AFTER THE TMDLS

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INTRODUCTION

In March 2015, the United States District Court for the Western District of Washington decided *Sierra Club v. McLerran*, a case involving something known as a total maximum daily load ("TMDL").[1] TMDLs are pollution budgets for impaired waterways, and they are, in theory, a key mechanism for bringing those water bodies into compliance with water quality standards.[2] They are also mandatory. Clean Water Act section 303(d) leaves little doubt that states must prepare TMDLs for water bodies that do not meet water quality standards, and that the U.S. Environmental Protection Agency ("EPA") must step in should a state fail to act.[3]

1. 2015 WL 1188522 (W.D. Wash. 2015).

2. *See* JOHN HORNBEEK ET AL., IMPLEMENTING TOTAL MAXIMUM DAILY LOADS: UNDERSTANDING AND FOSTERING SUCCESSFUL RESULTS 13 (2008) ("The federal TMDL program plays a central role in the nation's water quality management efforts."); Memorandum from Robert Perciasepe, Assistant Adm'r U.S. Envtl. Prot. Agency, to Reg'l Adm'rs and Reg'l Water Div. Adm'rs, U.S. Envtl. Prot. Agency on New Policies for Establishing and Implementing Total Maximum Daily Loads, http://www.epa.gov/sites/production/files/2015-10/documents/2003_10_21_tmdl_ratepace1997guid_0.pdf [https://perma.cc/MX9U-29WF] ("The TMDL program is crucial to success because it brings rigor, accountability, and statutory authority to the process.").

3. 33 U.S.C. § 1313(d)(1)(C) (2012) (beginning with "each state shall").

For the Spokane River, however, the Washington Department of Ecology and EPA honored that mandate only through what might appear to be a blatant breach. The department had begun a TMDL for polychlorinated biphenals, a group of pollutants impairing the river. But then, and with EPA's acquiescence, it suspended the TMDL writing process indefinitely.[4] That suspension did not derive from a lack of interest in responding to the river's pollution problems—or, at least, the department admitted no such thing. Instead, the department asserted that its resources would be best spent on developing a plan to restore the river.[5] The TMDL, in other words, would be a sideshow, a distraction, and the best course would be to skip the TMDL and go straight to implementation planning, which normally is the next step in the regulatory sequence. This was not the first time regulators had preferred this course of action, or expressed skepticism about the value of TMDLs.[6] Similar things have been said in many ways, perhaps none more concise than the brief words a guest speaker—a municipal stormwater manager and committed environmentalist—once offered to my environmental law class: "TMDLs suck."[7]

This article considers whether my guest speaker, and the Washington Department of Ecology, might have been right. It asks what tens of thousands of TMDLs have actually done to protect the environment. And while the most accurate answer to that question would be, "we don't know," the evidence we do have is somewhat discouraging. Twenty years ago, TMDLs were, in some quarters, the great hope of water quality law.[8] Now, however, the water quality problems that spurred so much interest in TMDLs still persist.[9] And despite some positive individual examples—one

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4. *McLerran*, 2015 WL 1188522, at *2–*4 (describing the administrative process, which involved a draft TMDL that never was finalized).

5. *Water Quality Improvement Project Spokane River: PCBs*, WASH. DEP'T ECOLOGY, http://www.ecy.wa.gov/programs/wq/tmdl/spokaneriver/SpokPCBTMDL.html [https://perma.cc/25PD-K9CT] (last visited Apr. 5, 2015). The Department of Ecology explains, "Rather than develop a TMDL for PCBs, Ecology is pursuing direct actions to lower PCB loading into the Spokane River. Because establishing a TMDL with wasteload allocations can take many generations to meet and may take a decade or more to establish, Ecology feels that taking steps to reduce toxics immediately is more effective at achieving the desired water quality goal." Id.

6. *See* Dave Owen, *Urbanization, Water Quality, and the Regulated Landscape*, 82 U. COLO. L. REV. 431, 453–54 (2011) (describing Maine regulators' frustrations with TMDLs for urban stormwater).

7. I will not name names, so readers will just have to trust in the accuracy of my memory.

8. *See, e.g.*, Robert W. Adler, *Integrated Approaches to Water Pollution: Lessons from the Clean Air Act*, 23 HARV. ENVTL. L. REV. 203, 204–05 (1999) (asserting the Clean Water Act's TMDL requirements "stand[] out as having sufficient promise to meet this challenge" of integrated water quality regulation); Memorandum from Robert Perciasepe to Reg'l Adm'rs and Reg'l Water Div. Adm'rs, *supra* note 2.

9. *See National Summary of State Information*, U.S. ENVTL. PROTECTION AGENCY, http://ofmpub.epa.gov/tmdl_waters10/attains_nation_cy.control [https://perma.cc/7BJU-SRR8] (last

of which is the focus of the rest of this symposium issue—there is little evidence that TMDLs can claim any credit for systemic pollution reductions.[10]

That dearth of demonstrated accomplishments raises uncomfortable questions. Why do we not have more evidence of success? Has a massive amount of effort been wasted? And what can we learn, at this still-preliminary stage, from TMDLs? Despite the informational deficits that prevent definitive answers, there are some lessons to be drawn. They just reflect basic common sense: construct your statutes well and, if you are an environmental group, pick your litigation battles carefully. But what these lessons lack in originality, they make up in importance.

These may all sound dark and pessimistic, particularly for a symposium celebrating TMDLs. And the conclusions do come with important caveats. Clearly, some TMDLs already have major accomplishments to their credit.[11] With others—including very important ones like the Lake Champlain TMDL—there is reason for cautious optimism. And, most importantly, there is a huge difference between the absence of evidence of success and affirmative evidence of failure. It may well be that the right studies just haven't been done yet, and that if we examine TMDLs in different ways, we will learn about undiscovered achievements.[12] But optimism, though somewhat justified, ought to be tempered. In fifty years, environmental lawyers may yet look back upon the United States' massive TMDL experiment as a success. But environmental advocates also should consider the possibility that the TMDL story is, more than anything else, a cautionary tale.

I. LAUNCHING THE TMDL PROGRAM

The obligation to prepare TMDLs springs from section 303 of the Clean Water Act.[13] Section 303 obligates states to set water quality standards, to identify water bodies that fail to meet those standards, and to create TMDLs for each non-attaining water body.[14] As its name suggests, the TMDL should function as a daily pollutant budget: it specifies the mass of each offending pollutant that a waterway can accommodate—with a

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visited Apr. 5, 2016) (summarizing water quality monitoring data, and showing widespread impairment).

10. *See infra* Section II.

11. *See, e.g.*, *infra* notes 97–98 and accompanying text (describing the Garcia River TMDL).

12. *See infra* note 58 and accompanying text (suggesting possible research projects).

13. 33 U.S.C. § 1313.

14. *Id.*

margin of safety—while still attaining water quality standards.[15] Section 303 also obliges states to adopt continuing planning processes designed, in theory, to turn the budgets contained in TMDLs into actual pollution controls.[16] The whole system exemplifies what some commentators refer to as an "ambient" approach to pollution control: the idea is to identify the level of pollution a system can tolerate and then reverse engineer that outcome through controls on individual sources.[17]

For many years, as Oliver Houck has explained in wonderful detail, this approach was the forgotten stepchild of the Clean Water Act.[18] The act also includes a permitting program, known as the National Pollutant Discharge Elimination System ("NPDES"), that employs technology-based controls on "point sources"—generally outfalls from factories, wastewater treatment plants, and municipal stormwater systems.[19] For decades, EPA devoted much of its attention to the monumental task of developing and enforcing those technology-based standards.[20] The results, by most accounts, were impressive.[21] Pollution loading from factories and wastewater treatment plants has been greatly reduced (stormwater is another story), and in some waterways, water quality has greatly improved.[22] But while EPA's attentions—and those of the states—were focused on the NPDES program, little happened with section 303. States did not even publish lists of impaired waterways, let alone write TMDLs, and EPA did not step into the void.[23] The agency had decided its efforts were better spent elsewhere.

In the 1990s, that all changed. Environmental groups filed a series of lawsuits challenging states and EPA for their failures to prepare 303(d) lists and TMDLs.[24] While some of the lawsuits initially failed, victories

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15. *Implementing Clean Water Act Section 303(d): Impaired Waters and Total Maximum Daily Loads (TMDLs)*, U.S. ENVTL. PROTECTION AGENCY, http://www.epa.gov/tmdl [https://perma.cc/LYT4-YKRD] (last visited Apr. 5, 2016).

16. 33 U.S.C. § 1313(e).

17. Sarah Birkeland, *EPA's TMDL Program*, 28 ECOLOGY L.Q. 297, 316–17 (2001).

18. OLIVER A. HOUCK, THE CLEAN WATER ACT TMDL PROGRAM: LAW, POLICY, AND IMPLEMENTATION (1999).

19. *National Pollutant Discharge Elimination System (NPDES): Permit Limits*, U.S. ENVTL. PROTECTION AGENCY, http://www.epa.gov/npdes/npdes-permit-limits [https://perma.cc/J3HK-36MS] (last visited Apr. 12, 2016).

20. HOUCK, *supra* note 18, at 12–24.

21. *See, e.g.*, Johnathan Cannon, *A Bargain for Clean Water*, 17 N.Y.U. ENVTL. L.J. 609, 618–21 (summarizing debates over the NPDES program's performance).

22. *See, e.g.*, William L. Andreen, *Success and Backlash: The Remarkable (Continuing) Story of the Clean Water Act*, 4 J. ENERGY & ENVTL. L. 25, 26 (2013).

23. HOUCK, *supra* note 18, at 49–56; *e.g.*, Sierra Club v. Hankinson, 939 F. Supp. 865, 870–71 (N.D. Ga. 1996) (describing Georgia's progress, or lack thereof).

24. *E.g.*, Alaska Ctr. for the Env't v. Browner, 20 F.3d 981 (9th Cir. 1994); Scott v. City of Hammond, 741 F.2d 992 (7th Cir. 1984); Friends of the Wild Swan v. U.S. Envtl. Prot. Agency, 130 F. Supp. 2d 1184 (D. Mont. 2001); Kingman Park Civic Ass'n v. U.S. Envtl. Prot. Agency, 84 F. Supp. 2d

eventually came steadily, and the primary issue—often resolved in consent decree negotiations—was not whether 303(d) lists and TMDLs must be prepared, but how quickly.[25] And so a massive experiment was launched. Now, over a decade after that first litigation phase was largely completed, the states and EPA have tens of thousands of TMDLs, with more emerging every day.[26] In court cases, the primary issues now concern the content and implications of TMDLs rather than the necessity of their preparation.[27] The Spokane River litigation, which does address that latter question, is a throwback.[28]

All of this litigation reflected a hypothesis. The cases made strategic sense for their environmental plaintiffs only if EPA was wrong about TMDLs.[29] Perhaps EPA was wrong because it simply misjudged TMDLs' potential to produce environmental improvements. And perhaps EPA—or more likely, the states—had not misjudged TMDLs' potential, but lacked the political will to embark on a program that would antagonize powerful industries.[30] But if TMDLs really were just a distraction from more promising efforts to address water quality, then bringing those lawsuits was a mistake, no matter how winnable they were.

At the time, there were some good reasons to believe that hypothesis was correct. Environmental advocates had accumulated plenty of experience then—and have accumulated more since—in using litigation to instigate regulatory initiatives that eventually provided important

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1 (D.D.C. 1999); Idaho Sportsman's Coal. v. Browner, 951 F. Supp. 962 (W.D. Wash. 1996); *Hankinson*, 939 F. Supp. 865.

25. When I interned at the Sierra Club's legal office in the summer of 2000, the club was involved in negotiating multiple consent decrees, and these timing questions were central.

26. As of April 5, 2016, EPA's TMDLs database puts the number of approved TMDLs at 69,289. That number is based on state reporting, however, and many of the state reports are quite dated. The actual number therefore is probably much higher. *National Summary of Impaired Waters and TMDL Information*, U.S. ENVTL. PROTECTION AGENCY, http://iaspub.epa.gov/waters10/attains_nation_cy.control?p_report_type=T#APRTMDLS [https://perma.cc/H877-GY2E] (last visited Apr. 5, 2016) [hereinafter *TMDL Database*].

27. *See, e.g.*, Am. Farm Bureau Fed'n v. U.S. Envtl. Prot. Agency, 792 F.3d 281, 310 (3d Cir. 2015) (rejecting multiple substantive challenges to the Chesapeake Bay TMDL); Friends of the Earth v. U.S. Envtl. Prot. Agency, 446 F.3d 140 (D.C. Cir. 2006) (holding that TMDLs must include daily load limits rather than using some other time increment).

28. *See supra* notes 1–5 and accompanying text.

29. An alternative hypothesis would be that the plaintiffs just brought the cases because they were hoping to secure attorneys' fees, with environmental improvements as a secondary goal. Having spent some time working with environmental groups during this time period, I am very skeptical of that claim. Even at that time, attorneys' fees were much less important than donations in supporting environmental groups' budgets. And an environmental non-profit is no place for an attorney that cynical. There is much more money to be made elsewhere.

30. *See generally* HOUCK, *supra* note 18 (describing many examples of political opposition to meaningful water quality regulation).

environmental protections.[31] And this use of litigation flowed from the basic premises and designs of environmental laws. The legislators who crafted those laws had not drafted citizen suit provisions by accident. They expected that sometimes litigation would be necessary to spur agencies to action, and prior experience had sometimes validated their foresight.[32] From the get-go, TMDL litigation had its skeptics; many commentators registered concerns about how efficacious Clean Water Act section 303 would ever really be.[33] But an attentive student of environmental law's then-short history might have expected that litigation was about to launch another important regulatory program.

II. 69,000 AND COUNTING

Decades later, the TMDL program is well past the launch phase. According to the most recent—but already dated—estimate from EPA, over 69,000 TMDLs have been written.[34] Many of those TMDLs are of very recent vintage, and more time will need to elapse before anyone can fairly evaluate their accomplishments.[35] But others are older, and studies of those older TMDLs provide some basis for preliminary judgments about what TMDLs have wrought.[36]

Initially, one of the most striking features of many of the TMDL implementation studies is not the answers they provide, but the questions they ask. EPA, for example, has produced multiple studies that focus on TMDL implementation.[37] The question many of these studies ask is not

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31. *See* Owen, *supra* note 6, at 483–84 (describing major watershed protection initiatives that litigation helped spur); ROBERT MELTZ, FEDERAL AGENCY ACTIONS FOLLOWING THE SUPREME COURT'S CLIMATE CHANGE DECISION IN *MASSACHUSETTS V. EPA*: A CHRONOLOGY (2014).

32. *See* JOSEPH L. SAX, DEFENDING THE ENVIRONMENT: A STRATEGY FOR CITIZEN ACTION (1971) (describing the theory behind citizen enforcement); Barton H. Thompson, Jr., *The Continuing Innovation of Citizen Enforcement*, 2000 U. ILL. L. REV. 185 (describing the origins, benefits, and problems associated with citizen suits and other citizen enforcement mechanisms).

33. *See, e.g.*, Birkeland, *supra* note 17, at 314 ("[T]he TMDL program is burdened with all of the problems inherent in any ambient-based regulatory system, with a few extra challenges tossed in for good measure.").

34. *TMDL Database*, *supra* note 26. As noted earlier, that number is almost certainly low.

35. *See* GEN. ACCOUNTING OFFICE, CLEAN WATER ACT: CHANGES NEEDED IF KEY PROGRAM IS TO HELP FULFILL THE NATION'S WATER QUALITY GOALS 14 (2013) [hereinafter GAO] (showing cumulative numbers of TMDLs).

36. *E.g.*, *id.*; JOHN HORNBEEK ET AL., MEASURING WATER QUALITY IMPROVEMENTS: TMDL IMPLEMENTATION PROGRESS, INDICATORS, AND TRACKING 6 (2011) (listing multiple earlier studies).

37. *See, e.g.*, U.S. ENVTL. PROT. AGENCY, FY2010 NATIONAL REPORT ON IMPLEMENTING TOTAL MAXIMUM DAILY LOADS (TMDLS) (2011); LAURA BLAKE ET AL., STATE APPROACHES AND NEEDS FOR MEASURING, TRACKING, AND REPORTING ON WATER QUALITY IMPROVEMENTS 8 (2010); DOUGLAS J. NORTON, WATER ENV'T FED'N, SAMPLING TMDL IMPLEMENTATION RATES AND PATTERNS IN THE NORTH CENTRAL US 1309 (2009); OFFICE OF WETLANDS, OCEANS, & WATERSHEDS,

whether TMDLs have improved water quality. Instead, it is whether something—anything—has been done implement the TMDL.[38] Particularly for TMDLs focused on nonpoint source pollutants, the answer to that question is often "no."[39] Additionally, EPA has surveyed its regional TMDL staff to find out about levels of awareness of, and interest in, TMDLs among staff at state and local planning offices, agricultural agencies, and other governmental entities that might partner in TMDL implementation. Those surveys revealed a widespread perception that the very people who ought to be implementing TMDLs instead lack understanding of, and commitment to, the TMDL program.[40] For other TMDLs, some type of implementation program exists, but many of the studies do not measure that implementation program against metrics designed to assess the likelihood of producing successful outcomes.[41] And, as EPA often notes, information gaps are pervasive.[42]

Other studies do provide that second layer of analysis. One of the most recent major studies is a General Accounting Office report from 2013.[43] The authors surveyed state agency staff responsible for TMDL implementation, and they also identified features thought to promote

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U.S. ENVTL. PROT. AGENCY, ANALYSIS OF TMDL IMPLEMENTATION RATES IN EPA REGION 5 (2009); THE CADMUS GRP., INC., TOTAL MAXIMUM DAILY LOAD (TMDL) IMPLEMENTATION TRACKING NEEDS ASSESSMENT: CURRENT STATUS AND FUTURE NEEDS FOR STATES IN REGION 5, 6, AND 10 (2008); INDUS. ECON., INC., DEVELOPING EFFECTIVE NONPOINT SOURCE TMDLS: AN EVALUATION OF THE TMDL DEVELOPMENT PROCESS (2007); Valentina Cabrera-Stagno, *Developing Effective TMDLs: An Evaluation of the TMDL Process*, PROC. WATER ENV'T FED'N, TMDL 2007 443 (2007); U.S. ENVTL. PROT. AGENCY, REGION 10, WATERSHED PROT. UNIT, IMPLEMENTATION OF WASHINGTON'S TMDL PROGRAM, 1998-2003 (2005).

38. *E.g.*, OFFICE OF WETLANDS, OCEANS, & WATERSHEDS, *supra* note 37, at iii; FY2010 NATIONAL REPORT ON IMPLEMENTING TOTAL MAXIMUM DAILY LOADS (TMDLS), *supra* note 37.

39. *See, e.g.*, HORNBEEK ET AL., *supra* note 36, at vi ("[E]xisting studies suggest that Total Maximum Daily Load implementation for point sources tends to occur more reliably than for nonpoint sources."); FY2010 NATIONAL REPORT ON IMPLEMENTING TOTAL MAXIMUM DAILY LOADS (TMDLS), *supra* note 37, at 10 (finding that only eight percent of mapped nonpoint source TMDLs are associated with an implementation project funded through section 319 of the Clean Water Act). The actual implementation percentage may be somewhat higher; implementation can occur without a section 319 grant. But federal grants are likely to be one of the first sources would-be implementers look to—federal money is usually a welcome thing—so those numbers probably provide at least a rough proxy for actual implementation rates.

40. INDUS. ECON., INC., *supra* note 37, at ES-4 ("EPA TMDL respondents *consistently* ranked state and local planning agencies, state agricultural agencies, and USDA programs as stakeholders/organizations with the least understanding of the TMDL program, lowest commitment to achieve water quality standards based on TMDLs, and fewest action(s) taken to improve water quality based on TMDLs.") (emphasis and parentheses in original).

41. For one exception, see HORNBEEK ET AL., *supra* note 36, at 4–5 (describing state agency staff's perceptions about whether loading has decreased and water quality has improved).

42. *See* FY2010 NATIONAL REPORT ON IMPLEMENTING TOTAL MAXIMUM DAILY LOADS (TMDLS), *supra* note 37, at 2 ("[M]any obstacles to comprehensive TMDL implementation tracking exist . . . .").

43. GAO, *supra* note 35.

successful TMDLs and then chose a sample of TMDLs to compare to their metrics of success. Their results were not encouraging, as the following partial, but reasonably representative, sampling demonstrates:

- "EPA tracks basic information on TMDL development, such as the number, location, and type of long-established TMDLs but, generally, does not have information on the extent to which the TMDLs have been implemented or have improved the quality of impaired water bodies."[44]
- "[S]tate TMDL coordinators do not know the extent to which many long-established TMDLs have been implemented. For those TMDLs where information exists, state coordinators reported that pollutants had been reduced in many waters, but few TMDLs had helped water bodies attain water quality standards."[45]
- "Long-established TMDLs often do not contain key features that would help water bodies attain water quality standards, in part because EPA's regulations and guidance do not direct TMDLs to contain them."[46]
- "As reported by state TMDL coordinators, the absence of two key factors—specifically, legal authority and sufficient funding—has generally stymied the implementation of TMDLs meant to curtail nonpoint source pollution."[47]

Several authors have taken a different approach to reviewing TMDLs and have focused on identifying successful TMDLs and trying to discern what makes them work.[48] By design, these studies are not representative; they try to figure out what can be learned from the outliers. But the fact that the authors did find successful TMDLs to review is at least modestly encouraging, even if there is little reason to infer that those successes extend to the thousands of TMDLs not selected for the studies.

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44. *Id.* at 27.
45. *Id.* at 35.
46. *Id.* at 36.
47. *Id.* at 62.
48. *See, e.g.*, Brian Benham et al., *Lessons Learned from TMDL Implementation Case Studies*, 2 WATER PRAC. 1 (2008); U.S. ENVTL. PROT. AGENCY, OFFICE OF WETLANDS & WATER, WATERSHED BRANCH, TOTAL MAXIMUM DAILY LOADS WITH STORMWATER SOURCES: A SUMMARY OF 17 TMDLS (2007); CTR. FOR TMDL & WATERSHED STUDIES AT VA. TECH, TMDL IMPLEMENTATION – CHARACTERISTICS OF SUCCESSFUL PROJECTS (2006).

Finally, two other types of information are relevant to any inquiry about TMDLs. The type of information is water quality data. Under Clean Water Act section 305(b), states must monitor water quality in their rivers, lakes, streams, and bays, and EPA aggregates the state reports to produce nationwide summaries of water quality status and trends.[49] These reports also are not encouraging. They show that water quality problems remain pervasive across much of the American landscape.[50] They also show that pollution sources that fall outside the reach of the NPDES program—and therefore might be the central targets of TMDLs—are the primary culprits for much of that water quality impairment.[51] To blame TMDLs for the persistence of these water problems would be to oversimplify a complex situation; these problems might have been even worse had TMDLs not been prepared. But it is at least accurate to say that the problems that people hoped TMDLs would solve have not, in fact, been solved.[52]

The second type of information addresses the costs of developing TMDLs. Current aggregate data on those costs are not easy to find; EPA's last comprehensive estimate of the cost of TMDL development comes from a 2001 draft report, which predicts that aggregate state costs would level off at between 68 and 75 million dollars per year.[53] But that estimate is almost certainly much too low. EPA predicated the assumption on an estimate that an average TMDL would cost $52,000,[54] while recent data suggest that for California, at least, average TMDL development costs are now closer to 1.3 million dollars.[55] Everything is more expensive in California, of course, but even if those estimates represent an upper bound, they suggest that EPA's

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49. 33 U.S.C. § 1315(b).

50. U.S. ENVTL. PROTECTION AGENCY, *supra* note 9; *see* GAO, *supra* note 35, at 14 (chart showing water quality trends).

51. *See* U.S. ENVTL. PROTECTION AGENCY, *supra* note 9 (listing agricultural sources as the leading cause of water quality impairment).

52. *See* GAO, *supra* note 35, at 62 (noting the lack of progress in nonpoint source pollution).

53. U.S. ENVTL. PROT. AGENCY, THE NATIONAL COSTS OF THE TOTAL MAXIMUM DAILY LOAD PROGRAM (DRAFT REPORT) ii–iii (2001). EPA's cost estimates for implementing TMDLs are much higher. *Id.* But given the uneven implementation of TMDLs, those estimates may not correspond to anything actually occurring in the real world. They also may be far lower than the direct costs of developing some alternative program that effectively regulates the pollution sources that TMDLs might target. The financial benefits of such a program also might be quite large, but that is a question for another analysis.

54. *Id.* at iii.

55. *See* STATE WATER RES. CONTROL BD. & REG'L WATER QUALITY CONTROL BDS., CALIFORNIA TOTAL MAXIMUM DAILY LOAD (TMDL) PROGRAM SUMMARY REPORT, FISCAL YEAR 2013 – 2014 18 (2014) (showing cost data); Email from Greg Gearheart, Dir., Office of Info. Mgmt. & Analysis, Cal. Envtl. Prot. Agency, State Water Res. Control Bd., to Dave Owen (Oct. 21, 2015, 9:23 AM) ("Average (staff and contracts) cost per TMDL to be completed in CA is about $1.5M.") (parentheses in original) (on file with Vermont Journal of Environmental Law).

older estimates were off by a wide margin. EPA also predicated its estimate on the assumption that approximately 36,000 TMDLs would be prepared, and the current TMDL count is probably more than double that number, with thousands more still in the works.[56] While pinpointing the exact cost of TMDL development probably is not possible—and while the number, whatever it is, would pale in comparison to some other government programs—the expense of developing TMDLs clearly is far from negligible.

Those expenses also bring opportunity costs. To the extent that money for TMDLs comes out of lump sum allocations to state or federal environmental agencies, it could have been spent on environmental protection in some other form. And there is no shortage of needs. To provide just one example, state environmental enforcement efforts are notoriously underfunded, and several million additional dollars per year might go a very long way.[57] Whether that money would have been effectively spent is another question; agencies do not always turn money into good results. But at the very least, it is possible that alternative expenditures would have been environmentally valuable.

While all of this may seem dismal, it is important to realize how much we just do not know. The optimal TMDL studies would not just sample a limited set of reports and examine their content. Instead, they might compare water quality data from many watersheds with and without TMDLs, controlling for other variables, all in hopes of discerning whether the presence of TMDLs correlates with positive changes in water quality status. No one has done that kind of study.[58] Additionally, the TMDL experiment, while not entirely new, is still no further along than adolescence. Sometimes regulatory programs take a long time to mature, and the TMDL program of 2040 may be quite different from that which exists today. And, finally, individual TMDLs do provide some basis for optimism. Efforts like the Chesapeake Bay TMDL and the Lake Champlain TMDL suggest that, at least sometimes, a TMDL may help regulators and water quality advocates gain traction on water quality problems that had been very difficult to resolve. But with all that said, there currently is little evidence that the TMDL program is producing anything more than isolated successes.

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56. U.S. ENVTL. PROT. AGENCY, *supra* note 53, at ii.

57. David L. Markell & Robert L. Glicksman, *A Holistic Look at Agency Enforcement*, 93 N.C. L. REV. 1, 53–55 (2014) (describing limited and declining enforcement budgets).

58. I doubt that is for lack of interest, and the authors of TMDL studies have generally been candid about the limitations of their methodologies. And I do not know whether such a study would even be possible. One key question would be whether water quality databases with sufficient longitude and data quality even exist.

III. STRUCTURAL FLAWS

So why these uneven (and obscure) results? One possible answer is that it can be very difficult to discern the causal relationships between particular provisions of environmental law and environmental changes in the real world.[59] But suppose, for a moment, that an even simpler explanation is correct, and that the evidence of success is sparse because successes have been few and far between. That would not be entirely surprising, for section 303 of the Clean Water Act was not constructed particularly well in the first place.

To understand that assertion, it is helpful to think about three primary categories of pollution to which TMDLs often apply, and which also are common sources of water quality problems. The first category—and, it turns out, the category where TMDLs offer the best fit—includes the same industrial and wastewater treatment plant discharges that the NPDES program already regulates. The second category is nonpoint source runoff, which includes pollution from forestry operations, agricultural stormwater, and irrigation return flows from agricultural fields. The third category, which occupies something of an intermediate position between nonpoint source runoff and traditional point sources, is urban stormwater runoff.

A. Traditional NPDES Sources

By nearly all accounts, the Clean Water Act's greatest successes have come through the NPDES program, which applies specifically to point sources of water pollutants.[60] The NPDES program prohibits unpermitted point source discharges, and it establishes technology-based numeric effluent standards for those discharges. Because those standards are numeric, violations are clear-cut; rarely is there much ambiguity about whether permit condition have been met.[61] NDPES permits also require dischargers to monitor their effluent levels and to report the results of their monitoring.[62] The Clean Water Act backstops these requirements with provisions allowing both governmental and citizen enforcement.[63] The

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59. Dave Owen, *Mapping, Modeling, and the Fragmentation of Environmental Law*, 2013 UTAH L. REV. 219, 278 (2013). Studies of TMDL implementation often note the challenges associated with determining the actual water quality consequences of TMDLs. *See, e.g.*, HORNBEEK ET AL., *supra* note 36, at 4–5.

60. *See, e.g.*, Cannon, *supra* note 21, at 621 ("Technology-based limitations have produced substantial reductions . . . .").

61. William L. Andreen, *Water Quality—Has the Clean Water Act Been a Success?*, 55 ALA. L. REV. 537, 549 (2004).

62. *Id.*

63. 33 U.S.C. § 1365.

entire system sets environmental law's gold standard for transparency and enforceability.[64] And TMDLs do play a part in that system.

When EPA and the states write NPDES permits, they begin with technology-based standards for effluent.[65] Generally speaking, those standards limit pollution based on the technological capabilities of dischargers, not based on the vulnerabilities of receiving waters.[66] But the statute also calls for more stringent permits when technology-based standards alone will not be sufficient to attain compliance with water quality standards.[67] That requirement exists with or without a TMDL; there is no legal reason why regulators must wait for TMDLs to write water quality-based effluent limitations ("WQBELs") into permits.[68] But a TMDL should, in theory, make WQBELs easier to set. TMDLs create overall pollution budgets for waterways, and those budgets should help regulators as they figure out how much pollutant loading each NPDES permit holder can contribute.[69] They also can provide an informational basis for water quality trading systems, which generally allow NPDES permit holders to trade effluent allocations with each other, or to acquire offsets from nonpoint source dischargers.[70]

EPA regulations bolster these connections between TMDLs and NPDES permits. These regulations require subdivision of the overall pollution budget into a load allocation, which covers nonpoint sources, and a wasteload allocation, which covers point sources.[71] The latter sub-budget should in turn facilitate a more refined allocation of pollution limits to specific NPDES permit-holders. The regulations also prohibit additional discharges into impaired waterways unless the discharger can demonstrate that "there are sufficient remaining pollutant load allocations to allow for

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64. *See* Wendy E. Wagner, *The Triumph of Technology-Based Standards*, 2000 U. ILL. L. REV. 83, 103 ("Environmental enforcement by private citizens is highest for violations of the Clean Water Act . . . .").

65. Andreen, *supra* note 61, at 548.

66. *Id.*

67. 33 U.S.C. § 1312; 40 C.F.R. § 122.44(d) (2011).

68. *See* 33 U.S.C. § 1312 (containing no mention of TMDLs).

69. *See* U.S. ENVTL. PROT. AGENCY, NPDES PERMIT WRITER'S MANUAL 6-30 (2010) Memorandum from N.Y. State Dep't of Envtl. Conservation to Reg'l Water Eng'rs, Bureau Dirs. & Section Chiefs, Division of Water Technical and Operational Guidance Series (1.3.1): Total Maximum Daily Loads and Water Quality-Based Effluent Limits 2–3 (July 8, 1996) (explaining links between TMDLs and WQBELs).

70. BOBBY COCHRAN & TIM MARTIN, BUILDING A TOTAL MAXIMUM DAILY LOAD TO BETTER SUPPORT WATER QUALITY TRADING 3, 4 (2014). Water quality trading generally allows entities that can reduce pollutant loading relatively cheaply to cut pollution more than would otherwise be required and to then sell credits to other entities for whom pollution reductions are more costly. U.S. ENVTL. PROT. AGENCY, WATER QUALITY TRADING TOOLKIT FOR PERMIT WRITERS 4 (2007).

71. *See* 40 C.F.R. § 130.2(e), (g)–(i) (defining load and wasteload allocations, and defining the TMDL as the sum of the load and wasteload allocations and a margin of error).

the discharge; and existing dischargers into that segment are subject to compliance schedules designed to bring the segment into compliance with applicable water quality standards."[72] In practice, that prohibition links a state's ability to permit new development to its implementation of existing TMDLs.[73]

But how much are TMDLs actually changing the water quality impacts of NPDES permit holders? Despite these regulatory linkages, the question is difficult to answer. There are reasons to suspect widespread benefits; most importantly, the mandatory nature of WQBELs creates a potentially direct connection between the information in TMDLs and actual controls on discharging facilities.[74] But there are also reasons for skepticism. First, the legal link between water quality standards and WQBELs does not depend on the presence of a TMDL, so even if WQBELs are improving water quality, TMDLs cannot necessarily claim to be part of the causal chain. Second, and perhaps most importantly, WQBELs impact a set of dischargers that already is subject to technology-based standards, some of which are quite stringent.[75] The impacts of TMDLs on many permits therefore may be marginal.

The balance of these factors is nearly impossible to discern, at least based on existing information. There is surprisingly little empirical research on how WQBELs actually are affecting water quality; and while the literature on TMDL implementation generally finds higher implementation rates for point source discharges, that literature also has very little to say about actual water quality improvements.[76] Consequently, the front where TMDLs might actually be most effective has gone largely unstudied.

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72. 40 C.F.R. § 122.4(h)(2)(i).

73. *See* Friends of Pinto Creek v. U.S. Envtl. Prot. Agency, 504 F.3d 1007 (9th Cir. 2007) (holding that a new permit could not issue because of the lack of compliance schedules for existing permittees in the same watershed). If a state has not yet prepared a TMDL for an impaired waterway, that particular mandate does not apply, though new sources still cannot impair water quality. *See In re* Cities of Annandale and Maple Lake NPDES/SDS Permit Issuance for the Discharge of Treated Wastewater, 702 N.W.2d 768, 773 (Minn. Ct. App. 2005), *rev'd on other grounds*, 731 N.W.2d 502 (Minn. 2007).

74. GAO, *supra* note 35, at 35 (noting state regulators' perceptions that wasteload allocations are actually being implemented).

75. *See* Cannon, *supra* note 21, at 614 ("The CWA's policy apparatus now squeezes increasingly expensive increments of improvements from point sources . . . .").

76. *See supra* notes 37–48 and accompanying text.

B. Nonpoint Source Runoff

When the TMDL era began, nonpoint sources were often the centers of attention.[77] Agricultural pollution was then, as it is now, a huge source of water quality impairment,[78] and agricultural pollution is almost entirely exempt from the Clean Water Act's permitting requirements for point sources.[79] Another mechanism was needed, and TMDLs were the great hope.[80] In some places, those hopes have been validated, at least partially; TMDL-based regulation of nonpoint sources does exist.[81] But it is rare.[82]

The reasons why stem partly from the statutory structure. Clean Water Act section 303 mandates the identification of impaired water bodies, the creation of TMDLs for those water bodies, and the existence of continuing planning processes for improving water quality in those water bodies.[83] Other sections of the Clean Water Act also authorize federal grants for addressing nonpoint source pollution.[84] But nowhere in the Clean Water Act is there a mandate for putting those plans into effect.[85] An implementation plan does not become a binding set of requirements, as would occur under otherwise analogous provisions of the Clean Air Act.[86] A state that fails to attain water quality standards faces no threat of lost funding (other than EPA's grants for nonpoint source pollution, which are

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77. *See, e.g.*, Seema Mehta, *Ocean Cleanup May Reach More than 100 Miles Inland*, L.A. TIMES (Jan. 17, 2001), http://articles.latimes.com/2001/jan/17/local/me-13425 [https://perma.cc/C2RC-AVSL] (describing TMDLs as "limits for pollution sources such as farms, nurseries and cities that were largely ignored in earlier enforcement efforts").

78. *See* Andreen, *supra* note 61, at 563–64 (describing water quality problems in the early 2000s).

79. *See* 33 U.S.C. § 1362(14) (exempting "agricultural stormwater discharges and return flows from irrigated agriculture" from the Clean Water Act's definition of point sources, and thus from regulatory coverage under the NPDES program).

80. *See, e.g.*, Mehta, *supra* note 77 (quoting NRDC attorney David Beckman: "'This is cutting edge. . . . [The limits] are intended to actually accomplish the fundamental goal of the Clean Water Act—to make water safe for swimming, fishing and other uses people like. It's because they have teeth that there's opposition to virtually every TMDL I can think of.'") (brackets in original).

81. *See, e.g.*, N. COAST REG'L WATER QUALITY CONTROL BD., NORTH COAST IMPAIRED WATERS & TMDL PROGRAM FISCAL YEAR 2013 – 2014 ACCOMPLISHMENTS, http://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/pdf/141205/140807_RMF_FY13-14TMDLYearEndEssay_ForEORptB.pdf [https://perma.cc/5GSR-AN4Y] (describing TMDL implementation efforts, including several programs focused on nonpoint source discharges).

82. *See supra* notes 35–48 and accompanying text (describing multiple reports finding that TMDL implementation for nonpoint sources is particularly rare).

83. 33 U.S.C. § 1313(d).

84. 33 U.S.C. § 1329 (authorizing the section 319 grant program).

85. *See* Pronsolino v. Nastri, 291 F.3d 1123, 1140 (9th Cir. 2002) ("States must implement TMDLs only to the extent that they seek to avoid losing federal grant money; there is no pertinent statutory provision otherwise requiring implementation of § 303 plans or providing for their enforcement.").

86. *See* 42 U.S.C. § 7410(a)(2) (2012) (requiring enforceable controls).

not very large) or of a federal takeover of plan implementation.[87] Nor is there any requirement that water quality planners demonstrate that plans, if implemented, actually would reduce nonpoint source pollution enough to attain compliance with water quality standards.[88] The TMDLs and plans just have to exist.

The absence of a mandate is not a matter of coincidence or oversight, for Clean Water Act section 303 was designed to leave a substantial and discretionary role for the states.[89] And states can give TMDLs teeth if they want to; all it takes is state legislation linking completed TMDLs to mandatory controls on nonpoint sources. But such legislation is rare. In preparing this article, I searched Westlaw's databases of state statutes for every reference to TMDLs and reviewed those statutory sections for any provisions mandating that TMDLs be turned into nonpoint source controls. I found almost nothing. Only two states—Vermont and Virginia—have statutory language drawing such links explicitly.[90] One other—California—had state statutory language that regulators have interpreted as establishing such links.[91] But more common, in my search, was language like the following blunt proclamation of the Arizona Revised Statutes: "Any reductions in loading from nonpoint sources shall be achieved voluntarily."[92]

Of course, mandates can come from sources other than explicit statutory language. Sometimes regulators can do creative work with

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87. *But see* § 7410(c) (requiring federal implementation plans if state plans are not submitted or are inadequate).

88. *But see* § 7511a(c)(2)(A) (stating that air quality plans must "provide for attainment of the ozone national ambient air quality standard by the applicable attainment date," and requiring a modeled demonstration that attainment will actually occur).

89. *See* HOUCK, *supra* note 18, at 14–24 (describing the history of Clean Water Act section 303).

90. *See* VA. CODE ANN. § 10.1-104.8 (2011) (requiring plans to implement the Chesapeake Bay TMDL); VT. STAT. ANN. tit 10, § 1386(a) (2016) (requiring plans for implementing the Lake Champlain TMDL).

91. *See* CAL. ENVTL. PROT. AGENCY, STATE WATER RES. CONTROL BD., POLICY FOR IMPLEMENTATION AND ENFORCEMENT OF THE NONPOINT SOURCE POLLUTION CONTROL PROGRAM 6–7 (explaining the agency's interpretation of the Porter-Cologne Water Quality Control Act). At Vermont Law School's 2015 TMDL symposium, participants who were familiar with Florida's implementation practices commented that their state had integrated regulation of nonpoint sources into its TMDL program.

92. ARIZ. REV. STAT. § 49-234(G) (2002); *see* IDAHO CODE § 39-3611(10) (2015) ("Nothing in this section shall be interpreted as requiring best management practices for agricultural nonpoint source activities which are not adopted on a voluntary basis . . . ."); KAN. STAT. ANN. § 82a-2007 (2012) (authorizing the appointment of a staff person to "implement voluntary incentive based conservation programs"); MONT. CODE ANN. § 75-5-703(8) (1997) (calling for "a voluntary program of reasonable land, soil, and water conservation practices to achieve compliance with water quality standards for nonpoint source activities for water bodies that are subject to a TMDL developed and implemented pursuant to this section").

ambiguous statutory provisions. But that will only happen if regulators have at least arguable statutory authority to impose such controls and if they operate in a political context where such controls are allowable. Just how often those circumstances arise is a question this article cannot definitively answer, but they do not appear to be common. In many states, legislation explicitly forbids state agencies from imposing any regulatory controls that exceed the minimum levels mandated by federal law.[93] In many states, also, the current political climate is not at all supportive of environmental regulation.[94] It would take a bold bureaucrat to defy those laws, or that culture, and impose discretionary controls on agricultural polluters. And retrospective studies of TMDL implementation for nonpoint sources suggest that such boldness is not occurring very often.[95]

And yet, boldness does occur sometimes. *Pronsolino v. Nastri*, the case that most succinctly summarizes the limitations of section 303, also hints at the potential: the TMDL at issue in that case actually did lead to significant controls on nonpoint source pollution from silvicultural activities.[96] Indeed, the North Coast Regional Water Quality Board—the California regional agency responsible for implementing that TMDL, and many others—has used the Garcia River TMDL as an important first step down a path toward broader regulation of nonpoint source pollution.[97] Much farther east, implementation of the Chesapeake Bay TMDL—probably the most ambitious and highest-stakes TMDL ever prepared—will include controls on nonpoint sources.[98] And, as the articles in this issue demonstrate, real controls on nonpoint sources are integral to implementation of the TMDL

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93. *See* William L. Andreen, *Federal Climate Change Legislation and Preemption*, 3 ENVT. & ENERGY L. & POL'Y 261, 279–80 (2008) (describing such laws).

94. *See, e.g.*, Trip Gabriel, *Ash Spill Shows How Watchdog Was Defanged*, N.Y. TIMES (Feb. 28, 2014), http://www.nytimes.com/2014/03/01/us/coal-ash-spill-reveals-transformation-of-north-carolina-agency.html [https://perma.cc/83TJ-YQQ3] (describing political pressures against environmental regulation in North Carolina); Charles Duhigg, *Clean Water Laws Neglected, at a Cost in Suffering*, N.Y. TIMES (Sept. 13, 2009), http://www.nytimes.com/2009/09/13/us/13water.html?_r=0 [https://perma.cc/LHX7-TKEX] (describing political issues and public health consequences in West Virginia and other states).

95. *E.g.*, GAO, *supra* note 35, at 35 ("[state agency] coordinators reported that a higher proportion of long-established point source TMDLs helped water bodies attain water quality standards than did nonpoint source TMDLs.").

96. *See* 291 F.3d at 1129–30. ("In order to comply with the Garcia River TMDL, Forestry and/or the state's Regional Water Quality Control Board required, among other things, that the Pronsolinos' harvesting permit provide for mitigation of 90% of controllable road-related sediment run-off and contain prohibitions on removing certain trees and on harvesting from mid-October until May 1.").

97. *See generally* JONATHAN WARMERDAM, N. COAST REG'L WATER QUALITY CONTROL BD., GARCIA RIVER WATERSHED AND SEDIMENT TMDL ACTION PLAN (May 5, 2010), http://www.waterboards.ca.gov/academy/courses/mtshasta/050510_jwarmerdam.pdf [https://perma.cc/LD52-9FJT] (PowerPoint describing implementation activities).

98. *See Am. Farm Bureau Fed'n*, 792 F.3d 281 (describing the TMDL).

for Lake Champlain. These efforts demonstrate beyond doubt that nonpoint source regulation can be done and that TMDLs can be part of the regulatory process. But these efforts also seem to be outliers.

C. Urban Stormwater

A third major category of pollution sources does not fit neatly into either of the analytical categories described above. One of the leading causes of water quality impairment—the leading source, in the areas where most people live and work—is urban stormwater pollution.[99] Legal commentators often lump urban stormwater runoff into the larger category of nonpoint source pollution, but that is mostly incorrect; most urban stormwater discharges through point sources.[100] But the laws and physical realities of urban stormwater are sufficiently different from those of other point sources that urban stormwater generates its own distinctive problems and merits its own separate discussion.[101]

The problems with urban stormwater TMDLs arise partly because of mismatches between the requirements of section 303 and the nature of urban stormwater pollution. Section 303 is highly specific in its prescriptions: states must set daily loading budgets for individual pollutants.[102] That is a sensible system for discrete pollutants that arrive in predictable increments.[103] But stormwater tends to move in erratic pulses, and those pulses typically contain cocktails of different pollutants, all of which interact to degrade waterways.[104] Some of the stressors associated with urban stormwater runoff also do not meet the Clean Water Act's definition of pollutant.[105] Excess flow, for example, is an excellent proxy for pollutant levels and also is a major stressor for many urban

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99. *See* Owen, *supra* note 6, at 441–44 (describing the pervasiveness of urban stormwater pollution).

100. Dave Owen, *Stormwater, Point Sources, and the Importance of Getting Terms Right*, ENVTL. L. PROF BLOG (Feb. 12, 2014), http://lawprofessors.typepad.com/environmental_law/2014/02/stormwater-point-sources-and-the-importance-of-getting-terms-right.html [https://perma.cc/N3AU-FMJ4].

101. *See generally* Owen, *supra* note 6, at 445–54.

102. 33 U.S.C. § 1313(d).

103. *See* Wendy E. Wagner, *Stormy Regulation: The Problems that Result when Stormwater (and Other) Regulatory Programs Neglect to Account for Limitations in Scientific and Technical Information*, 9 CHAP. L. REV. 191, 201 (2006) (describing some of the advantages of the NPDES program).

104. Owen, *supra* note 6, at 446–47.

105. *See* 33 U.S.C. § 1362(6) (defining "pollutant" to include "dredged spoil, solid waste, incinerator residue, 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").

waterways.[106] But flow is not itself a pollutant.[107] Despite those challenges, TMDLs can be written for stormwater-impaired streams.[108] But during past research projects, regulators bluntly, and repeatedly, told me they found the TMDL requirements to be a misfit for urban waterways.[109]

Regulators' efforts to work around that mismatch also face legal impediments. One creative solution to the challenges of stormwater TMDLs is to create a proxy TMDL, which uses some other watershed feature—typically stormwater flow levels or impervious cover—as a proxy for pollutant loading.[110] As I have argued elsewhere, this approach makes scientific sense, for it focuses attention on root rather than intermediate causes of impairment, and policy sense, for it can produce budgets that municipal planners might actually use.[111] But proxy TMDLs have raised legal questions. Most prominently, a federal district court in Virginia recently held that EPA's use of a proxy TMDL for Accotink Creek was arbitrary and capricious.[112] The Clean Water Act, the court noted, required TMDLs for pollutants, and EPA's proxy—flow—was not a pollutant.[113] As a district court decision, the case holds no precedential value, and other courts might reach different results.[114] But, at the very least, the decision signals that proxy TMDLs occupy a legal gray zone, and it may persuade states and EPA to retreat from what initially seemed like promising policy innovations.[115]

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106. *See* Owen, *supra* note 6, at 452–53 (noting the problem).

107. *Id.*

108. *See* U.S. ENVTL. PROT. AGENCY, *supra* note 48 (providing case studies of stormwater TMDLs).

109. Owen, *supra* note 6, at 453–54.

110. *See, e.g.*, CONN. DEP'T OF ENVTL. PROT., A TOTAL MAXIMUM DAILY LOAD ANALYSIS FOR EAGLEVILLE BROOK, MANSFIELD, CT (2007) (using impervious cover as a proxy); VT. DEP'T OF ENVTL. CONSERVATION, TOTAL MAXIMUM DAILY LOAD TO ADDRESS BIOLOGICAL IMPAIRMENT IN POTASH BROOK, CHITTENDEN COUNTY 4–5 (2006) (using flow as a proxy).

111. Owen, *supra* note 6, at 462–63.

112. Va. Dep't of Transp. v. U.S. Envtl. Prot. Agency, No. 1:12-CV-775, 2013 WL 53741, at *7 (E.D. Va. 2013).

113. *Id.* at *4–*9.

114. While I have discussed issues with the legality of proxy TMDLs, see Owen, *supra* note 6, at 463–64, I think the district court was too quick to dismiss arguments favoring the legality of the Accotink Creek TMDL. In that particular TMDL, EPA was using flow as a proxy measure for a specific pollutant (sediment). That strikes me as a different situation than if EPA was using flow as a proxy for a suite of stressors, some of which are not pollutants. But that distinction did not seem important to the district court. *See* Dave Owen, *An Important Stormwater Case (and It's not the One You're Thinking of)*, ENVTL. L. PROF BLOG (Jan. 9, 2013), http://lawprofessors.typepad.com/environmental_law/2013/01/an-important-stormwater-case-and-its-not-the-one-youre-thinking-of.html [https://perma.cc/K3DC-NRKT] (discussing the Accotink Creek decision).

115. *See* Owen, *supra* note 6, at 463–64.

Urban stormwater TMDLs also face a significant additional challenge: the mechanisms for translating them into controls on individual sources are weak. That might initially seem like a surprising statement, for, as explained above, urban stormwater largely discharges through point sources, and point source permits generally must contain limitations designed to implement water quality standards and, therefore, TMDLs.[116] But for two reasons, that linkage is weaker with urban stormwater. The first reason is that many point source discharges are not part of the NPDES program. Clean Water Act section 402(p) creates a convoluted regulatory structure for stormwater runoff, and the upshot of that structure is that only a subset of stormwater point sources require NPDES permits.[117] Some major categories of sources—for example, developed sites in smaller municipalities or in census tracts with low population density—are exempt.[118] Second, courts have held that the NPDES program's requirements for WQBELs are not mandatory for municipal stormwater discharges, even if those stormwater discharges are subject to NPDES permitting.[119] Those holdings weaken what might otherwise be a powerful mechanism for turning TMDLs into enforceable controls.

Again, all of these obstacles have not prevented states from addressing urban stormwater in some TMDLs. Regulators in California, for example, have taken aggressive—and controversial—steps to use TMDLs as the basis for limitations on litter.[120] In Vermont, regulators have stood by their proxy TMDLs, notwithstanding legal controversies elsewhere about their use. The Chesapeake Bay TMDL should spur major steps to address urban stormwater pollution.[121] But each of these efforts involves state or local regulators with an independent commitment to water quality protection. For a recalcitrant state, the spurs to action remain limited.

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116. *See supra* notes 60–73 and accompanying text.

117. 33 U.S.C. § 1342(p).

118. Owen, *supra* note 6, at 449.

119. *See* Defs. of Wildlife v. Browner, 191 F.3d 1159, 1166 (9th Cir. 1999) ("In conclusion . . . Congress did not require municipal storm-sewer discharges to comply strictly with 33 U.S.C. § 1311(b)(1)(C)."); Md. Dep't of the Env't v. Anacostia Riverkeeper, 112 A.3d 979, 990–92 (Md. Ct. Spec. App. 2015), *rev'd on other grounds*, 2016 WL 929349 (Md. 2016).

120. City of Arcadia v. State Water Res. Control Bd., 38 Cal. Rptr. 3d 373 (Cal. Ct. App. 2006) (considering, and mostly upholding, a TMDL for trash in the Los Angeles River).

121. *See* U.S. ENVTL. PROT. AGENCY, CHESAPEAKE BAY TOTAL MAXIMUM DAILY LOAD FOR NITROGEN, PHOSPHOROUS AND SEDIMENT 8-14 to 8-15 (2010) (describing limits on urban stormwater pollution); Donna Peterson, *Arlington County Taking Lead in Curbing Runoff to Potomac River and Chesapeake Bay*, WASH. POST (Aug. 13, 2012), https://www.washingtonpost.com/blogs/the-state-of-nova/post/arlington-county-taking-lead-in-curbing-runoff-to-potomac-river-and-chesapeake-bay/2012/08/13/cc8615ce-e564-11e1-936a-b801f1abab19_blog.html [https://perma.cc/24U3-7XPZ] (discussing municipal efforts to curb stormwater runoff).

IV. LESSONS

The history of environmental law is filled with success stories. The United States has achieved major improvements in air quality while the economy has continued to grow;[122] many rivers are much cleaner than they were in the late 1970s;[123] and current practices for managing hazardous waste make the sloppiness of generations past seem mind-boggling.[124] Many of those successes are readily traceable to specific statutory provisions. But Clean Water Act section 303 does not yet seem to belong in the environmental law hall of fame, and there are reasons to suspect, based on the structural flaws described above, that it never well. That raises a question, then: what can we learn from all the things TMDLs, and section 303 more generally, seem not to have achieved?

Of many possible answers to that question, the discussion below focuses on just two. One involves designing statutes, and the other involves the decisions litigants make about forcing those statutes' implementation.

A. Mandates and Work-Arounds

One of the most striking features of section 303(d) is its particularity. In just a few words, the statute binds regulators to a single process: they must specify a maximum daily load of specific pollutants. Nowhere in the statute is there express permission for a state regulator to say, "what's impairing water quality in this stream is flow fluctuations, or water withdrawals, or a loss of riparian habitat, or dams, and calculating a daily pollutant load doesn't make sense, so we're not going to do it." Nor—according to the United States Court of Appeals for the D.C. Circuit, at least—can regulators say, "daily pollutant loads don't really make sense; let's use some other time period."[125] Nor does a regulator have clear statutory authorization to say, "we know the root problem of impairment and how we should go about

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122. *Clean Air Act Overview: Progress Cleaning the Air and Improving People's Health*, U.S. ENVTL. PROTECTION AGENCY, http://www.epa.gov/clean-air-act-overview/progress-cleaning-air-and-improving-peoples-health [https://perma.cc/9BZY-5HXX] (last visited Apr. 5, 2016).

123. *See* James Salzman, *Why Rivers No Longer Burn: The Clean Water Act Is One of the Greatest Success in Environmental Law*, SLATE (Dec. 10, 2012 5:20 AM), http://www.slate.com/articles/health_and_science/science/2012/12/clean_water_act_40th_anniversary_the_greatest_success_in_environmental_law.html [https://perma.cc/UY74-FT99] (describing the transformation of pollution control from 1969 to today).

124. I base this assertion on my own experience, prior to becoming a lawyer, performing hazardous waste management audits and working on waste site cleanups. The differences from past to current practices are dramatic.

125. *Friends of the Earth*, 446 F.3d at 142 ("Daily means daily, nothing else."). *But see* Natural Res. Def. Council v. Muszynski, 268 F.3d 91, 99 (2d Cir. 2001) (allowing non-daily measurements of loading).

regulating it, so let's just go ahead and do that."[126] The statute presumes that one regulatory method always works best, with other methods offering supplements but not substitutes.

In historical context, that specificity makes some sense. In the early 1970s, Congress recognized that government agencies would be essential to the project of implementing environmental law, and that the states would need to be involved too, but reliance did not mean trust.[127] So Congress turned to highly specific mandates, often backstopped by petition and citizen suit provisions, to ensure that state and federal agencies actually carried out their mandates.[128] For that reason, perhaps the most anomalous feature of section 303(d) is not the specificity of its mandates but their incompleteness. In other areas of environmental law, like the Clean Water Act's provisions for regulating point sources or the planning provisions of the Clean Air Act, the mandates extend not just to planning but also to implementation.[129] In section 303, Congress somewhat uncharacteristically stopped short.

Four decades later, however, that level of distrust looks anachronistic. EPA is not simply a timid expert, capable of regulating effectively if and only if Congress tells it exactly what to do and how to do it. Instead, it does things—often bold things—partly on its own initiative; it comes up with regulatory techniques that Congress might not have contemplated; and, sometimes, it exercises restraint for sensible reasons.[130] Other agencies can and do exercise similar judgment.[131] Spurs to action still clearly have a place in environmental law. But to bind an entire regulatory process within a narrow statutory straitjacket no longer makes much sense.

And there are alternatives. Section 303(d) could have been constructed to require EPA and the states to prepare TMDLs or, if they explained why

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126. States can prioritize among streams, and the resulting latitude does provide some flexibility for EPA or a state to prepare higher-value TMDLs first. But, in theory at least, a TMDL is eventually required for every impaired waterway.

127. *See* RICHARD J. LAZARUS, THE MAKING OF ENVIRONMENTAL LAW 87–91 (2004) (describing widespread distrust of EPA).

128. *See id.* at 79–84; SAX, *supra* note 32 (providing an intellectual blueprint for many of these accountability mechanisms).

129. *See, e.g.*, 42 U.S.C. § 7410 (setting forth requirements for state implementation plans).

130. EPA's Clean Power Plan (in my view, at least) exemplifies this: EPA used a creative regulatory mechanism, and it also tried to push to, but not beyond, the limits of political and legal feasibility. *See generally* Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 80 Fed. Reg. 64662 (Oct. 23, 2015) (to be codified at 40 C.F.R. pt. 60).

131. *See, e.g.*, Dave Owen, *Little Streams and the Transformations of Environmental Law*, 2016 UTAH L. REV. (forthcoming) (on file with Vermont Journal of Environmental Law) (describing a largely agency-driven process of expanding regulatory protections for small streams); John D. Leshy, *The Babbitt Legacy at the Department of the Interior: A Preliminary View*, 31 ENVTL. L. 199, 212–14 (2001) (describing changes to ESA implementation).

the TMDL approach did not make sense, to adopt enforceable recovery plans for impaired waterways. Similarly, it could have given regulators the option of skipping TMDLs, and skipping planning entirely, if they demonstrated that a regulatory program already in place would effectively address impairment in the affected waterway. To put the point more generally, the statute could have taken the same partial flexibility that reformers have long demanded for the regulated community and extended it to the regulators themselves: it could have established performance standards for regulators while allowing those regulators to determine how best to achieve those standards.[132] And, similarly, it could encourage more effective regulation by allowing actual regulatory controls—and results—to substitute for extra layers of regulatory process.

These alternative regulatory approaches would not be novel.[133] The Clean Air Act planning process, for example, allows some similar flexibility, giving regulators discretion to select many of the elements of state implementation plans, but backstopping that discretion by requiring a demonstration that the plans will work.[134] Other statutes create opportunities to substitute performance for process. Federal agencies often comply with the National Environmental Policy Act and the Endangered Species Act, for example, by reducing projects' environmental impacts so that they do not exceed regulatory thresholds, thus avoiding what otherwise would be complex regulatory procedures.[135] Sometimes those workarounds are controversial.[136] But TMDL implementation provides a stark reminder that the absence of a workaround can mean compelling agencies to allocate resources in rather sub-optimal ways. As environmental law grows up, that kind of narrow mandate is increasingly dated.

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132. *See* CARY COGLIANESE ET AL., PERFORMANCE-BASED REGULATION: PROSPECTS AND LIMITATIONS IN HEALTH, SAFETY AND ENVIRONMENTAL PROTECTION 1–2 (2002) (describing the push for performance standards; the report also identifies circumstances where performance standards would not make sense).

133. *See generally* Bradley C. Karkkainen, *Adaptive Ecosystem Management and Regulatory Penalty Defaults: Toward a Bounded Pragmatism*, 87 MINN. L. REV. 943 (2003) (supporting the use of penalty default regulatory structures, which use a somewhat blunt default legal arrangement as an incentive for parties to craft solutions better tailored to their needs).

134. 42 U.S.C. § 7410(a) (requiring assurances of attainment).

135. *See, e.g.*, Dave Owen, *Probabilities, Planning Failures, and Environmental Law*, 84 TULANE L. REV. 265, 295 (2009) (describing common mechanisms of NEPA compliance); U.S. FISH & WILDLIFE SERV., EARLY ACTION: CANDIDATE CONSERVATION AGREEMENTS (2012), http://www.fws.gov/southeast/candidateconservation/PDF/earlyactionCCAAbrochure.pdf [https://perma.cc/WN7S-P5VF] (describing candidate conservation agreements, which generally involve using commitments to heightened conservation to avoid the listing of species as threatened or endangered—and thus to also avoid all the procedural and substantive constraints a species listing entails).

136. *See* Bradley C. Karkkainen, *Whither NEPA?*, 12 N.Y.U. ENVTL. L.J. 333 (2004) (summarizing (and partially disagreeing with) critiques of mitigated FONSIs).

That insight may come too late for Clean Water Act section 303(d), for sympathetic amendments to our foundational environmental laws rarely gain much traction in the current Congress.[137] But if times change, adjustments that give regulators less discretion about whether they address water quality impairment and more discretion about how they do so would make a lot of sense. Similarly, as legislators design other environmental laws, the misconstruction of section 303 offers a useful reminder that giving regulators a range of tools to choose from can sometimes be a wise idea.

B. Considering Litigation's Pathways

The other key lessons apply to litigators. TMDL litigation was a grand experiment, and its core hypothesis—that requiring TMDLs would lead to significant and systemic improvements in water quality—has not been proven. If it remains unproven or, worse, is proven false, then environmentalist litigators ought to take note, not just for TMDL litigation but also across the fields of environmental and administrative law.

More than anything else, the uncertain outcomes of TMDLs underscore the importance of considering what will happen after one wins a case. Will the losing agency be compelled, not just to take some intermediate step toward environmental protection, but also to see the regulatory process through to actual environmental results?[138] Will a victory create a default prohibition on some kind of environmentally destructive action, thus requiring regulated entities to obtain permission—and, most likely, comply with protective conditions—before they act?[139] Sometimes the answer to one or both of those questions will be "yes," and then it may make sense to spur even a highly reluctant regulator to act. But if victory will only compel regulators to take some intermediate step that might or might not lead to environmental results, filing suit may be unwise, even if environmentalists are sure they can win. TMDLs exemplify this point. Only for one category of sources—traditional NPDES discharges—did generating a TMDL create a clear pathway to actual regulatory controls.[140] Other than that, the prevailing litigators were just compelling the production of documents that could sit, ignored, on dusty shelves.

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137. Richard Lazarus, *Environmental Law Without Congress*, 30 J. LAND USE 15, 28–33 (2014).

138. The Endangered Species Act, which mandates protection for listed species, provides a good example of such compulsion: winning a listing case means that species must receive protection. *See* 16 U.S.C. §§ 1536, 1538 (2012) (providing mandatory protections for listed species).

139. *See, e.g.*, 33 U.S.C. § 1311 (categorically prohibiting pollutant discharges, unless the discharger obtains and complies with a permit).

140. *See supra* Section III.

The second, and related, lesson is to consider the culture of the agency being challenged. Sometimes litigation compels reluctant agencies to act, and sometimes it unleashes them.[141] In the latter circumstance, it may not matter quite so much that a victory will not compel a process that will necessarily culminate in regulatory controls. But in the absence of an agency culture sympathetic to the underlying goals of an environmental case, taking off the leash will not do much good.

Here, TMDLs present a more complicated story. EPA clearly has shown a commitment to the basic goals of TMDLs, and its TMDL regulations do flesh out the basic statutory mandate.[142] In past regulatory processes, EPA also came close to adding real teeth to TMDL requirements; late in the Clinton Administration, EPA proposed rules that would have further strengthened the TMDL program by demanding that states provide reasonable assurances of actual implementation.[143] Those rules did not last, but the fact that they almost became operable suggests that litigants were not irrational in their hopes.[144]

Nor were litigants crazy to expect that at least some of the fifty states would embrace TMDL requirements and try to turn them into something meaningful. Environmental politics vary tremendously from state to state, and some of those states—California is perhaps the best example—take pride in their reputations as environmental leaders.[145] In addition to EPA and the states, there are many other actors, both private and public, that could turn TMDLs into documents with real meaning.[146] Sub-state actors, other federal agencies, and watershed groups all could, and sometimes have, taken TMDLs and turned them into stepping stones toward environmental progress.[147]

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141. The *Massachusetts v. EPA* litigation against EPA arguably exemplifies the latter dynamic. 549 U.S. 583 (2007). Many people working at EPA in the mid-2000s had the competence and, most likely, the inclination to take steps toward addressing climate change, and the Supreme Court's ruling gave them—eventually—the ability to begin taking those steps.

142. For example, the regulations call for load and wasteload allocations—requirements that do not appear within the statute itself. *See Am. Farm Bureau Fed'n*, 792 F.3d at 300 (finding these regulatory requirements to be lawful).

143. *See* Linda A. Malone, *The Myths and Truths that Ended the 2000 TMDL Program*, 20 PACE ENVTL. L. REV. 63, 64–66 (2002) (describing EPA's efforts).

144. *See id.* at 68–69 (chronicling the demise of the rulemaking effort).

145. *See, e.g.*, Richard M. Frank, *California & the Future of Environmental Law & Policy*, 35 ECOLOGY L. CURRENTS 62 (2008) (describing California's leadership roles and also a few arenas in which it is a laggard).

146. *See* Mark Lubell et al., *Watershed Partnerships and the Emergency of Collective Action Institutions*, 46 AM. J. POLI. SCI. 148, 149 (2002) (noting the existence—as of 2002—of 958 watershed partnerships in the United States).

147. *See, e.g.*, KAJSA STROMBERG ET AL., NORTH FORK COEUR D'ALENE RIVER SUBBASIN WATERSHED RESTORATION EFFECTIVENESS REVIEW – SEDIMENT REDUCTIONS AND BIOLOGICAL RESPONSE (2013), https://www.deq.idaho.gov/media/1060945-

TMDL litigation, in short, was not obviously quixotic. Nevertheless, the inescapable reality is that most TMDL lawsuits were compelling states to take one additional, and partial, step in a process that they had never wanted to begin in the first place, and that would not lead to water quality protection without additional initiatives. Because of that history, any assumption that many states would say, "well, we never wanted to do TMDLs at all, but now that we're doing them, let's turn them into meaningful regulatory documents," seems to have been far-fetched.[148]

The point of this discussion is not condemn the litigators who sought to compel TMDLs. Clearly, I am skeptical of the utility of the cases they filed, but hindsight makes judgment all too easy. At the time, these litigators were facing huge unresolved water quality problems and better options for addressing nonpoint source pollution did not exactly seem abundant. Litigation and lawmaking also are highly uncertain practices, and often one cannot achieve a positive outcome without first engaging in the fight. But if hindsight is no basis for condemnation, it is a useful basis for assessing the future. And hindsight about TMDLs suggests the need for caution about when environmental litigators sue, even if a case seems like it can be won.

CONCLUSION

This article's conclusions may seem a little belated. After all, Congress and litigators did what they did, and with the TMDL program now in full swing, the lessons of the past may matter less than finding ways to make a flawed program work in the future. For that reason, the more important story in this volume is about the Vermonters who are turning the TMDL program, warts and all, into a viable tool of water quality improvement. Strong institutions and smart individuals can sometimes conjure good policy from weak law, and in the Lake Champlain basin, and elsewhere in the country, many people are trying to do just that with TMDLs. Some have already succeeded; others may yet do so.

But underlying legal structures still matter, and we can learn a thing or two from the past. Here, the primary lesson is that a major environmental program has not yet proven its worth. And while future studies may fill what presently are large information gaps, and also may paint a more

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north_fork_cda_river_sba_watershed_restoration_effectiveness_review_0913.pdf [https://perma.cc/RV3H-N6MJ] (describing successful implementation of several TMDLs in Idaho); VA. DEP'T OF ENVTL. QUALITY, TMDL PROGRAM SIX YEAR PROGRESS REPORT 2000 - 2006 (2007), http://www.deq.state.va.us/Portals/0/DEQ/Water/TMDL/06prgrpt.pdf [https://perma.cc/82HC-EM3B] (providing detailed case studies showing water quality improvements).

148. *See* HOUCK, *supra* note 18, at 133–34 (quoting multiple Congressmen's observations about the states' reluctance to protect water quality).

positive picture, the presently-thin evidence of success offers cautionary lessons for statutory and regulatory design and for litigants choosing future battles. Sometimes a regulatory program just is not constructed to succeed, at least not on a widespread basis, and occasionally, regulators may be right to leave a mandate on the shelf.