwin Chemerinsky et. al. eds., Aspen Publishers 2004).

¹⁷ EPA, HISTORY OF THE CLEAN WATER ACT, <http://www.epa.gov/lawsregs/laws/cwahistory.html> (last visited July 23, 2010).; The lack of water quality and point source regulations caused severe outbreaks of waterborne diseases in the first half of the twentieth century that resulted in death. FERREY, *supra* note 16, at 226.

¹⁸ Ferrey, *supra* note 16, at 219.

¹⁹ Many sections of this bill have survived and are the foundation of the current Clean Water Act. EPA, SUMMARY OF THE CLEAN WATER ACT, <http://www.epa.gov/lawsregs/laws/cwa.html> (last visited July 23, 2010).

²⁰ EPA, *supra* note 17.

A. *Water Quality Standards*

The CWA attempts to ensure water quality standards²¹ by regulating pollution from point and nonpoint sources.²² Water quality standards are “goals for individual water bodies and provide the legal basis for control decisions under the Act.”²³ The four aspects of water quality standards are designated use, water quality criteria, antidegradation policy, and “general policies addressing implementation issues.”²⁴ States must designate uses of waterbodies as either agricultural, industrial, fish propagation, recreational, or public water supply purposes.²⁵ The EPA publishes water quality criteria which list maximum concentrations of pollutants allowances for waterbodies to meet their designated uses.²⁶ For example, water quality criteria are higher for recreational waters than for industrial waters because people are in contact with the water for activities such as boating and swimming. Thus the law requires elevated standards to ensure public health when people are in contact with the water.

²¹ Water quality standards are meant to protect the public health or welfare, enhance the quality of water, and serve the purposes of the CWA. 40 C.F.R. § 130.2(d) (2010).

²² Point source “means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agriculture stormwater dischargers and return flows from irrigated agriculture.” 33 U.S.C. § 1362(14). The CWA does not define nonpoint source. The major nonpoint source is runoff. *See Ky. Waterways Alliance v. Johnson*, 540 F.3d 466, 470 n.3 (6th Cir. 2008) (stating there is no statutory definition for nonpoint source and attempting to define the term.).

²³ 40 C.F.R. § 130.0(b) (2010).

²⁴ 33 U.S.C. § 1313(C)(2)(A); EPA, OVERVIEW OF IMPAIRED WATERS AND TOTAL MAXIMUM DAILY LOADS PROGRAM, <http://www.epa.gov/owow/tmdl/intro.html> (last visited July 28, 2010).

²⁵ 40 C.F.R. § 131.10 (2010).

²⁶ FERREY, *supra* note 16, at 247.

There are two types of water quality standards: numeric and narrative.²⁷ Numeric standards are the most effective and enforceable water quality standards.²⁸ Although numeric nutrient standards are most effective, it is legal for states to develop narrative water quality standards that use phrases such as “no visible foam” or “no odor.”²⁹ After a water quality standard is set, the next step is to consider whether the waterbody is impaired.³⁰ Following this determination, the waterbody is ranked in a priority system.³¹ A Total Maximum Daily Load (TMDL) is then developed for each specific waterbody.³² A TMDL is a goal for pollution reduction from point and nonpoint sources that enables the waterbody to meet the water quality standards.³³

B. Anti-Degradation Policies

Yet another piece to the puzzle are antidegradation policies. Each state must formulate an antidegradation policy for each waterbody.³⁴ The 1987 amendments to the CWA require that “state standards be sufficient to maintain existing beneficial uses of

²⁷ Fla. Pub. Interest Research Grp. Citizen Lobby, Inc. v. EPA, 386 F.3d 1070 (11th Cir. 2004).

²⁸ See generally *Am. Paper Inst., Inc. v. EPA*, 996 F.2d 346 (D.C. Cir. 1993).

²⁹ 40 C.F.R. § 131.11 (2010); See *Defenders of Wildlife v. Browner*, 909 F. Supp 1342, 1347 (D. Ariz. 1995) (allowing narrative water quality standards but finding that Arizona lacked implementation procedures for such standards).

³⁰ 33 U.S.C. § 1313(d); There are currently 39,986 impaired waters nationwide. EPA, NATIONAL SUMMARY OF IMPAIRED WATERS AND TMDL INFORMATION, http://iaspub.epa.gov/waters10/attains_nation_cy.control?p_report_type=T#imp_water_by_state (last visited July 28, 2010) (chart detailing the number of impaired waters in each state, then broken down by the cause of the impairment).

³¹ 33 U.S.C. § 1313(d)(1)(A).

³² 33 U.S.C. § 1313(d)(1)(C).

³³ See STATE-EPA TASK GROUP, *supra* note 14, at 19; 40 C.F.R. § 130.7(c)(1)(ii) (2010) (“TMDLs shall be established for all pollutants preventing or expected to prevent attainment of water quality standards.”).

³⁴ 40 C.F.R. § 131.12 (2010).

navigable waters, preventing their further degradation.”³⁵ A state’s antidegradation policy must ensure that “existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.”³⁶

C. NPDES Permitting

TMDLs are achieved by permitting point source polluters. The NPDES is the permitting program for dischargers of “pollutants³⁷ from any point source into waters of the United States.”³⁸ The EPA authorizes most states to administer the NPDES permitting programs for facilities within the states.³⁹ When reviewing permit applications, a state must ensure compliance with water quality standards for the receiving waterbody and compliance with the CWA and CWA regulations.⁴⁰ Publicly owned treatment works (POTWs), power plants, and concentrated animal feeding operations (CAFOs) are examples of facilities requiring NPDES permits because they are point source polluters.⁴¹

³⁵ PUD No. 1 of Jefferson Co. v. Wash. Dept. of Ecology, 511 U.S. 700, 705 (1994).

³⁶ *Id.* (quoting 40 C.F.R. § 131.12 (1993)).

³⁷ “Pollutant means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.” 40 C.F.R. § 122.2 (2010).

³⁸ 40 C.F.R. § 122.1(b)(1) (2010).

³⁹ New Hampshire, Massachusetts, and Idaho are the only states not authorized to run the NPDES program. EPA, NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM OVERVIEW, <http://cfpub.epa.gov/npdes/> (last visited July 28, 2010).

⁴⁰ 40 C.F.R. § 122.4 (2010).

⁴¹ EPA, CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFO) – FINAL RULE, <http://cfpub.epa.gov/npdes/afo/cafofinalrule.cfm> (last visited September 5, 2010).

D. Nonpoint Sources

While facilities classified as point sources must seek NPDES permits for pollutant discharges, nonpoint sources of pollutants are largely unregulated.⁴² Nonpoint source pollution accounts for nearly 50 percent of water pollution and includes:

excess fertilizers, herbicides, insecticides from agricultural lands and residential areas; oil, grease and toxic chemicals from urban runoff and energy production; sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks; salt from irrigation practices and acid drainage from abandoned mines; bacteria and nutrients from livestock, pet wastes and faulty septic systems, atmospheric deposition and hydromodification.⁴³

Congress has not regulated nonpoint sources because it regards such control as an infringement upon state and local land uses.⁴⁴ Instead, nonpoint sources are addressed with best management practices (BMPs).⁴⁵ The governor of each state must submit a report to the EPA Administrator for approval that “identifies those navigable waters within the State which, without additional action to control nonpoint sources of pollution, cannot reasonably be expected to attain or maintain applicable water quality standards.”⁴⁶ However, many state-administered BMPs are

⁴² See 33 USC § 1329(a)(1)(C) (requiring only the use of “best management practices”).

⁴³ WHAT IS NONPOINT SOURCE POLLUTION, *supra* note 10.

⁴⁴ See BUREAU OF LAND MANAGEMENT, WATER QUALITY LAW SUMMARY, *Chapter Five*, <http://www.blm.gov/nstc/WaterLaws/Chap5.html> (last visited September 5, 2010).

⁴⁵ 33 U.S.C. § 1329(a)(1)(C).

⁴⁶ 33 U.S.C. § 1329(a)(1)(A).

voluntary and not legally enforceable.⁴⁷ Financial incentives are provided to entice nonpoint source polluters to follow the BMPs.⁴⁸

Finally, the EPA Administrator has the authority to promulgate water quality rules to meet the requirements of the CWA, if a state fails to do so.⁴⁹ As the Florida Wildlife Federation explained, “[t]hat provision requires EPA to ‘promptly’ propose a new or revised water quality standard for a state once it has made a determination that the standard is necessary to meet the requirements of the CWA.”⁵⁰

II. Nutrient Loading: Too Much of a Good Thing

While nitrogen and phosphorus are beneficial organic compounds in reasonable amounts, excessive quantities can lead to catastrophic results.⁵¹ Nitrogen is the most prevalent gas in the atmosphere, but plants cannot utilize the gas until it has chemically transformed.⁵² In an undisturbed ecosystem, nitrogen is a precious commodity because it is only available to plants in small amounts.⁵³ However, human activities have created an abundance of nitrogen that threatens the health of the country’s water and aquatic life.⁵⁴

⁴⁷ Bureau of Land Management, *supra* note 47.

⁴⁸ *Id.*; See David Zarin, *Agriculture, Nonpoint Source Pollution, and Regulatory Control: The Clean Water Act’s Bleak Present and Future*, 20 HARV. ENVTL. L. REV. 515, 523-24 (1996).

⁴⁹ 33 U.S.C. § 1313(c)(4)(B).

⁵⁰ Complaint for Plaintiff at 2, Fla. Wildlife Fed’n., Inc v. Johnson, (N.D. Fla. 2008) (No. 4:2008cv00324).

⁵¹ WRI, *supra* note 7.

⁵² See *id.* (explaining the chemical transformation of nitrogen gas to nitrate compounds that plants can metabolize).

⁵³ *Id.*

⁵⁴ “Human activities contribute now contribute more to the global supply of fixed nitrogen each year than natural processes do, with human-generated nitrogen totaling about 210 million metric tons per year, while natural processes contribute about 140 million metric tons.” *Id.*

Nutrient overload causes eutrophication, which is “a plant-growth-promoting process resulting from accumulation of nutrients in lakes or other water bodies.”⁵⁵ Eutrophication is a slow, natural process that is accelerated by human activities.⁵⁶ It contributes to overpopulation of algae, decreased amounts of surface water available for recreation, and fish kills due to decreased levels of oxygen in water.⁵⁷ The increased amounts of algae make water unfit for swimming and hamper boating because boat propellers often get tangled in the algae.⁵⁸ Also, “eutrophic waters tend to be scummy, cloudy, or even soupy green.”⁵⁹

Additionally, eutrophication leads to dead zones, which are areas of water where little or no aquatic life can survive.⁶⁰ Due to the decreased levels of oxygen in dead zones, many fish swim away, while other forms of aquatic life, such as starfish, suffocate.⁶¹ Dead zones vary in size from “small areas of coastal bays and estuaries to huge areas of the open sea.”⁶² A recent study by the United Nations Environment Programme found that the number of dead zones throughout the world has increased every decade since the 1970s.⁶³ As of 2004, there were 146 dead zones

⁵⁵ Fareed A. Khan & Abid Ali Ansari, *Eutrophication: An Ecological Vision*, 71 (4) THE BOTANICAL REV. 450, 452 (Dec. 2005).

⁵⁶ *Id.*

⁵⁷ *Id.*

⁵⁸ *Id.*

⁵⁹ *Id.*

⁶⁰ Dybas, *supra* note 8 (explaining that dead zones are “coastal waters too low in oxygen to sustain life.”).

⁶¹ *Id.*

⁶² *Id.*

⁶³ Press Release, United Nations Environment Programme, Dead Zones as Big Threat to 21st Century Fish Stocks, (March 29, 2004), *available at*: <http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=388&ArticleID=4458&l=en&t=long> (last visited July 9, 2010).

worldwide.⁶⁴ Forty-three of the world's dead zones are located in U.S. waters.⁶⁵

A. *National and International Dead Zones*

The world's second largest dead zone is located in the Gulf of Mexico.⁶⁶ Due to varying weather patterns, each year the dead zone shifts in location and size.⁶⁷ In 2002, the largest recorded dead zone in the Gulf was 8,500 square-miles.⁶⁸ Agricultural runoff from the Mississippi River watershed is the leading contributor to dead zones in the Gulf.⁶⁹ Water from thirty-one states drains into the Mississippi River Basin, ending up in the Gulf of Mexico.⁷⁰ The Mississippi River Basin is more than 1,245,000 square miles in size.⁷¹ Many of the states in the Mississippi River Basin produce large amounts of agricultural crops, including all of the Corn Belt states.⁷² Rain washes

⁶⁴ Dybas, *supra* note 8.

⁶⁵ Dybas, *supra* note 8 at 554.

⁶⁶ Dybas, *supra* note 8 at 554.

⁶⁷ Dybas, *supra* note 8 at 554.

⁶⁸ This dead zone was roughly the size of New Jersey. Brian K. Sullivan, *Gulf of Mexico 'Dead Zone' is Smaller Than Expected*, BLOOMBERG, July 27, 2009, [http://www.bloomberg.com/apps/news?pid=newsarchive&sid=a1WsUp_sIqa4.](http://www.bloomberg.com/apps/news?pid=newsarchive&sid=a1WsUp_sIqa4.;); Henry Fountain, *Dead Zone in Gulf is Smaller Than Forecast but More Concentrated in Parts*, N.Y. TIMES, July 28, 2009, at D3, available at http://www.nytimes.com/2009/07/28/science/earth/28zone.html?_r=1&ref=henry_fountain.

⁶⁹ See Henry Fountain, *Dead Zone in Gulf is Smaller Than Forecast but More Concentrated in Parts*, N.Y. TIMES, July 28, 2009, at D3, available at http://www.nytimes.com/2009/07/28/science/earth/28zone.html?_r=1&ref=henry_fountain.

⁷⁰ EARTH SYSTEM SCIENCE EDUCATION ALLIANCE, GULF OF MEXICO DEAD ZONE http://essecourses.strategies.org/module.php?module_id=92 (last visited February 17, 2011).

⁷¹ EPA, THE MISSISSIPPI RIVER GULF OF MEXICO WATERSHED NUTRIENT TASK FORCE, THE MISSISSIPPI-ATCHAFALAYA RIVER BASIN, <http://www.epa.gov/msbasin/marb.htm> (last visited July 9, 2010).

⁷² Corn belt states include Indiana, Illinois, Kansas, Iowa, Missouri, and Nebraska. ENCYCLOPEDIA BRITANNICA, 2010.

fertilizers containing nitrogen and phosphorus off of crops and fields.⁷³ The runoff then migrates to the Mississippi River through the various waterways, that feed the Mississippi, including the Ohio River.⁷⁴

Another significant dead zone in the United States is located in the Chesapeake Bay.⁷⁵ A large land area drains into the Bay, which substantially contributes to high levels of pollution.⁷⁶ Every summer, an overpopulation of algae suffocates the Bay area.⁷⁷ This not only leads to impaired water quality, but also impacts the local economy by reducing the number of crabs and fish available to harvest.

After decades of failed promises and commitments from the federal government, President Barack Obama signed an executive order requiring federal agencies to develop and implement plans to restore and protect the Bay.⁷⁸ During George W. Bush's presidency, several individuals and not-for-profit organizations sued the EPA Administrator for failure to implement nutrient standards and formulate TMDLs for the Bay, which is a non-discretionary duty under the CWA.⁷⁹ The federal government

<http://www.britannica.com/EBchecked/topic/137792/Corn-Belt> (last visited July 12, 2010).

⁷³ Dybas, *supra* note 8, at 553.

⁷⁴ Dybas, *supra* note 8, at 553.

⁷⁵ Recorded dead zones in the Chesapeake have occupied approximately forty percent of the water and up to five percent of its volume. David Malmquist, *Dead Zones Continue to Spread*, Virginia Institute of Marine Science, Aug. 14, 2008, <http://www.vims.edu/newsandevents/topstories/2008-dead-zones-spread.php> (last visited July 9, 2010).

⁷⁶ Cynthia J. Aukerman, *Agricultural Diffuse Pollution Controls: Lessons for Scotland from the Chesapeake Bay Watershed*, 20 J. LAND USE & ENVTL. L. 191, 196 (2004).

⁷⁷ Janet Larsen, *Dead Zones Increasing in World's Coastal Waters*, USA TODAY (THE SOCIETY FOR THE ADVANCEMENT OF EDUCATION), Sept. 2004, at 29.

⁷⁸ See Exec. Order No. 13508, 74 Fed. Reg. 23,099 (May 15, 2009).

⁷⁹ Complaint at 1, C. Bernard Fowler v. EPA, (D.C. Cir. 2009) (No. 1:09-cv-00005-CKK).

settled the suit in 2010 because EPA officials stated that the agency shared the same goals as the plaintiffs and saw no reason to litigate issues filed under the Bush administration.⁸⁰ The settlement required the EPA to establish TMDLs for the Bay,⁸¹ expand its review of watershed permits, and issue new regulations for CAFOs and stormwater runoff.⁸² Legislation has been in place for years to give the EPA authority to clean up the Bay and enforce strict TMDLs.⁸³

However, the EPA has failed time and again to perform its non-discretionary duty to implement nutrient standards and enforce TMDLS. For the first time activists now have a legally binding settlement agreement to hold the EPA accountable. The Chesapeake Bay Foundation president described the settlement as “a game changer,” stating that “we’ve had promises before but never a legal document” that mandates the EPA to perform its duties under the CWA.⁸⁴

Dead zones are not just a problem in the United States; but also internationally.⁸⁵ Dead zones occur off the coasts of

⁸⁰ The suit was filed during the Bush administration, but settled during the Obama administration. Press Release, EPA, EPA Reaches Settlement in Chesapeake Bay Lawsuit, (May 11, 2010), *available at* <http://yosemite.epa.gov/opa/admpress.nsf/0/ac46af32562521d48525772000591133?OpenDocument>.

⁸¹ The settlement tasks the EPA to work with the six states to develop the TMDLs. This proves a lengthy and complicated process as it is the “largest and most complex ever developed in the nation, involving pollution sources throughout a 64,000 square-mile watershed.”). *Id.*

⁸² *Id.*

⁸³ See CHESAPEAKE BAY COMMISSION, *Policy for the Bay*, <http://www.chesbay.state.va.us/history.html> (last visited Sept.5, 2010).

⁸⁴ Ashley Halsey III, *A Better Bay Chesapeake Settlement Has EPA Agreeing to Enforce Pollution Reduction Goals*, WASH. POST, May 16, 2010, <http://www.washingtonpost.com/wp-dyn/content/article/2010/05/11/AR2010051105212.html>.

⁸⁵ Dybas, *supra* note 8 at 553.

Australia, Brazil, China, Japan, and New Zealand.⁸⁶ The largest dead zone in the world is located in the Baltic Sea and, at some points, covering up to 120,000 square kilometers.⁸⁷

The above locations are just a few of the roughly 150 dead zones located all over the world.⁸⁸ No waterbody is immune to the problem of dead zones, which can occur at a variety of depths in freshwater or saltwater.⁸⁹

B. A Mixed Bag of Sources

The causes of nutrient overload and dead zones can be traced to human activity. Human population growth and the growing demands put on natural resources exacerbate nutrient overload. Some of these sources include “urban and suburban stormwater runoff, municipal wastewater treatment systems, air deposition, agricultural livestock activities, and row crops.”⁹⁰ While some levels of nitrogen and phosphorus are found naturally in water, human activity elevates these levels to a degree that causes hypoxic conditions, eutrophication, and dead zones.⁹¹ Depending on the surrounding land use, the source of the nitrogen and phosphorus varies. For example, the dead zone in the Gulf of Mexico is largely attributed to agricultural runoff because the

⁸⁶ *Id.*

⁸⁷ *Id.* at 554.

⁸⁸ 150 ‘Dead Zones’ Counted in Oceans, MSNBC.COM, Mar. 29, 2004, <http://www.msnbc.msn.com/id/4624359/>.

⁸⁹ Ed Brayton, *Great Lakes Dead Zone a Mystery*, MICHIGAN MESSENGER, Sept. 1, 2008, <http://michiganmessenger.com/3428/great-lakes-dead-zone-a-mystery>.

⁹⁰ STATE-EPA TASK GROUP, *supra* note 14 at 9.

⁹¹ Press Release, World Resources Institute, World’s Waters Choking from Meat Consumption and Other Human Activities (July 21, 2009), *available at* <http://www.wri.org/press/2009/07/worlds-waters-choking-meat-consumption-and-other-human-activities>.

Mississippi River flows through the Corn Belt.⁹² However, in the Chesapeake Bay area, stormwater and municipal wastewater are the major contributors of nitrogen and phosphorus, due to population density surrounding the Bay.⁹³

C. Suburban and Urban Runoff

Urban and suburban stormwater runoff contains phosphorus and nitrogen from residential fertilizer use.⁹⁴ The application of household fertilizers is considered a nonpoint source for which no permit is needed under the CWA, but runoff from the fertilizer will likely end up in a neighboring waterbody. Per acre, lawn fertilizer is applied at a rate ten times higher than fertilizer for agricultural use.⁹⁵ The National Academy of Sciences has determined that residential lawn fertilizer is “a significant component of the total pesticide problem.”⁹⁶ A lush, green lawn comes at the high price of polluting our water.

If any runoff enters a municipal storm sewer system, the municipality must obtain an NPDES permit to discharge it. Therefore, when numeric nutrient standards are in place, this runoff will be regulated through the NPDES permitting system.⁹⁷ Municipal wastewater treatment plants discharge phosphorus and

⁹² See STATE-EPA TASK Group, *supra* note 14 at 13 (detailing the percentages each source contributes to the total nitrogen and phosphorus pollution in the Gulf of Mexico).

⁹³ *Id.*

⁹⁴ See generally Lisabeth M. White, THE CONTRIBUTION OF LAWN FERTILIZER TO THE NITROGEN LOADING OF CAPE COD EMBAYMENTS (2003), available at <http://www.3bays.org/pdfs/reports/2003-ThesisLisabethWhite.pdf>.

⁹⁵ Colleen Aagesen & Mary Fiscus, *Can Lawns Kill?*, HEARTLAND JOURNAL reprinted in 9 *Wild Ones Handbook* 4th ed., available at http://www.epa.gov/greenacres/wildones/wo_2004b.pdf.

⁹⁶ *Id.*

⁹⁷ STATE-EPA TASK GROUP, *supra* note 14 at 14.

nitrogen⁹⁸ and, therefore, can be a significant source of nutrients in some watersheds.⁹⁹ This is especially true in highly populated areas. Wastewater treatment facilities should be upgraded to achieve stringent numeric nutrient standards, but the estimated cost of doing so would be \$54 billion.¹⁰⁰

D. Fossil Fuel

The burning of fossil fuels and other combustibles releases nitrogen oxide particulates into the air, creating atmospheric nitrogen deposition.¹⁰¹ The reliance by many Americans on automobiles and their lack of public transportation options compounds this problem.¹⁰² Atmospheric nitrogen deposition contributes significant amounts of nitrogen to surface water.¹⁰³ However, the EPA cannot regulate atmospheric nitrogen deposition under the CWA. Rather, it must be regulated by the Clean Air Act (CAA). Solving the problem of water quality is, therefore, a complicated regulatory puzzle involving various environmental media and statutory regimes.

E. Agricultural Runoff

The agricultural industry contributes to nitrogen and phosphorus runoff through livestock operations and row crop

⁹⁸ “Municipal wastewater treatment plants” are also known as publicly owned treatment works (POTWS). *See id.* at 13.

⁹⁹ Erik Heinen et al, *The Relationship Between Wastewater Treatment Plants and Nutrient Impaired Surface Water Bodies in Seven Northern States*, http://www.aciscience.org/docs/ENSR_WWTP_and_Nutrient_Impairment.pdf (last visited Sept. 5, 2010).

¹⁰⁰ STATE-EPA TASK GROUP, *supra* note 14 at 14.

¹⁰¹ *Id.*

¹⁰² Automobiles account for fifty-five percent of NOx emissions. *Id.* at 15.

¹⁰³ *Id.* at 15.

farming.¹⁰⁴ With approximately 9 billion broilers, 446 million laying hens, 96 million head of cattle, and 68 million head of swine, manure management is a concern in the U.S.¹⁰⁵ Many livestock producers who also grow row crops use their livestock's manure as organic fertilizer. However, if the plants do not absorb all the nutrients, excess fertilizer will become a part of runoff. The CWA regulates CAFOs as a point source.¹⁰⁶

The problem with row crop¹⁰⁷ production is that plants can only convert and use a fraction of the applied nitrogen and phosphorus.¹⁰⁸ Therefore, any unused excess nutrients are volatilized into the air, infiltrate ground water, or are collected in runoff from rainfall and snowmelt.¹⁰⁹

¹⁰⁴ EPA, *Managing Nonpoint Source Pollution from Agriculture*, <http://water.epa.gov/polwaste/nps/outreach/point6.cfm> (last visited February 17, 2011).

¹⁰⁵ STATE-EPA TASK Group, *supra* note 14 at 15.

¹⁰⁶ A CAFO is an animal feeding operation where animals will be confined and fed for a total of 45 days or more in a given year without crops, vegetation, forage growth, or post-harvest residue covering any portion of the lot. This designation is based on the number of animals in an operation and is species dependent. For example, 500 horses qualify as a large CAFO while 55,000 turkeys qualify as a CAFO. 40 C.F.R. §§ 122.23(b)(1)-(b)(4). Prior to *Waterkeeper Alliance et al v. EPA*, all CAFOs had to apply for a NPDES permit. The rule that all CAFOs had to apply for a permit was challenged. In response to the *Waterkeeper* decision, the EPA revised CAFO rules. Now only CAFOs that actually discharge or propose to discharge must apply for a permit. CAFO operators also must submit a nutrient management plan with their NPDES permit application. The public may comment on every CAFO permit application and nutrient management plan. EPA, OFFICE OF WASTEWATER MANAGEMENT, *Concentrated Animal Feeding Operations Final Rulemaking – Fact Sheet*, Oct. 2008, <http://cfpub.epa.gov/npdes/afo/cafofinalrule.cfm> (last visited September 6, 2010).

¹⁰⁷ Row crops include corn, soybeans, hay, wheat, rice, barley, oats, cotton, sorghum. As of 2008, these crops covered approximately 313,110 acres in the U.S. with a total value of over \$120 billion. STATE-EPA TASK GROUP, *supra* note 14 at 16,

¹⁰⁸ *Id.* at 17.

¹⁰⁹ *Id.*

All of the sources of nutrient overload are rooted in population growth. A growing population means more homes being built, more automobiles on the road, more mouths to feed, and more houses to light. The construction, energy, transportation, and agriculture industries all contribute to nutrient overload. No single industry can fix this problem alone because there are numerous sources of pollution. Instead, achieving water quality standards requires a systematic approach.

F. A Model to Follow

Given the EPA's failure to propose, adopt, and implement numeric nutrient standards for each state, environmental groups working in Florida¹¹⁰ sued the EPA to formulate and implement numeric nutrient standards for nitrogen and phosphorus.¹¹¹ The plaintiffs argued that Florida's existing narrative nutrient standards were too subjective to be effective at reducing nutrient loads.¹¹² The narrative standard stated that "in no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora or fauna."¹¹³ Without objective criteria, it is difficult to determine how many fish and plants must die in order to constitute an "imbalance in natural populations of aquatic flora or fauna." The difficulty in enforcing the current standard is evidenced by the condition of Florida's water.

¹¹⁰ Plaintiffs include the Florida Wildlife Federation, Sierra Club, Conservancy of Southwest Florida, Environmental Confederation of Southwest Florida, and St. Johns Riverkeeper. Compl., Fla. Wildlife Fed'n et. al. v. Johnson, 2008 WL 4076436, at *1 (N.D. Fla. July 17, 2008) (No. 408CV00324).

¹¹¹ Meline MacCurdy, *EPA Proposal for Numeric Nutrient Standards for Florida Waters has National Implications*, February 3, 2010, <http://www.martenlaw.com/newsletter/20100203-numeric-nutrient-standards> (last visited July 30, 2010).

¹¹² Compl., Fla. Wildlife Fed'n et. al. v. Johnson, 2008 WL 4076436, at *1 (N.D. Fla. July 17, 2008) (No. 408CV00324).

¹¹³ *Id.*

A 2008 study of Florida's water quality found that sixteen percent of rivers, thirty-six percent of lakes, and twenty-five percent of estuaries are impaired.¹¹⁴ The largest contributing factor to Florida's water woes is nutrient loading, which the study characterized as "the most prevalent water pollution problem in the state, contributing to algae blooms that kill fish and cause respiratory problems and infections among boaters and beachgoers."¹¹⁵ In fact, nutrients adversely affect seventy-three percent of Florida's impaired rivers, streams, and creeks;¹¹⁶ eighty-two percent of impaired lakes, reservoirs, and ponds;¹¹⁷ and seventy-two percent of Florida's impaired estuaries, bays, and coasts.¹¹⁸ Florida ranks second in the nation for the most nutrient impairments of all waterbodies¹¹⁹

The EPA announced in 1998 that it expected "all States and Tribes to adopt and implement numerical nutrient criteria into their water quality standards by December 31, 2003."¹²⁰ In 2001, as the deadline approached for submitting numeric nutrient standards, the EPA again published guidelines charging each state to adopt or revise nutrient criteria as part of the states' water quality standards.¹²¹ Because few states had made any progress, the

¹¹⁴ Impaired waters are waterbodies that do not meet each state's water quality standards and are list on the CWA Section 303(d) list. Thomas v. Jackson, 581 F.3d 658, 661 (8th Cir. 2009); John Frank, *EPA Steps in on Pollution*, ST. PETERSBURG TIMES, January 16, 2010, available at 2010 WLNR 1087298.

¹¹⁵ John Frank, *supra* note 117.

¹¹⁶ Scorecard, The Pollution Information Site, available at http://www.scorecard.org/env-releases/water/cwa-state.tcl?fips_state_code=12#cause (last visited November 12, 2010).

¹¹⁷ *Id.*

¹¹⁸ *Id.*

¹¹⁹ Waterbodies included in the study include rivers, creeks, streams, lakes, reservoirs, ponds, estuaries, bays, coast, and wetlands. *Id.*

¹²⁰ Notice of National Strategy for the Development of Regional Nutrient Criteria, 63 Fed. Reg. 34648 (June 25, 1998).

¹²¹ Nutrient Criteria Development; Notice of Ecoregional Nutrient Criteria, 66 Fed. Reg. 1671 (Jan. 9, 2001).

deadline was extended to 2004.¹²² If a state fails to submit water quality standards, or if the standards are not approved by the EPA, then the EPA has a duty under the CWA to “initiate rulemaking to promulgate nutrient criteria appropriate to the region and waterbody types.”¹²³

The U.S. Office of Inspector General (OIG) conducted a study in 2009 to evaluate the EPA’s progress in adopting numeric nutrient standards.¹²⁴ This report criticized the EPA for its lack of progress in implementing numeric nutrient standards.¹²⁵ The report labeled the EPA’s previous efforts to implement numeric nutrient standards as “ineffective,” noting that reports had been issued, but no affirmative action had been taken to develop these standards.¹²⁶ The OIG scolded the EPA for failing to hold “the states accountable to committed milestones.”¹²⁷ The EPA first issued notice in 1998 that it intended to aid states in developing numeric nutrient standards or it would formulate the standards without input from the states.¹²⁸ However, deadlines lapsed in 2003 and 2004 without any consequences or action.¹²⁹

The EPA provided states with several reports on how to formulate and adopt numeric standards, with suggested limits.¹³⁰

¹²² *Id.*

¹²³ Notice of National Strategy for the Development of Regional Nutrient Criteria, *supra* note 123.

¹²⁴ The cost of this report to taxpayers totaled \$505,399. While the Office of Inspector General spent time and resources to notify the EPA that the agency that it is failing to implement the CWA, that is obvious from examining the state of America’s waterbodies. EPA, OFFICE OF INSPECTOR GENERAL, REPORT NO. 09-P-0223, EPA NEEDS TO ACCELERATE ADOPTION OF NUMERIC NUTRIENT WATER QUALITY STANDARDS (Aug. 26, 2009) *available at* <http://www.epa.gov/oig/reports/2009/20090826-09-P-0223.pdf>.

¹²⁵ *Id.*

¹²⁶ *Id.*

¹²⁷ *Id.*

¹²⁸ *Id.*

¹²⁹ *Id.*

¹³⁰ *Id.*

However, states resisted approving these numeric standards because they were “overly protective.”¹³¹ Under the CWA, if states do not adopt EPA’s suggested numeric nutrient standards, they must formulate standards on their own, which is costly and time consuming.¹³² The OIG report recommended that the EPA take specific action to ensure numeric nutrient standards would be implemented by states in the near future.¹³³ The recommendations included that the EPA select waters of national importance that need numeric nutrient standards to achieve the standards of the CWA,¹³⁴ set numeric nutrient standards for those waters, and establish a system of accountability in order to motivate states to meet deadlines.¹³⁵

Frustrated by the lack of progress and degradation of Florida’s water quality, environmental groups sued¹³⁶ the EPA in 2008.¹³⁷ The basis of the suit was EPA’s failure to follow its non-discretionary duty to formulate numeric nutrient standards under the CWA.¹³⁸ Section 303(c)(4)(B) of the CWA requires the EPA to promulgate regulations for water quality standards for navigable waters in situations where the EPA determines that revised or new water quality standards are needed to meet the requirements of the CWA.¹³⁹ The 1998 Federal Register notice from the EPA

¹³¹ *Id.*

¹³² *Id.*

¹³³ *Id.*

¹³⁴ The goal of the CWA is to ensure waters of the U.S. are fishable and swimmable. 33 U.S.C. § 1251.

¹³⁵ EPA, *supra* note 127.

¹³⁶ Under CWA § 505(a)(2), citizens can bring suit against the administrator for failure to perform a non-discretionary duty under the CWA. Federal District Courts have jurisdiction over these cases regardless of the traditional jurisdictional requirements such as citizenship of parties and amount in controversy. 33 U.S.C. § 1365(a)(2).

¹³⁷ Meline MacCurdy, *supra* note 114.

¹³⁸ Meline MacCurdy, *supra* note 114.

¹³⁹ Consent Decree, Fla. Wildlife Fed’n, Inc. et al., v. Jackson, (N.D. Fla. Dec. 30, 2009) (No. 4:08cv324-RH/WCS), *available at*

Administrator triggered this requirement because it was a call to action for new water quality standards.

The suit ended in a consent decree between the parties, which the United States District Court for the Northern District of Florida approved on December 30, 2009.¹⁴⁰ The phased consent decree required the EPA to publish the proposed numeric water quality standards for lakes and flowing waters in Florida by January 14, 2010.¹⁴¹ The decree stated that after the public comment period ended, the EPA would sign the rules and publish the final version for lakes and flowing waters by October 2010.¹⁴² The proposed rules for numeric water quality standards for Florida coastal and estuarine waters must be published by January 14, 2011 and the rules must be published and signed by October 15, 2011.¹⁴³

Numeric nutrient standards for phosphorus and nitrogen create several obligations. Under the CWA, states must first designate each waterbody by use.¹⁴⁴ Florida should already have established designated uses for each waterbody because this is an existing requirement under the CWA.¹⁴⁵ However, the existing

<http://docs.justia.com/cases/federal/district-courts/florida/flndce/4:2008cv00324/50856/152/>.

¹⁴⁰ *Id.*; FLORIDA WILDLIFE FEDERATION, 2009 ANNUAL REPORT 5 (2010), available at

http://www.fwfonline.org/documents/FWF_Annual_Report_2010.pdf.

¹⁴¹ Consent Decree, *supra* note 142.

¹⁴² *Id.*

¹⁴³ *Id.*

¹⁴⁴ CWA § 303(c) requires that states designate uses by taking “into consideration the use and value of water for public water supplies, protection and propagation of fish, shellfish, and wildlife, recreation in and on the water, agricultural, industrial and other purposes including navigation.” 33 U.S.C. §1313 et seq.

¹⁴⁵ Florida Department of Environmental Protection classifies water in either class I, II, III, IV, or V. Class I includes potable water supplies, class II is for shellfish propagation or harvesting, class III includes recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife,

designated use becomes important in terms of TMDL limits.¹⁴⁶ If the waterbody is impaired and does not meet the water quality standards, then TMDLs will be set for the corresponding designated use.¹⁴⁷ TMDLs are established “to attain and maintain the applicable narrative and numerical Water Quality Standards.”¹⁴⁸ Each pollutant that is contributing to the impaired status of a waterbody will have a TMDL.¹⁴⁹ Now that there are numeric standards for nitrogen and phosphorus in Florida, TMDLs will have to be re-evaluated to take into account these two nutrients. Only point source dischargers are required to obtain NPDES permits to lawfully discharge pollutants into waterbodies. TMDLs are one consideration in granting a NPDES permit.¹⁵⁰ The discharger has to list the amount of pollutants discharged.¹⁵¹ If this amount, in conjunction with the amount of pollutants from other dischargers, will collectively exceed the TMDL, then the state or federal EPA will deny the permit.

While TMDLs are useful criteria when determining NPDES permits, TMDLs are unenforceable for nonpoint sources. Best management practices (BMPs) are voluntary for nonpoint sources. Even with established TMDLs that take into consideration nitrogen and phosphorus, nonpoint sources do not need a permit; therefore, it is difficult to regulate agricultural

class IV is designated for agricultural water supplies, and class V for navigation, utility, and industrial use. FLORIDA DEP’T OF ENV’T L PROTECTION, SURFACE WATER QUALITY STANDARDS – CLASSES, USES, CRITERIA, *available at* <http://www.dep.state.fl.us/water/wqssp/classes.htm>.

¹⁴⁶ EPA, *Impaired Waters and Total Maximum Daily Loads*, <http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/index.cfm> (last visited Sept. 5, 2010).

¹⁴⁷ 40 C.F.R. § 130.7(C)(1) (1992).

¹⁴⁸ *Id.*

¹⁴⁹ *Thomas*, 581 F.3d at 661(citing 33 U.S.C. § 1313(d)(1)(c), 33 U.S.C. § 1362(6)). TMDLs are applicable to pollutants from both point sources and nonpoint sources. *Id.* at 661 (citing 40 C.F.R. § 130.2 (g)-(i)).

¹⁵⁰ 40 C.F.R. § 130.7(a) (2002); 40 C.F.R. § 130.12 (2002).

¹⁵¹ *Id.*

runoff.¹⁵² To manage nutrient overload in waters, the agricultural community needs to take appropriate actions to reduce levels of nutrients in waters. Florida will require agricultural operations to file a notice of intent and implement BMPs.¹⁵³ Once the notice of intent is filed, the producer is in compliance with numeric water quality standards.¹⁵⁴ There is no suggestion of what the recourse will be if a producer fails to file this notice of intent or if the BMP is not actually executed and maintained.¹⁵⁵ However, in response to Florida farmer's concerns over these requirements, the Division of Environmental Assessment and Restoration of the Florida Department of Environmental Protection told farmers that the "one bright spot" is "that simply promising and attempting to meet the new regulations should be enough to avoid trouble in the near future."¹⁵⁶ As long as producers sign the intent form and put forth a good faith effort, producers will be assumed to "be in compliance."¹⁵⁷ Florida anticipates that improved BMPs will replace existing BMPs in order to comply with the numeric nutrient standards with the overall goal of reducing nitrogen and phosphorus levels in Florida's waters.¹⁵⁸

Regulated entities in Florida are outraged at the idea of numeric nutrient standards. Numeric nutrient standards will require stricter limits on point sources. Opponents of the rule

¹⁵² Concentrated Animal Feeding Operations are regulated under the CWA, but all other agricultural practices and operations are excluded from NPDES permit requirements. CAFOs are considered point sources under the CWA. 33 U.S.C. § 1362 (2002).

¹⁵³ Thomas Obreza et al., A GUIDE TO EPA'S PROPOSED NUMERIC NUTRIENT WATER QUALITY CRITERIA FOR FLORIDA, 7 University of Florida IFAS Extension (2010).

¹⁵⁴ *Id.*

¹⁵⁵ *Id.*

¹⁵⁶ Chip Carter, *Citrus Growers Look to Live With the New EPA Standards; Legal Action Promised*, THE PRODUCE NEWS, June 18, 2010, <http://www.producenews.com/StoryNews.cfm?ID=9825>.

¹⁵⁷ *Id.*

¹⁵⁸ Thomas Obreza et al., *supra* note 156.

include agriculture, municipalities, and factories.¹⁵⁹ Politicians with ties to these industries are working on bills to stop the implementation of numeric nutrient standards in Florida.¹⁶⁰ Many industry leaders feel the standards are too strict and will end up causing economic loss for the state.¹⁶¹ It is estimated that the initial cost for implementation will range from \$855 million to over \$3 billion.¹⁶² Annual compliance costs are estimated to range from \$271 million to \$974 million.¹⁶³ Despite the cost, clean drinking water and healthy habitats for aquatic life are priceless and irreplaceable. After decades of water degradation, it will not be cheap to clean up the damage already done.

Florida's Attorney General Bill McCollum¹⁶⁴ addressed citrus growers on June 11, 2010, and stated that "[t]he nutrient standards are outlandish as they are [proposed]. We will file a lawsuit against the U.S. government. We cannot and should not live with these standards."¹⁶⁵ On McCollum's campaign website, he addressed Florida's numeric nutrient water standards.¹⁶⁶ McCollum stated that the EPA's proposed numeric standards are "impractical and unfair to the residents and businesses of this

¹⁵⁹ See Meline MacCurdy, *supra* note 114 (detailing what groups oppose the regulations and why).

¹⁶⁰ Virginia Chamlee, *Nutrient Standards for Florida Waters Remain in Limbo*, THE FLORIDA INDEPENDENT, July 8, 2010, <http://floridaindependent.com/2934/nutrient-standards-for-florida-waters-remain-in-limbo>.

¹⁶¹ Chip Carter, *Citrus Growers Look to Live With the New EPA Standards; Legal Action Promised*, THE PRODUCE NEWS, June 18, 2010, <http://www.producenews.com/StoryNews.cfm?ID=9825>.

¹⁶² *Id.*

¹⁶³ *Id.*

¹⁶⁴ Bill McCollum served as Florida's attorney general from 2007 to 2011. McCollum was a Republican candidate for the 2010 gubernatorial race but lost in the August primary. Kris Alingod, *Rick Scott Beats Florida Attorney General in GOP Primary for Governor*, ALL HEADLINE NEWS, Aug. 25, 2010, <http://www.allheadlinenews.com/articles/7019692432>.

¹⁶⁵ Chip Carter, *supra* note 164.

¹⁶⁶ *Id.*

state” and asserts that the previous approach to water quality was sufficient.¹⁶⁷ His plan for improved water quality standards includes challenging the “federal government to develop a reasonable and fair strategy for NNC implementation.”¹⁶⁸ This is no plan at all. And what better alternative does McCollum offer? None.

III. Action is Needed in Ohio

Ohio is not immune to the problems of dead zones and excessive nitrogen and phosphorus either. Ohio’s runoff contributes to two major dead zones: Lake Erie and the Gulf of Mexico.¹⁶⁹ Seasonal dead zones occur in Lake Erie’s western basin while the Ohio River flows into the Mississippi River, which contributes to the Gulf of Mexico dead zone.¹⁷⁰ Grand Lake St. Marys, an inland lake in western Ohio, is a Petri dish for the problems of nutrient impairment. Lake Erie and Grand Lake St. Marys serve as a source of drinking water for thousands of Ohioans. Both waterbodies are also tourist attractions that help generate revenue in the state.

All types of nutrient overload are prevalent in Ohio because of the dense population of Cleveland, Cincinnati, and Columbus, and its rural outlying communities with farms of varying sizes. Given these factors, Ohio needs to take action now to curb nutrient overload and repair the health of these waterbodies.

¹⁶⁷ *Id.*

¹⁶⁸ *Id.*

¹⁶⁹ Dan Vergano, *Enlarged Environmental ‘Dead Zone’ Ripples Across Lake Erie*, USA TODAY, Sept. 24, 2003 http://www.usatoday.com/news/science/2003-09-24-lake-erie_x.htm; Dan Ferber, *Dead Zone Fix Not a Dead Issue: Scientists Debate How Best to Revive the Gulf of Mexico’s Oxygen-Starved Waters*, 305 SCIENCE 1557 (Sept. 10, 2004) (Ohio is in the Mississippi River watershed).

¹⁷⁰ *Id.*

A. *Lake Erie*

Although Lake Erie's water quality has significantly improved since the 1960s and 1970s,¹⁷¹ and "phosphorus levels were reduced to record lows in 1995," phosphorus levels have since been on the rise.¹⁷² Several factors are contributing to Lake Erie's condition.¹⁷³ First, Lake Erie's drainage basin "is the most intensively farmed and the most densely populated of the Great Lakes Region."¹⁷⁴ Nitrogen and phosphorus from agricultural runoff contribute to nutrient overload in Lake Erie, while residential use of lawn fertilizer, and construction runoff are also contributing factors.¹⁷⁵ Second, all the pollution from the three upper Great Lakes¹⁷⁶ ends up in Lake Erie via the Detroit River.¹⁷⁷

Lake Erie is the perfect depth for a disastrous mixture of eutrophication and dead zones.¹⁷⁸ As the shallowest of the Great Lakes, dead algae rains down on the lake bottom.¹⁷⁹ Lake Erie is shallow enough to allow the dead algae to decay, consuming oxygen in the process.¹⁸⁰ Lake Erie is also "just deep enough to form different and distinct layers of water temperatures, blocking the bottom waters where oxygen is being consumed from mixing with warmer surface waters that can take in oxygen from the

¹⁷¹ See Mike Vogel, *The Dead Zone*, THE BUFFALO NEWS, Jan. 19, 2003, at H1 (detailing the improvements of Lake Erie's water quality, but noting that Lake is dying nevertheless).

¹⁷² STATE-EPA TASK GROUP, *supra* note 14 at 18.

¹⁷³ Mike Vogel, *supra* note 171.

¹⁷⁴ *Id.*

¹⁷⁵ *Id.*

¹⁷⁶ The three upper Great Lakes are Lake Superior, Lake Huron, and Lake Michigan.

¹⁷⁷ Mike Vogel, *supra* note 171.

¹⁷⁸ *Id.*

¹⁷⁹ *Id.*

¹⁸⁰ *Id.*

air.”¹⁸¹ This results in a massive dead zone in the depths of Lake Erie.¹⁸²

Recognizing the problem of algae blooms in Lake Erie, the Ohio EPA formed the Ohio Lake Erie Phosphorus Task Force.¹⁸³ This task force was charged with “identify[ing] and evaluat[ing] potential point and nonpoint sources of phosphorus” and proposing methods to decrease phosphorus loading in Lake Erie.¹⁸⁴ The problem with the Task Force is that there are no direct actions taken to reduce phosphorus in the lake, only research and recommendations. Action is needed immediately; it is no longer enough to release studies with meaningless recommendations.¹⁸⁵

The algae blooms are composed of *Microcystis aeruginosa*.¹⁸⁶ The potential danger of this type of algae should not be understated because it can “impact drinking water supplies, recreational use, and the aquatic community.”¹⁸⁷

Some are skeptical about the size and source of the dead zone in Lake Erie. While some think the dead zone is growing, others are reluctant to conclude that the dead zone is growing or

¹⁸¹ *Id.*

¹⁸² *Id.*

¹⁸³ OHIO EPA DIVISION OF SURFACE WATER, OHIO LAKE ERIE PHOSPHORUS TASK FORCE FINAL REPORT, April 2010, *available at* http://ohiosierraclub.org/wp-content/uploads/2010/06/Task_Force_Final_Report_April_2010.pdf.

¹⁸⁴ *Id.*

¹⁸⁵ *See Id.* (listing several recommendations to reduce phosphorus in Lake Erie which farmers are actually already doing, such as no-till and crop rotation farming practices. This study clearly does not take into consideration what the majority of the Ohio farmers already do to protect the environment.)

¹⁸⁶ LAKE ERIE NUTRIENT SCIENCE TASK GROUP, *Status of Nutrients in the Lake Erie Basin*, at iii, Dec. 2009, http://epa.gov/greatlakes/lakeerie/erie_nutrient_2010.pdf.

¹⁸⁷ *Id.*

even to hypothesize about the causes.¹⁸⁸ Some scientists question whether the dead zone is growing because of varying and conflicting data.¹⁸⁹ Causes of the Lake Erie dead zone are also questionable. According to scientists, point source nutrient pollution into Lake Erie has been reduced since the 1970s.¹⁹⁰ As for nonpoint sources, “it seems almost certain that the amount of nonpoint source nutrient pollution has also decreased significantly due to tighter regulations of fertilizer use on farms.”¹⁹¹

Scientists have hypothesized two causes of Lake Erie’s dead zones: climate change and invasive species.¹⁹² Climate change could be a cause because “[w]armer water stays warm for longer periods of time, which exacerbates the stratification¹⁹³ problem.”¹⁹⁴ Even if climate change is not the main source of Lake Erie’s dead zone, it is no doubt a contributing factor.¹⁹⁵ Zebra and quagga mussels live on the bottom of Lake Erie and “tend to pull nutrients down into the lake floor sediments with them, making the water more anoxic.”¹⁹⁶ Scientists agree that the mussels “have changed the nutrient cycles in the lakes, but how exactly that relates to dead zones is still not entirely known.”¹⁹⁷ These two hypotheses could explain why “it does not appear that total

¹⁸⁸ Ed Brayton, *Great Lakes Dead Zone a Mystery*, MICH. MESSENGER, Sept. 1, 2008, <http://michiganmessenger.com/3428/great-lakes-dead-zone-a-mystery>.

¹⁸⁹ *Id.*

¹⁹⁰ LAKE ERIE NUTRIENT SCIENCE TASK GROUP, *supra* note 186 at 1.

¹⁹¹ *Id.*

¹⁹² *Id.*

¹⁹³ Lake Erie’s depth contributes to the “stratification problem,” which means the “bottom layer . . . is much smaller, has less oxygen in it to begin with[,] and is thus more rapidly depleted of that oxygen.” *Id.*

¹⁹⁴ *Id.*

¹⁹⁵ Kari Lydersen, *Lake Erie’s Dead Zone Dilemma*, THE GREAT LAKES TOWN HALL, <http://www.greatlakestownhall.org/the-daily-post/3251>.

¹⁹⁶ Brayton, *supra* note 191.

¹⁹⁷ *Id.*

phosphorus loads are increasing, [although] total phosphorus concentrations in the nearshore are.”¹⁹⁸

Even though there is some dispute as to the cause and source of dead zones in Lake Erie, Ohio banned phosphates in washer detergent in 1989 to reduce phosphorus levels in the Lake.¹⁹⁹ Ohio was the last Great Lake state to do so.²⁰⁰ In 2009, Senator George Voinovich of Ohio introduced legislation to ban phosphates nationwide from dishwasher detergent.²⁰¹ The Senator stated: “[b]y limiting phosphates that enter Lake Erie, we will reduce harmful algal blooms and the dead zone that emerges every summer in the lake, helping to protect the Great Lakes and its ecosystems for generations to come.”²⁰² A 2005 study “estimated that dishwasher detergent accounts for nearly 19 percent of the total amount of phosphorus entering municipal wastewater systems each year.”²⁰³ The proposed legislation would amend the CWA to require the EPA Administrator “to prohibit the sale in the United States of residential dishwashing detergent that contains phosphorus in any form in excess of 0.5 percent.”²⁰⁴ Although a nationwide ban has not yet gone into effect, many states have introduced their own statewide bans.²⁰⁵

¹⁹⁸ LAKE ERIE NUTRIENT SCIENCE TASK GROUP, *supra* note 189.

¹⁹⁹ *U.S. Sen. George Voinovich Calls for Nationwide Ban on Phosphates in Dishwasher Detergent*, CLEVELAND PLAIN DEALER, March 25, 2009, <http://www.cleveland.com/news/plaindealer/index.ssf?/base/news/123796982917991.xml&coll=2>.

²⁰⁰ *Id.*

²⁰¹ *Id.*

²⁰² *Id.*

²⁰³ Press Release, U.S. Senator Carl Levin, Levin and Voinovich Introduce Legislation to Limit Phosphates in Dishwashing Detergent, (March 24, 2009), *available at* <http://levin.senate.gov/newsroom/release.cfm?id=310422>.

²⁰⁴ CONG. RESEARCH SERV., CRS Summary of S.675, 3/24/2009 – Introduced, *available at* <http://thomas.loc.gov/cgi-bin/bdquery/z?d111:SN00675:@@D&summ2=m&>.

²⁰⁵ Ad Crable, *Phosphate Ban in Dishwasher Detergent Goes into Effect: Pennsylvania One of 16 States to Prohibit Use of Cleaning Agent*, LANCASTER

B. Grand Lake St. Marys

As Ohio's largest inland lake, Grand Lake St. Marys (Grand Lake) is located in western Ohio in Mercer and Auglaize counties.²⁰⁶ Grand Lake was originally built in 1837 as a reservoir to ensure a proper depth for the Miami Erie Canal.²⁰⁷ Now, almost 175 years later, Grand Lake "has become enriched with phosphates and nitrates from several sources."²⁰⁸ This was the worst year in the history of the Grand Lake. Last year, the Ohio EPA posted warning signs advising limited contact with the water.²⁰⁹ Those signs were taken down in April 2010, but just a few months later, the Ohio EPA again posted warnings and advisories of no-contact with the water.²¹⁰

The advisory is in response to the overabundance of a new and toxic species of blue-green algae. Ohio EPA advises a strict policy of no contact with the water whatsoever, which means no

NEW ERA, July 6, 2010, *available at* <http://articles.lancasteronline.com/local/4/263806>. The other states banning phosphates in dishwasher detergent include Illinois, Indiana, Maryland, Massachusetts, Michigan, Minnesota, Montana, New Hampshire, Oregon, Pennsylvania, Utah, Vermont, Virginia, Washington, and Wisconsin. Young Kwak, *16 States to Ban Phosphate-laden Dishwasher Soap*, USA TODAY, Jun 30, 2010, <http://content.usatoday.com/communities/greenhouse/post/2010/06/16-states-ban-phosphate-laden-dishwasher-soap/1>.

²⁰⁶ OHIO DEPARTMENT OF NATURAL RESOURCES, *Grand Lake St. Marys State Park*, <http://www.dnr.state.oh.us/parks/parks/grndlake/tabid/737/Default.aspx> (last visited July 27, 2010).

²⁰⁷ *Id.*

²⁰⁸ STATE-EPA TASK GROUP, *supra* note 14, at 19.

²⁰⁹ Jim DeBrosse, *Grand Lake St. Marys 'Dying' From Toxic Algae*, DAYTON DAILY NEWS, July 2, 2010, <http://www.daytondailynews.com/news/dayton-news/grand-lake-st-marys-dying-from-toxic-algae-794991.html?showComments=true>.

²¹⁰ *Id.*

fishing, no boating and no swimming.²¹¹ This species of algae “produced a foul-smelling blue-green scum and killed off thousands of fish.”²¹² The algae is dangerous to human health because it releases “liver- and neuro-toxins into the water.”²¹³

This year’s highly publicized advisories have taken a toll on the local economy. For example, a local marina’s sales were down by fifty percent.²¹⁴ Former Ohio Governor Ted Strickland stated that “[w]e have reached a tipping point where the degraded nature of the lake is causing a significant loss to local businesses and the total livelihood of the region.”²¹⁵ Halfway through the summer, cottages and camp sites were empty, while “[m]arinas and restaurants [we]re cutting workers, and a few... shut down for good.”²¹⁶ In comparison, however, agricultural revenues far outweigh tourism. On a normal year, area tourism brings in roughly \$160 million.²¹⁷ Agriculture, on the other hand, brings in revenues of \$675 million a year.²¹⁸ Mercer and Auglaize Counties are two of the most profitable counties in Ohio for agricultural revenue.²¹⁹

²¹¹ Steve Bennish, *State Warns Against Boating, Eating Fish from Grand Lake St. Marys*, DAYTON DAILY NEWS, July 16, 2010, <http://www.daytondailynews.com/news/dayton-news/state-bans-boating-or-eating-fish-from-grand-lake-st-marys-815276.html>.

²¹² DeBrosse, *supra* note 212.

²¹³ *Id.*

²¹⁴ *Algae in Grand Lake St. Marys Dangerous and Hurting Ohio Economy*.

NEWS TIME, July 5, 2010, http://www.newstime.co.za/Health/Algae_in_Grand_Lake_St_Marys_dangerous_and_hurting_Ohio_economy/7248/.

²¹⁵ *Id.*

²¹⁶ *Id.*

²¹⁷ DeBrosse, *supra* note 212.

²¹⁸ *Id.*

²¹⁹ Mercer County is the most profitable county in the state of Ohio while Auglaize county is the 8th most profitable county in terms of agricultural revenue. *Id.*

On July 2, 2010, Governor Strickland wrote a letter to the U.S. Department of Agriculture (USDA) requesting federal funds to help address agricultural runoff in the area.²²⁰ The USDA answered Strickland's request to the tune of \$1 million.²²¹ This money will be used to encourage local farmers to "apply conservation measures that will benefit water quality in Grand Lake St. Marys."²²² More specifically, the farmers will have to participate in the Environmental Quality Incentives Program (EQIP) to receive any of the funds.²²³ EQIP is a conservation method included in the Food, Conservation, and Energy Act of 2008.²²⁴ This voluntary program allows a producer to enter into a contract with the federal government for anywhere from a one to ten-year period.²²⁵ EQIP reimburses producers up to "75 percent of the estimated incurred costs and income foregone of certain conservation practices and activities."²²⁶ The producers who enter into a contract will "focus on providing winter cover on agricultural land receiving manure in the fall of 2010 and also for land with low crop residue to reduce soil erosion."²²⁷

Besides agriculture, other contributing sources to the nutrient problem are associated with the developed shorelines of Grand Lake St. Marys. Some industrial and residential wastes are

²²⁰ Spencer Hunt, *Feds Send \$1 Million to Help Save Grand Lake St. Marys*, COLUMBUS DISPATCH, July 20, 2010, [http://www.dispatch.com/live/content/local_news/stories/2010/07/20/Feds_send_\\$1_million_to_help_save_Grand_Lake_St._Marys.html](http://www.dispatch.com/live/content/local_news/stories/2010/07/20/Feds_send_$1_million_to_help_save_Grand_Lake_St._Marys.html).

²²¹ *Id.*

²²² Press Release, Office of the Governor, Grand Lake St. Marys Receives \$1 Million from USDA to Improve Water Quality (July 20, 2010) (on file with author).

²²³ *Id.*

²²⁴ USDA, NATURAL RESOURCES CONSERVATION SERVICE, *Environmental Quality Incentives Program*, <http://www.nrcs.usda.gov/programs/eqip/> (last visited July 27, 2010).

²²⁵ *Id.*

²²⁶ *Id.*

²²⁷ Press Release, *supra* note 225.

piped directly into the lake.²²⁸ These pollutants come from residential septic tanks and package plants, and are due to the lack of community sewage treatment facilities.²²⁹

Grand Lake St. Mary's is the perfect illustration of why numeric nutrient standards and improved water quality standards are needed. It will take years to remediate and solve this problem because the water flows out of the lake slowly. Unless humans change their activities by reducing lawn fertilization and practicing safe manure handling procedures, the lake will continued to be plagued with nutrient overload and toxic algae problems. This is a reactive situation, but Ohio and other states should take note and be proactive to ensure that this history does not repeat itself.

Ohio and other states can duplicate Florida's actions.²³⁰ The law requires the EPA Administrator to promulgate numeric nutrient standards. It has been almost twenty years since the EPA recognized the harmful impact of nutrient pollution. But deadlines repeatedly lapsed, until environmental groups sued the EPA to mandate numeric nutrient standards for Florida. To spur promulgation and implementation of numeric nutrient standards, a letter of intent to sue is effective. The precedent is already set that the EPA has a mandatory, non-discretionary duty to formulate these standards.

²²⁸ LAKE IMPROVEMENT ASSOCIATION, *Pollution Issues and Solutions for Grand Lake St. Marys*, <http://www.lakeimprovement.com/pollution-issues-and-solutions-grand-lake-st-marys> (last visited July 28, 2010).

²²⁹ *Id.*

²³⁰ At the time of publication in February 2011, several lawsuits are pending against the EPA for its set of numeric nutrient standards for Florida waterbodies. Specifically the Florida League of Cities and Florida Stormwater Association are parties to one lawsuit. GULF COAST BUSINESS REVIEW, *Controversial Criteria Drowning in Lawsuits*, Jan. 27, 2011, <http://www.review.net/section/detail/controversial-criteria-drowning-in-lawsuits/>.

C. Possible Solutions

Even if numeric nutrient standards are promulgated in each state, nonpoint sources will remain unregulated. Given that nonpoint sources are a large contributor of nutrient pollution, more needs to be done to create better water quality standards. Federal standards are unlikely given Congress's reluctance to regulate nonpoint sources.²³¹

One option to regulate nonpoint source pollution is through local land use regulations. To combat nutrient overload, many municipalities and even states are banning the use and application of lawn fertilizer containing phosphorus. Minnesota, Wisconsin, Maine, Florida, and New York have provisions banning the use of lawn fertilizer containing phosphorus.²³² Moreover, cities such as Ann Arbor and Annapolis have banned the use of lawn fertilizer containing phosphorus.²³³ Data from Michigan State University researchers show a significant decline in phosphorus levels in the Huron River since Ann Arbor's phosphorus ban went into effect.²³⁴ One caveat of the Ann Arbor rules allows for application of

²³¹ David Zarin, *Agriculture, Nonpoint Source Pollution, and Regulatory Control: The Clean Water Act's Bleak Present and Future*, 20 HARV. ENVTL. L. REV. 515, 523-24 (1996).

²³² *NY Bans Phosphorus in Detergent, Lawn Fertilizer*, WSYR-SYRACUSE, <http://www.9wsyr.com/news/local/story/NY-bans-phosphorus-in-detergent-lawn-fertilizer/FCQwZDnlRkSnTdDXKhWJhg.csp> (last visited Sept. 5, 2010). Press Release, Chesapeake Bay Program, Annapolis Bans Use of Lawn Fertilizer Containing Phosphorus (Jan. 2009), available at http://www.chesapeakebay.net/news_lawnfertilizer09.aspx?menuitem=33395 (last visited September 5, 2010); A. Marino & M. Naud, *Environmental Indicators: Phosphorus*, THE ANN ARBOR CHRONICLE, April 13, 2010, <http://annarborchronicle.com/2010/04/13/environmental-indicators-phosphorus/>.

²³⁴ A twenty-eight percent decline in phosphorus was recorded in 2008 and a seventeen percent decline in 2009. A. Marino & M. Naud, *Environmental Indicators: Phosphorus*, THE ANN ARBOR CHRONICLE, April 13, 2010, <http://annarborchronicle.com/2010/04/13/environmental-indicators-phosphorus/>.

phosphorus lawn fertilizer if soil tests reveal a phosphorus deficiency.²³⁵

Nutrient trading programs provide another mechanism to control nonpoint source pollution. These programs are a market-based approach to improving water quality.²³⁶ Point source dischargers face expensive upgrades when numeric nutrient standards are passed. The numeric nutrient standards will be taken into account for NPDES permits and in setting TMDLs for a waterbody. Thus, point source dischargers are looking for a way to meet the requirements of their NPDES permits while achieving the TMDL. Trading can occur when a point source has a low-cost pollution reduction option that reduces pollution beyond what is mandated by its NPDES permit.²³⁷ Such a facility can then sell its excess credits to other point source polluters with higher compliance costs.²³⁸

Additionally, private contracts between nonpoint sources and point sources may provide a mechanism to achieve set TMDLs for waterbodies. Because there is no enforcement hook for nonpoint sources, downstream point sources end up correcting their own pollution and that of the nonpoint source polluters. Many point source dischargers are contracting with upstream nonpoint sources to reduce their pollution. Point sources pay the upstream nonpoint sources to incorporate methods of pollution reduction. Therefore, the amount of pollution that the point sources have to control is less. This is more cost-effective than installing expensive technology to control pollution.

²³⁵ *Id.*

²³⁶ WORLD RESOURCES INSTITUTE, *Nutrient Trading*, <http://www.nutrientnet.org/trading.cfm> (last visited Sept. 5, 2010).

²³⁷ *Id.*

²³⁸ *Id.*

Conclusion

Federal legislation to regulate water pollution has been in effect in some shape or manner for over sixty years. Yet today, one of the largest sources of water pollution remains unregulated in much of the country. Nutrient overload is a problem that will persist unless numeric standards are promulgated, implemented, and enforced. Individuals need to take action to reduce nutrient overload in waterbodies, from reducing the use of residential lawn fertilizer application to implementing best management practices on farms. Without action, dead zones will continue to grow and choke out life in areas like Lake Erie, the Gulf of Mexico, and the Chesapeake Bay.

Nutrient overload not only causes environmental havoc; it also has economic impacts. Areas that rely on water-related tourism, such as Grand Lake St. Marys, will continue to suffer until the water quality improves enough that tourists will come back. This process will be long and costly. However, when addressing water quality standards, it is important to keep in mind that “[c]lean water is not an expenditure of [f]ederal funds; clean water is an investment in the future of our country.”²³⁹

²³⁹ U.S. Rep. Bud Shuster, quoted in the Wash Post, *available at* <http://www.stthomas.edu/recycle/water.htm> (last visited July 28, 2010).