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Science, Politics, Law and the Arc of the Clean Water Act: The Role of Assumptions in the Adoption of a Pollution Control Landmark

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I. INTRODUCTION

As the 1960s drew to a close, the nation's surface water resources were heavily polluted. In the first of a three-part series of articles on public regulation of water quality, Professor William Hines found that "[p]ollution invades our waters in such a noxious variety of forms as to nearly defy description."[1] According to Hines, most of the surface waters within the United States were only marginally suitable for even low-quality uses such as irrigation, stockwatering, and industrial intake, "and many of our waters are so contaminated as to be offensive to sight and smell."[2] The problem, however, extended beyond aesthetical niceties. Hines cited to warnings by public health officials that water pollution rendered the country vulnerable to serious health problems arising from "the disease carrying capacity of our polluted watercourses."[3] He asserted that the need to control water quality "raises a kaleidoscopic array of scientific, economic, political and social issues,"[4] and he characterized the effort to control water pollution as "the

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[1] N. William Hines, *Nor Any Drop to Drink: Public Regulation of Water Quality, Part I: State Pollution Control Programs*, 52 IOWA L. REV. 186, 186 (1966) [hereinafter Hines I]. The other two components of Hines' trilogy are *Part II: Interstate Arrangements for Pollution Control*, 52 IOWA L. REV. 432 (1966), and *Part III: The Federal Effect*, 52 IOWA L. REV. 799 (1967) [hereinafter Hines III].

[2] Hines I, *supra* note 1, at 189. Professor Hines defined water pollution in terms of unsuitability of the resource for desired human uses. *Id*. at 188 (stating that "pollution of water simply means that the quality of the resource is lower than that reasonably required for the uses to which it would otherwise be put").

[3] *Id*. According to the Centers for Disease Control, hundreds of thousands of people become ill and hundreds die each year in the United States due to exposure to pathogenic organisms in drinking water. Chemical pollution also gives rise to public health concerns. *See* ROBERT L. GLICKSMAN, DAVID L. MARKELL, WILLIAM W. BUZBEE, DANIEL R. MANDELKER & A. DAN TARLOCK, ENVIRONMENTAL PROTECTION: LAW AND POLICY 801 (5th ed. 2007).

[4] Hines I, *supra* note 1, at 186.

latest problem in a long series of conflicts between private enterprise and public interest in the use of natural resources."[5]

Congress responded to the water pollution problem described by Professor Hines by adopting the Federal Water Pollution Control Act Amendments of 1972, now known as the Clean Water Act (CWA).[6] On its face, the CWA is an ambitious effort to rid the nation's surface waters of pollution. Its stated objective "is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters,"[7] and its goal is to eliminate the discharge of pollutants into navigable waters by 1985.[8] In the interim, the statute strives, "wherever attainable," to provide for waters capable of protecting fish and wildlife and supporting recreation (the so-called "fishable-swimmable waters" goal).[9] Nearly five decades after its enactment, surface water quality has improved considerably, but serious problems remain, and the goal of eliminating surface water pollution seems chimerical.

This essay examines the assumptions upon which Congress relied in enacting the CWA and the extent to which they have been borne out or belied as the federal and state governments have implemented their CWA responsibilities in the quest to achieve acceptably clean water. Part II briefly traces the development of federal water pollution control legislation before 1972, highlighting the deficiencies that contributed to the need for a new approach in 1972. Part III examines the scientific and technical, political, and legal assumptions that helped shape the 1972 CWA in an effort to determine whether the failure to achieve fully the statute's goals is inherent in the statute's design or is more likely the result of the law's incomplete implementation. Part

[5] *Id*. at 195.
[6] 33 U.S.C. §§ 1251-1387 (2006). A year before the publication of Professor Hines' trilogy, Congress enacted the Water Quality Act of 1965, Pub. L. No. 89-234, 79 Stat. 903, which was a predecessor of the modern CWA.
[7] 33 U.S.C. § 1251(a) (2006).
[8] *Id*. § 1251(a)(1).
[9] *Id*. § 1251(a)(2).

IV provides an assessment of how water quality conditions today compare both with those that existed in 1972 and with the goals that Congress identified in the CWA. Part V speculates about the future direction of water pollution control law. We conclude that a surprisingly large share of the assumptions upon which Congress built the CWA were valid and have helped to make the statute an environmental success story. The statute's failure to perform even more admirably than it has is due largely to a lack of legislative clarity in addressing the role of wetlands in preserving the integrity of aquatic ecosystems and to Congress' unwillingness to adopt, or force the states to adopt, measures to control nonpoint source pollution.

II. FEDERAL WATER POLLUTION CONTROL LEGISLATION BEFORE 1972

The story of pre-1972 federal water pollution legislation is one of incremental enhancement of federal responsibility and control. Although the Supreme Court in a series of decisions in the 1960s[10] converted the River and Harbors Act of 1899[11] into a vehicle for controlling water pollution, the statute was adopted primarily as a device to protect navigation.[12] The first significant piece of legislation adopted with the aim of reducing water pollution was the Federal Water Pollution Control Act of 1948.[13] Before World War II, water pollution control was regarded as a state and local responsibility.[14] The 1948 statute expanded the federal government's role by, among other things, authorizing it to take action to abate interstate pollution.[15] By the mid-1960s, Congress was ready to further expand the federal role, in part because of the "almost total lack of enforcement" of the 1948 statute (which depended on

[10] United States v. Standard Oil Co., 384 U.S. 224 (1966); United States v. Republic Steel Co., 362 U.S. 482 (1960). *See also* United States v. Pennsylvania Indus. Chem. Co., 411 U.S. 655, 670-71 (1973).
[11] 33 U.S.C. § 407 (2006). That statute prohibited discharge of "refuse matter" without a permit from the U.S. Army Corps of Engineers.
[12] GLICKSMAN ET AL., *supra* note 3, at 586-87.
[13] Pub. L. No. 80-845, 62 Stat. 1155 (1948).
[14] GLICKSMAN ET AL., *supra* note 3, at 586.
[15] *Id*. at 587.

cooperation by the states).[16] In addition, by that time the northern states were concerned that southern and western states were trying to lure industry with lax regulation. They therefore supported the establishment of a federal regulatory floor to combat the further migration of industry to the south and west.[17]

The Water Quality Act of 1965[18] required all states to designate intended uses for interstate water bodies within their jurisdiction and then adopt water quality standards that would allow each body to meet its intended use. States also had to craft plans to implement the standards. The standards were enforceable (in theory) by the federal government.[19] The statute failed to make a significant dent in interstate water pollution. By 1970, half of the states still had not adopted the water quality standards required by the 1965 Act.[20] Even when the states committed to meeting their statutory responsibilities, they often lacked the scientific information necessary to determine the appropriate pollutant concentrations needed to support the designated use and to convert the maximum concentrations into a series of effluent limits on individual dischargers. These difficulties hampered both the establishment and enforcement of effluent limits, as dischargers contested cause-and-effect linkages between their discharges and extant water quality problems at both stages of the process.[21]

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[16] S. REP. NO. 92-414 (1971), *reprinted in* 1972 U.S.C.C.A.N. 3668, 3672.
[17] GLICKSMAN ET AL., *supra* note 3, at 587.
[18] Pub. L. No. 89-234, 79 Stat. 903 (1965).
[19] JAMES SALZMAN & BARTON H. THOMPSON, JR., ENVIRONMENTAL LAW AND POLICY 141 (2d ed. 2007).
[20] *Id*.
[21] *Id*.; Oliver A. Houck, *Tales from a Troubled Marriage: Science and Law in Environmental Policy*, 17 TUL. ENVTL. L.J. 163, 168 (2003). *See also* Khristine L. Hall, *The Control of Toxic Pollutants Under the Federal Water Pollution Control Act Amendments of 1972*, 63 IOWA L. REV. 609, 611-12 (1978) ("Establishing an effective water quality standard was a cumbersome process, and many states resisted implementing effective standards."). Carol Rose has described the "tentative efforts to contain harmful impacts on the environment" made by the states in the "pre-history" stage before adoption of the CWA in 1972, noting that "the states were supposed to set water quality standards for different bodies of water. But these . . . approaches did not in fact work very well to improve water quality. The problem was that once the standards were set, nothing much happened. It was just too hard to connect deterioration in water quality to any particular responsible party." Carol M. Rose, *Environmental Law Grows Up (More or Less), and What Science Can Do to Help*, 9 LEWIS & CLARK L. REV. 273, 277 (2005). *Cf.* Kenneth M. Murchison, *Learning from More than Five-and-a-Half Decades of Federal Water Pollution Control Legislation:*

The Senate Committee on Public Works, which had jurisdiction over the legislation that was eventually adopted as the 1972 CWA, concluded after lengthy study "that the national effort to abate and control water pollution has been inadequate in every vital aspect."[22] Some states had taken the initiative to respond to the water pollution problems that they had clearly identified and understood well with some success.[23] Both industrial and municipal dischargers were continuing to dispose of large (and growing) quantities of waste into surface waters, however,

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Twenty Lessons for the Future, 32 B.C. ENVTL. AFF. L. REV. 527, 534 (2005) (noting that before 1972 "approximately half of the states had adopted water quality standards, but the federal legislation failed to compel meaningful progress toward achieving those standards"); James R. Rasband, *Priority, Probability, and Proximate Cause: Lessons from Tort Law About Imposing ESA Responsibility for Wildlife Harm on Water Users and Other Joint Habitat Modifiers*, 33 ENVTL. L. 595, 600 n.11 (2003) (deeming pre-1972 implementation of state water quality programs "mostly a failure"); Scott D. Anderson, *Watershed Management and Nonpoint Source Pollution: The Massachusetts Approach*, 26 B.C. ENVTL. AFF. L. REV. 339, 342 (1999) (concluding that before 1972, "the practice of states establishing acceptable concentrations of pollutants for different water bodies did not result in noticeable improvements in water quality. . . . [N]ot only were few states setting specific water quality standards, but many problems arose when states implemented these standards – including problems of determining when a discharge violated an established standard, and with identifying ways to allocate effluent limitations among different polluters. Moreover, industry commonly pressured states to reclassify their waterways to allow a greater pollutant load."); Ana M. Babigian, Note and Comment, *Medical Waste: A Loaded Gun on the Verge of Firing: United States v. Plaza Health Laboratories, Inc.*, 13 PACE ENVTL. L. REV. 1063, 1065-66 (arguing that the pre-1972 water quality standard "system proved to be inadequate, since it possessed a limited, unclear scope, suffered from administrative problems, and lacked a permitting process").

[22] S. REP. NO. 92-414, at 7 (1972), *reprinted in* 1972 U.S.C.C.A.N. 3668, 3674. *See also* EPA v. Calif. ex rel. Water Res. Control Bd., 426 U.S. 200, 203 (1976). One of the authors of this article was reminded almost daily of the sorry state of the quality of some of the nation's surface water bodies, having grown up in the 1950s and 1960s within a mile of a river that, even in 2009, was described as "[a] toxic cocktail of dioxin, sewage, heavy metals and industrial chemicals left behind by factories, tanneries, smelters and refineries," "a toxic disgrace," a river whose last "increasingly foul and dispiriting [80] miles" devolve into "a dark, malodorous industrial sink," and "a pretty decisive argument against human perfectibility." Peter Applebome, *In One Day, Saddening Reminders of a River's Murky History*, N.Y. TIMES, July 13, 2009. An environmental group spokesperson noted, however, that "the river, however foul, is cleaner than it was when, like the [Cuyahoga] in Cleveland, it could catch fire." *Id*. The quality of the Cuyahoga River near Cleveland, meanwhile, has improved markedly since the late 1960s and is now home to more than sixty species of fish. *See* Christopher Maag, *From the Ashes of 1969, a River is Reborn*, N.Y. TIMES, June 21, 2009 (quoting a river specialist describing the river's "amazing comeback"). At the same time, forty years after the Cuyahoga caught fire on June 22, 1969, EPA denied a request to remove a large part of the river from the list of water bodies not meeting state water quality standards because it was still failing to meet EPA standards in eight of fourteen locations for determining whether a river is healthy (such as the number of fish advisories). Michael Scott, *U.S. EPA: Cuyahoga River Has Made Strides but Stays on List of Polluted North American Waterways*, CLEVELAND PLAIN DEALER, June 23, 2009.

[23] EPA's initial national water quality inventory, which was conducted in 1973, found that there had been substantial improvement in water quality in major waterways over the last decade, at least with regard to the pollutants of greatest concern at the time: organic waste and bacteria. A. Myrick Freeman III, *Water Pollution Policy*, *in* PUBLIC POLICIES FOR ENVIRONMENTAL PROTECTION 97, 114 (Paul R. Portney ed., 1990); Jonathan Adler, *The Fable of Federal Environmental Regulation: Reconsidering the Federal Role in Environmental Protection*, 55 CASE W. RES. L. REV. 93, 96–97 (2004) [hereinafter Adler, *Fable*].

and enforcement was so sporadic and ineffective that it failed to serve as a deterrent.[24] Congress responded in 1972 by amending the 1948 and 1965 Acts through the adoption of the first version of the modern CWA.

III. THE SCIENTIFIC, POLITICAL, AND LEGAL ASSUMPTIONS BEHIND THE 1972 CLEAN WATER ACT

The Senate Committee on Public Works provided both the backdrop for and an explanation of the aims of the 1972 legislation. It denounced past federal water pollution control efforts as "sporadic, inconsistent, and improvised on an ad hoc basis."[25] It described the purpose of the 1972 CWA as the establishment of "a comprehensive long-range policy for the elimination of water pollution, making it clear to industry and municipalities alike the pollution control performance which will be expected over the next decade."[26] The Act's ambitious objective, as indicated above, was to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters" through the elimination of all pollutant discharges by 1985.[27]

In hindsight, the goal of eliminating all surface water pollution within thirteen years of the CWA's adoption appears to be wildly aspirational, and perhaps even to amount to foolhardy optimism. It is hard to escape the question of whether those who fashioned that goal operated under serious misconceptions about the nature of water pollution and an industrial society's

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[24] William L. Andreen, *Beyond Words of Exhortation: The Congressional Prescription for Vigorous Federal Enforcement of the Clean Water Act*, 55 GEO. WASH. L. REV. 202, 202-03 (1987) [hereinafter Andreen, *Exhortation*] (stating that, "confronted by the twin evils of severe water quality degradation and a failed federal initiative to control it, Congress opted to discard the earlier federal program and chart a new, more effective course"). *See also* William L. Andreen, *The Evolution of Water Pollution Control in the United States – State, Local, and Federal Efforts, 1789-1972: Part II*, 22 STAN. ENVTL. L.J. 215, 261-62 (2003) [hereinafter Andreen, *Evolution II*] (quoting Senator Edmund Muskie's view that "spotty" enforcement required a new approach that required "tougher enforcement").

[25] S. REP. NO. 92-414 (1971), *reprinted in* 1972 U.S.C.C.A.N. 3668, 3758.

[26] *Id*., *reprinted in* 1972 U.S.C.C.A.N. 3668, 3758.

[27] 33 U.S.C. § 1251(a) (2006).

ability to control it. This part explores what assumptions drove Congress to adopt the 1972 CWA and how those assumptions affected the scope and character of the supposedly "comprehensive" statutory program that emerged.

A. Scientific and Technical Assumptions

Numerous judgments face policymakers designing a pollution control program such as the CWA. Mistaken or misguided assumptions can sabotage a program before it even gets off the ground. This section addresses the scientific and technical assumptions and determinations that seem to have driven Congress to adopt a statute whose essential characteristics include a foundational "no discharge" goal, an objective of restoring and maintaining aquatic ecosystem integrity, a first line of defense against water pollution that relies on a set of technology-based rather than water quality-based controls, a virtual failure to address nonpoint source pollution, and an aquatic development control program that fails to mention the term wetlands even once.

1. *The Viability of the "No Discharge" Goal*

Did anyone who voted for the 1972 CWA really think that the statute would be capable of eliminating all discharges of surface water pollution by 1985? If so, they clearly failed to anticipate the scope of the task. Several competing theories emerge that support the conclusion that it is unlikely that the supporters of the CWA in Congress labored under the impression that the no discharge goal would become a reality by 1985.

The first possibility is that those who crafted and voted for the no discharge goal did so not because they thought achieving it was a realistic possibility but because they sought to make a moral statement that pollution of the nation's water resources was unacceptable.[28] There is some flavor of that sentiment in the legislative history. A Senate report attributes to the no

[28] SALZMAN & THOMPSON, *supra* note 19, at 142-43 (describing "moral outrage, not pragmatic cost-benefit considerations," as the motivating influence of federal pollution control legislation in the 1970s). *See generally* John P. Dwyer, *The Pathology of Symbolic Legislation*, 17 ECOL. L.Q. 233 (1990).

discharge goal a desire to "clearly establish that no one has the right to pollute – that pollution continues because of technological limits, not because of any inherent right to use the nation's waterways for the purpose of disposing of waste."[29] A related possibility is that the CWA's supporters knew full well that it would be impossible to meet the no discharge goal by 1985, but they codified such a lofty goal anyway so that when practical and political realities surfaced that required a retreat from the stated goal, the result would nevertheless be acceptable water quality.[30] Had the statute established a less absolute goal, the fallback position, too, would have been less protective.[31] Yet another possibility is that the no discharge goal allowed those who voted for it to present themselves to constituents as protectors of the environment, while at the same time to assure industries whose support they needed in future elections that the operative provisions of the statute fell far short of the stated aspirations.[32]

But the CWA's legislative history suggests another reason why Congress may have codified a no discharge goal along with a set of substantive provisions clearly inadequate to the

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[29] S. REP. NO. 92-414 (1971), *reprinted in* 1972 U.S.C.C.A.N. 3668, 3709. *Cf.* Friends of the Everglades v. South-Florida Water Mgmt. Dist., 2009 WL 1545551, at *15 (11th Cir. June 4, 2009) (noting that some of the CWA's substantive provisions "do not comport with its broad purpose of restoring and maintaining the chemical, physical, and biological integrity of the Nation's waters. (Which may help explain why the Act's express goal of completely eliminating all discharges of pollutants into the navigable waters by 1985 was not met.")).

[30] SALZMAN & THOMPSON, *supra* note 19, at 143 ("Anticipating that industry and municipalities were likely to fight vigorous implementation of the CWA, Congress may have felt that the fishable-swimmable and 'no discharge' goals would provide a valuable counterweight."). *Cf.* DAVID M. DRIESEN & ROBERT W. ADLER, ENVIRONMENTAL LAW: A CONCEPTUAL AND PRAGMATIC APPROACH 123 (2007) ("A charitable explanation is that Congress believes that it is important to establish long-term environmental aspirations, but realizes that economic, technological, and other factors must be considered in providing for short-term progress toward those goals.").

[31] The Senate report indicates that the Committee on Public Works regarded the no discharge goal as an important enforcement tool, but recognized that the impracticality of efforts to halt all pollution immediately required an exception for discharges covered by valid permits. S. REP. NO. 92-414 (1971), *reprinted in* 1972 U.S.C.C.A.N. 3668, 3709.

[32] DRIESEN & ADLER, *supra* note 30, at 123 (arguing that Congress may consciously refuse to adopt specific provisions adequate to achieve statutory goals "for fear of alienating powerful constituents and other interest groups"). *Cf.* Nat'l Wildlife Fed'n v. Gorsuch, 693 F.2d 156, 178 (D.C. Cir. 1982) ("[A]s any student of the legislative process soon learns, it is one thing for Congress to announce a stated goal, and another for it to mandate full implementation of that goal.").

task.[33] The legislative history reveals that the key House and Senate committees were both fully aware that achievement of the no discharge goal would not occur, at least in the time frame spelled out in the statute. Both committees recognized the difficulty of implementing a no-discharge policy.[34] Both intended that the no discharge goal serve as a kind of place holder, until a study that the law required the National Academy of Sciences and the National Academy of Engineering to conduct provided further information that Congress could use to determine the next step. That information would "assist the Nation in any decision on the proper enforcement mechanism to be established to support the goal, if appropriate, or a decision to refine the date for the attainment of the goal with greater precision, if required, or the extent of the exceptions to that goal, if any, or whether the costs associated with reaching this ultimate standard, in some instances, may far outweigh the benefits derived."[35] In the interim, the no discharge goal would provide an impetus for the Environmental Protection Agency (EPA), state environmental agencies, and industry to support research that would generate the technology needed to achieve acceptable levels of water quality.[36]

2. *Equilibrium vs. Dynamic Ecosystem Conceptions*

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[33] The CWA makes the discharge of any pollutant by any person unlawful, 33 U.S.C. § 1311(a) (2006), but explicitly exempts from that prohibition discharges covered by a permit issued by either the Environmental Protection Agency or a state to which EPA has delegated its permit-issuing authority. *Id*. §§ 1311(a), 1342(a)-(b).
[34] S. REP. NO. 92-414, *reprinted in* 1972 U.S.C.C.A.N. 3668, 3678.; H.R. REP. NO. 92-911, at __ (1972).
[35] S. REP. NO. 92-414, *reprinted in* 1972 U.S.C.C.A.N. 3668, 3678; *see also* H.R. REP. NO. 92-911, at ___ (1972) ("At the conclusion of the study, with the appropriate information available, the Congress will be in a position to fully evaluate the implications of a no-discharge policy."). The requirement that states review and revise, as appropriate, their water quality standards at least once every three years beginning in 1972 also reflects the evolutionary nature of the statute. 33 U.S.C. § 1313(c)(1) (2006). It should be noted that Congress retained the no discharge goal in § 101(a)(1) even after it amended the CWA in 1977 and 1987. It may not have been politically feasible then to delete the highly visible no discharge goals, even though it was clear that they could not be achieved, and perhaps should not be legally enforceable. The National Pollutant Discharge Elimination System (NPDES) permit program, *id*. § 1342, together with the extended deadlines for compliance with the Act's technology-based effluent limitations, made it clear that the no discharge goal was not the driving force behind day-to-day implementation of the statute.
[36] S. REP. NO. 92-414, *reprinted in* 1972 U.S.C.C.A.N. 3668, 3678. The National Water Commission established by President Lyndon Johnson to study water quality problems took a different view, deeming the no discharge goal unfeasible, "destined to lead to public disappointment," and reflective of the imputation of "an extravagant social value to an abstract concept of water purity." SALZMAN & THOMPSON, *supra* note 19, at 142.

The explanation for the appearance in the first section of the CWA of the goal of restoring and maintaining physical, chemical, and biological integrity is also contestable. It is now well established that Congress adopted many of the core environmental statutes of the 1970s on the basis of the belief among most scientists and natural resource management policymakers that ecological systems tend toward a natural equilibrium.[37] But the science of ecology has since experienced a "paradigm shift."[38] Instead of viewing natural systems as being in equilibrium or moving toward it, "[t]he contemporary paradigm recognizes that ecosystems are open and not necessarily in equilibrium. It recognizes disturbances to be a natural part of ecosystems."[39] The prevailing current view also recognizes the inevitability of disturbance and the need for environmental management efforts to consider them, lest those efforts risk failing to preserve the resources in question in the long term.[40]

If congressional policymakers were guided by the equilibrium paradigm in drafting the CWA, the statue's integrity goal would make sense. Some scholars attribute the integrity goal to adherence to the then-prevailing equilibrium paradigm.[41] Both the text and the legislative history are consistent with that premise, at least in part. The statute defines pollution to mean "the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water."[42] The Senate committee explained that it added the definition to refine the concept of

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[37] *See* Fred P. Bosselman & A. Dan Tarlock, *The Influence of Ecological Science on American Law: An Introduction*, 69 CHI.-KENT L. REV. 847, 863-69 (1994) (discussing "equilibrium theory").
[38] Judy L. Meyer, *The Dance of Nature: New Concepts in Ecology*, 69 CHI.-KENT L. REV. 875, 877 (1994).
[39] *Id*. at 877.
[40] *Id*. at 878-79.
[41] *See, e.g.*, RICHARD J. LAZARUS, THE MAKING OF ENVIRONMENTAL LAW 215 (2004) (contending that the CWA, reflected the prevailing notion "that nature was static and maintained an equilibrium or 'balance.' Pollution and excessive resource exploitation threatened the destruction of the fragile equilibrium underlying that balance, with potentially catastrophic consequences.").

[42] 33 U.S.C. § 1362(19) (2006). Most of the CWA's substantive provisions are tied to the discharge of "pollutants," rather than to the occurrence of "pollution." *See, e.g.*, *id*. §§ 1311(a), 1362(12). "Pollutants" are defined by way of a list of examples, rather than by generic description. *Id*. § 1362(6). Some provisions refer to pollution, however. *E.g.*, *id*. § 1251(b) (reciting a policy of preserving the primary right and responsibility of the states "to prevent,

water quality, as measured by the natural integrity of the resource. Consistent with the equilibrium paradigm, the committee asserted that

> [m]aintenance of such integrity requires that any changes in the environment resulting in a physical, chemical or biological change in a pristine water body be of a temporary nature, such that by natural processes, within a few hours, days or weeks, the aquatic ecosystem will return to a state functionally identical to the original.[43]

It added that the national policy concerning water bodies that are not pristine should be to take steps resulting in changes towards a pristine state in which physical, chemical, and biological integrity can be said to exist. Restoration and maintenance of a pristine state would provide "a stable biosphere that is essential to the well-being of human society."[44] Likewise, the House committee reported that the term "integrity" was meant to refer "to a condition in which the natural structure and function of ecosystems is maintained."[45] A natural" ecosystem, in turn, generally meant one with conditions that existed "before the activities of man invoked perturbations which prevented the system from returning to its original state of equilibrium."[46] The Committee's evocation of the equilibrium paradigm is unmistakable.

The legislative history also demonstrates, however, that legislators recognized that even ecosystems without people experience disturbances that alter their nature. The House committee pointed out that "[e]cosystems themselves are dynamic, changing things. They undergo their own evolutionary changes, and these are 'natural'."[47] It also provided examples of "minor physical activities," including "the perturbations caused by earthquakes, landslides, hurricanes, floods, volcanic activity, and the like," that result in "changes [that] are part of the general order

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reduce, and eliminate pollution"). Moreover, the original name of the 1972 version of the CWA was the Federal Water *Pollution* Control Act Amendments.

[43] S. REP. NO. 92-414 (1971), *reprinted in* 1972 U.S.C.C.A.N. 3668, 3742.

[44] *Id*., *reprinted in* 1972 U.S.C.C.A.N. 3668, 3742.

[45] H.R. REP. NO. 92-911, at 76-77(1972).

[46] *Id*.

[47] *Id*. at __.

of things: the natural law that has existed since the planet began to support life."[48] The Committee's goal was to prohibit activities that "overtax" the ability of nature to adapt to these minor, natural perturbations.[49]

It is an oversimplification, therefore, to regard the equilibrium model as the underpinning for the CWA's ecosystem integrity protection goal. If the House Committee missed something important, it may have been in assuming that the time scale in which the CWA would operate would reflect "a relatively high degree of stability" in the absence of human intervention.[50] The Committee recognized that evolutionary changes are "natural," but counted those changes in terms of "geological" time.[51] What the Committee seems to have underestimated is the degree to which ecosystems are engaged in a constant process of change, even in the absence of major, obvious natural or human disruptions, and that thoses changes can be measured in years or decades rather than just millennia.[52]

3. *The Relationship Between Surface Water and Groundwater*

When discussing the CWA's goals and scope, this Article has referred to surface water. The intended distinction is between surface water and groundwater. The CWA's core provision – the prohibition on unpermitted pollutant discharges – applies to "navigable waters."[53] The Act then defines "navigable waters" as "the waters of the United States."[54] That amorphous term has

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[48] *Id*. at __.
[49] *Id*. at 76-77.
[50] *Id*. at __.
[51] *Id*. at __.
[52] Professor Adler's contribution to this symposium argues that restoration of ecological health and resilience of the nation's waters should be the focus of future CWA implementation. The concept of resilience accepts that ecosystems are subject to change, but seeks to ensure that healthy natural systems have the capacity to resist radical changes that move them to entirely different states. Robert W. Adler, *Resilience, Restoration, and Sustainability*, __ WASH. U. J. L. & POL'Y __ (2009).
[53] Section 301(a) of the CWA bars the discharge of a pollutant without or in violation of a permit. 33 U.S.C. § 1311(a) (2006). The statute defines "discharge of a pollutant" to mean "any addition of any pollutant to navigable waters from any point source." *Id*. § 1362(12)(A).
[54] *Id*. § 1362(7). The term also includes the territorial seas. *See also id*. § 1362(8) (defining territorial seas).

given rise to a series of controversial questions whose resolution largely determines the statute's scope.[55] One of those is whether the discharge prohibition applies to groundwater pollution, or only discharges into surface water bodies. The courts have reached inconsistent conclusions on this question.[56] One recent district court decision concluded that the CWA "establishes that when Congress enacted the CWA, it decided not to attempt the general regulation of discharges to groundwater."[57] It added, however, that "the decision not to comprehensively regulate groundwater as part of the CWA does not require the conclusion that Congress intended to exempt groundwater from all regulation, particularly when the introduction of pollutants into the groundwater adversely affects adjoining river surface water."[58] The court therefore held "that the CWA extends federal jurisdiction over groundwater that is hydrologically connected to surface waters that are themselves waters of the United States."[59]

If the courts that have found congressional intent to exclude or greatly limit coverage of groundwater have interpreted the statute correctly, one would expect to be able to discern a reason for treating surface and groundwater differently. One possibility is that Congress regarded surface water and groundwater as separate resources and did not appreciate the existence of any relationship between the two. The legislative history does not support that hypothesis, however. The Senate Committee Report states explicitly that "[t]he Committee

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[55] *See, e.g.*, *infra* notes 83-91 and accompanying text (discussing the applicability of the dredge and fill permit program to wetlands).

[56] *Compare* Idaho Rural Council v. Bosma, 143 F. Supp. 2d 1169, 1178-81 (holding that the CWA applies to groundwater that is hydrologically connected to surface water), *with* Umatilla Water Quality Protective Ass'n v. Smith Frozen Foods, 962 F. Supp. 1312, 1320 (D. Or. 1997) (holding that the CWA does not apply to discharges into groundwater, even if the water is hydrologically connected to surface water). A recent summary of the cases appears in Hernandez v. Esso Standard Oil Co. (Puerto Rico), 599 F. Supp. 2d 175 (D.P.R. 2009). The court interpreted the cases as establishing that "'isolated /tributary groundwater,' such as confined wells, has been unequivocally excluded from the Act," *id*. at 179, but that there is a split of opinion on whether tributary groundwater which allegedly migrates from groundwater back into surface water is covered. *Id*. at 180-81 (citing cases).

[57] *Hernandez*, 599 F. Supp. 2d at 181.

[58] *Id*.

[59] *Id*.

recognizes the essential link between ground and surface waters and the artificial nature of any distinction."[60] The committee warned that "[t]he importance of groundwater in the hydrological cycle cannot be underestimated. Although only about 21.5 percent of our domestic, industrial agricultural supply comes directly from wells, it must be remembered that rivers, streams and lakes themselves are largely supplied with water from the ground – not surface runoff."[61] The Committee criticized existing regulatory programs that confined their coverage to surface water bodies and rejected the premise that the control of surface water pollution would assure acceptable groundwater quality. Although the Committee did not regard groundwater pollution to be "as serious a national problem at present as is surface water pollution, . . . groundwater availability and quality is [sic] deteriorating."[62] It was concern over the growing threat to groundwater quality that prompted the Committee to support regulation of deep well disposal.[63]

If Congress did not labor under the misimpression that groundwater could be safely ignored without impairing the CWA's efforts to restore and maintain the integrity of aquatic ecosystems, why did it not clearly include discharges into groundwater within the scope of the Act's general regulatory coverage? One possibility is that it regarded the term "waters of the United States" as sufficiently broad to include groundwater, precluding the need for more detailed specification. Some of the courts that found no coverage of groundwater have cited a portion of the Senate committee report, however, that referred to the "complex and varied" nature of state jurisdiction over groundwater.[64] As indicated below,[65] Congress was solicitous

[60] S. REP. NO. 92-414, *reprinted in* 1972 U.S.C.C.A.N. 3668, 3739.
[61] *Id*., *reprinted in* 1972 U.S.C.C.A.N. 3668, 3739.
[62] *Id*., *reprinted in* 1972 U.S.C.C.A.N. 3668, 3739.
[63] *See id*., *reprinted in* 1972 U.S.C.C.A.N. 3668, 3739. The CWA requires each state that seeks permission to administer the NPDES permit program to demonstrate to EPA that its permit program provides adequate authority to control the disposal of pollutants into wells. 33 U.S.C. § 1342(b)(1)(D) (2006).
[64] Umatilla Water Quality Protective Ass'n, Inc. v. Smith Frozen Foods, Inc., 962 F. Supp. 1312, 1318 (D. Or. 1997) (quoting S. REP. NO. 92-414, at 73 (1971), *reprinted in* 1972 U.S.C.C.AN. 3668, 3749). The district court in *Umatilla* also supported its conclusion that the CWA does not cover groundwater by noting the "new level of

and protective of state authority to control land and water development.[66] A decision to avoid general coverage of groundwater discharges would be consistent with that deference to state authority if a sweeping regulatory program covering groundwater discharges would in effect require land use control, an area of traditional state regulatory jurisdiction. In any event, it seems clear that Congress did not exclude groundwater discharges from the Act's coverage as a result of a misperception that groundwater pollution plays no role in efforts to protect surface water quality or the integrity of aquatic ecosystems.

4. *The Role of Nonpoint Source Pollution*

A second jurisdictional issue is more easily resolved than the applicability of the CWA to groundwater. The scope of the CWA's regulatory provisions turns heavily on the distinction between point sources and nonpoint sources. The Act's core provision applies exclusively to the activities of point sources,[67] which the statute defines broadly as "discernable, confined and

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uncertainty and expense" that a contrary conclusion would add to the CWA permitting process and the possibility that groundwater coverage "would expose potentially hundreds of . . . permittees to current or future litigation and legal liability if they or [the state permitting agency] has happened to make the 'wrong' choice about which kind of permit discharges to groundwater require." *Id*. at 1320. These "practical consequences" are of course irrelevant except to the extent they shed light on congressional intent on the question of groundwater coverage.

[65] *See infra* note 78 and accompanying text.

[66] *See, e.g.*, 33 U.S.C. § 1251(b), (g) (2006).

[67] Again, § 301(a) bars the unpermitted discharge of a pollutant. *Id*. § 1311(a). The Act defines the "discharge of a pollutant" as "any addition of any pollutant to navigable waters from any point source." *Id*. § 1362(12)(A). Consequently, the addition of pollutants to navigable waters from nonpoint sources do not qualify as discharges of pollutants. *See also* Friends of the Everglades v. South-Florida Water Mgmt. Dist., 2009 WL 1545551, at *15 (11th Cir. June 4, 2009) ("Non-point source pollution, chiefly runoff, is widely recognized as a serious water quality problem, but the NPDES program does not even address it."). *Cf.* SALZMAN & THOMPSON, *supra* note 19, at 143 ("Congress' principal goal in passing the CWA was to reduce discharges from point sources."). Environmental advocates have pressed for a more expansive application of the CWA's scope to encompass nonpoint sources. *See* Kristi Johnson, Note, *The Mythical Giant, Clean Water Act Section 401 and Nonpoint Source Pollution*, 29 ENVTL. L. 417, 418 (1999) (discussing efforts by environmentalist groups to use § 401 of the CWA to regulate nonpoint sources). But the courts have refused to interpret the statute broadly to encompass nonpoint sources. *See* Defenders of Wildlife v. EPA, 415 F.3d 1121, 1124-25 (10th Cir. 2005) (holding that "the CWA does not require states to take regulatory action to limit the amount of non-point water pollution introduced into its waterways"); Pronsolino v. Nastri, 291 F.3d 1123 (9th Cir. 2002) (holding EPA can regulate nonpoint source pollution using total maximum daily loads, but that implementation remains the responsibility of the states); Am. Wildlands v. Browner, 94 F. Supp. 2d 1150, 1161 (D. Colo. 2000) (holding that states retain option, but are not required, to regulate nonpoint sources because Congress recognizes the difficulty of isolating responsible polluters), *aff'd*, 260 F.3d 1192 (10th Cir. 2001).

discrete conveyances."[68] The technology-based effluent limitations, the Act's first line of defense against harmful pollution,[69] also apply only to point sources.[70] The few provisions of the statute that apply to nonpoint sources[71] do not create authority for the establishment of federally enforceable discharge limits.[72] Instead, control of nonpoint sources is left almost entirely to state discretion.[73]

Why did Congress draw such a distinct and significant line between point sources, which would be extensively regulated, and nonpoint sources, whose control would remain within the discretion of the states? One possibility is that those who drafted the CWA were unaware of the scope of nonpoint source pollution or the degree to which it would affect efforts to restore and maintain ecosystem integrity.[74] The CWA's legislative history, however, does not support the notion that legislators were blithely unaware that nonpoint source pollution was a significant contributor to the burden of surface water pollution that the CWA was designed to check. A House committee report refers to "extensive testimony" during oversight hearings "that nonpoint sources of pollutants could and would, in many cases, preclude the meeting of

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[68] 33 U.S.C. § 1362(14) (2006). The statute specifically excludes agricultural stormwater discharges and return flows from irrigated agriculture from the definition of a point source. *Id*.

[69] *See infra* notes 92-97 and accompanying text.

[70] 33 U.S.C. § 1311(b) (2006) (describing effluent limitations for point sources, or for categories and classes of point sources). The CWA also authorizes regulation of indirect dischargers, also known as industrial users. These are industrial sources of pollution that send their waste for treatment by publicly owned treatment works instead of discharging them directly into waters of the United States. *See id*. §§ 1314(g), 1317(b) (authorizing the adoption of pretreatment standards for indirect dischargers).

[71] The CWA does not even define a nonpoint source. It is therefore defined by process of exclusion. If a source of surface water pollution is not a point source, it must be a nonpoint source. For examples of nonpoint sources, see *id*. § 1314(f).

[72] *See* Jeffrey M. Gaba, *New Sources, New Growth and the Clean Water Act*, 55 ALA. L. REV. 651, 662 (2004) ("The provisions of the CWA that require control over the addition of pollutants by nonpoint sources are also simple. There, basically, are not any.").

[73] *See* SALZMAN & THOMPSON, *supra* note 19, at 153 ("The CWA effectively leaves the regulation of nonpoint pollution up to the individual states.").

[74] *Cf.* Rose, *supra* note 21, at 283-84 (noting that "[s]ome major polluters can be located easily, particularly those polluters already classed as point sources . . . . But many discharges cannot be located easily, and hence they may be overlooked entirely in regulatory systems for water pollution control. Many discharges come from run-off, i.e., the so-called nonpoint pollutants: sediment from construction, organic materials, pesticides from farms, and fertilizers from lawns.").

water quality standards. . . . The Committee clearly recognizes that non-point sources of pollution are a major contributor to water quality problems."[75]

Rather, the decision to essentially exclude nonpoint sources from mandatory federal regulation stemmed from two other assumptions, one technical and the other political. The first was that the means of controlling (and measuring)[76] nonpoint source pollution were not as readily available as those for point source pollution, thus making control of nonpoint source pollution a much tougher nut to crack.[77] The second was that the diffuse nature of nonpoint source control, which does not emanate from an easily identified and convenient pipe or other conveyance upon which to slap technological controls, essentially requires the use of best management practices (BMPs) rather than end-of-pipe technological fixes. Enforceable BMPs, in turn, are tantamount to land use controls. Because many legislators were committed to protecting the sovereignty of state and local governments to control land use, nonpoint source pollution seemed to extend federal regulation too far, even if the newly authorized federal technology-based controls for point sources did not.[78]

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[75] H.R. REP. NO. 92-911, at 911 (1972). *See also* S. REP. 92-414 (19771), *reprinted in* 1972 U.S.C.C.A.N. 3668, 3705. Professor Hines noted in 1966 that "agriculture has joined the cities and industries as a major source of pollution." Hines I, *supra* note 1, at 193.

[76] *See, e.g.*, Rose, *supra* note 21, at 279 ("The end of the pipe, or 'point source' as it was called, was the place where pollution control performance could be measured easily.").

[77] William L. Andreen, *Water Quality Today – Has the Clean Water Act Been a Success?*, 55 U. ALA. L. REV. 537, 562 (2004) [hereinafter Andreen, *Water Quality Today*], makes the point as follows:

> Not only would there be fewer and more obvious candidates for regulation, but point source discharges were amenable to end-of-pipe treatment, whereas the control of non-point source pollution was often thought impractical and not properly subject to federal direction. What was the EPA supposed to do, tell farmers how to farm?

See also Jonathan Cannon, *A Bargain for Clean Water*, 17 N.Y.U. ENVTL. L.J. 608, 616 (2008) ("It is difficult, although in at least some cases not impossible, to directly monitor discharges from non-point sources. Therefore, setting and enforcing discharge limitations on non-point sources of the sort typically applied to point sources, which require monitoring at the point of discharge, remains problematic.").

[78] *See* Cannon, *supra* note 77, at 616 ("The 1972 Congress may also have been influenced by the view that control of non-point source pollution is a form of land use control and that land use control rests traditionally with state and local governments, not with the federal government."). In fact, there is still no federal land use planning in the United States. Jonathan H. Adler, *Once More with Feeling: Reaffirming the Limits of the Clean Water Act Jurisdiction, in* THE SUPREME COURT AND THE CLEAN WATER ACT: FIVE ESSAYS ON RAPANOS 82 (K. Wroth ed., Vt. Envtl. L.J. and VLS, 2007).

Further, the decision to exclude nonpoint sources from mandatory federal regulation in 1972 was consistent with the notion that the CWA as it was adopted at that time was an experiment, whose impact and sufficiency would be reassessed as implementation proceeded.[79] To facilitate that evaluation process, Congress chose to require that EPA adopt guidelines to assist state pollution control agencies in identifying and evaluating the nature and extent of nonpoint source pollution and available processes and methods of controlling it.[80] The House committee report warned that "[i]f our water pollution problems are truly to be solved, we are going to have to vigorously address the problems of nonpoint sources."[81] For that reason, the information-gathering provision concerning nonpoint sources was "among the most important in the 1972 Amendments."[82]

5. *The Role of Wetlands in Aquatic Ecosystems*

Yet another crucial coverage question concerns the applicability of the CWA to wetlands. The importance of wetlands to aquatic ecosystems is beyond question.[83] Among other things, they filter out pollutants and purify and recharge groundwater, provide protection against storm surges in coastal areas, provide erosion protection, reduce flood damage, provide fish and wildlife habitat, and even mitigate global warming.[84] The 1972 CWA included a program which

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[79] *See supra* notes 34-36 and accompanying text (explaining why Congress was willing to adopt an unrealistic no discharge goal).
[80] 33 U.S.C. § 1314(f) (2006).
[81] H.R. REP. NO. 92-911, at __ (1972).
[82] *Id*. at __.
[83] *See, e.g.*, LAZARUS, *supra* note 41, at 72 (stating that "aquatic wetland areas that constitute the border between land and water are . . . invariably of great ecological value (and fragility)"). The value of wetlands was not always appreciated, as the federal government previously viewed them as obstacles to progress and enacted policies attempting to eliminate them. Jonathan H. Adler, *Swamp Rules: The End of Federal Wetland Regulation?*, 22 REGULATION 11, available athttp://www.cato.org/pubs/regulation/regv22n2/swamprules.pdf [hereinafter Adler, *Swamp Rules*].
[84] *See* Oliver A. Houck, *Federalism in Wetlands Regulation: A Consideration of Delegation of Clean Water Act Section 404 and Related Programs to the States*, 52 MD. L. REV. 1242, 1244-45 (1995) [hereinafter Houck, *Wetlands Regulation*]; Christine A. Klein, *The New Nuisance: Am Antidote to Wetland Loss, Sprawl, and Global Warming*, 48 B.C. L. REV. 1155, 1200-01 (2007); Marc C. Hebert, *Coastal Restoration Under CWPPRA and Property Rights Issues*, 57 LA. L. REV. 1165, 1169-70 (1997). Recognizing the importance of wetlands, some states

has been used to control wetlands development – the section 404 dredge and fill permit program[85] – even though the statute does not use the term wetlands.[86] Judicial interpretations of the scope of the program have exacerbated rather than resolved the resulting confusion.[87] The dredge and fill permit program apparently was designed to both protect wetlands and allow development of economically valuable properties with access to water.[88] It failed, however, to enunciate a clear policy to guide the responsible agencies in striking that balance.[89] Given the ecosystem services that wetlands provide, their preservation is consistent with and vital to the statutory goals of restoring and maintaining the chemical, physical, and biological integrity of

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began enacting wetland protection statutes in the 1960s, before federal regulation began. *See, e.g.*, Adler, *Swamp Rules*, *supra* note 83, at 11. By the time federal regulation had begun in the mid-1970s, eleven inland states and every coastal state (except Texas), had wetland protections in place. COMPETITIVE ENTER. INST., THE CLEAN WATER ACT OVERVIEW at 56 (citing Robert Beck, *The Movement in the United States to Restoration and Creation of Wetlands*, 34 NATURAL RESOURCES J.781, 788-89 (1994)).

[85] Section 404(a) allows the Secretary of the Army, through the Army Corps of Engineers, to issue permits for the discharge of dredged or fill material into the navigable waters. 33 U.S.C. § 1344(a) (2006). Because the term pollutant includes materials such as dredged spoil, rock, and sand, *id*. § 1362(6), the discharge of dredged or fill material without such a permit would violate § 301(a)'s prohibition on unpermitted discharges. *Id*. § 1311(a).

[86] *See* William L. Andreen & Shana Campbell Jones, *The Clean Water Act: A Blueprint for Reform* 38 (Center for Progressive Reform White Paper #802, July 2008), *available at* http://www.progressiveregulation.org/whitePapers.cfm. The 1972 statute did not refer directly to "wetlands" or "tributaries," despite language defining the jurisdictional reach of § 13 of the Rivers and Harbors Act and the direct reference to "wetlands" in the Coastal Zone Management Act of 1972. ECOLOGY OF FRESHWATER AND ESTUARINE WETLANDS 323 (Darold P. Batzer & Rebecca R. Sharitz eds., University of Cal. Press, 2006). The Corps of Engineers' § 404 regulations initially did not cover discharges to wetlands, but the Corps amended those regulations to do so after the courts interpreted the scope of statutory coverage broadly. *See, e.g.*, Natural Res. Def. Council, Inc. v. Callaway, 392 F. Supp. 685, 686 (D.D.C. 1975) (ordering the agency to issue "regulations clearly recognizing the full regulatory mandate of the Water Act"); Augusta Wilson, Note, *Of Ponds and Pot: How Rapanos Ignored Raich and the Potential Role for Cooperative Federalism*, 17 CORNELL J.L. & PUB. POL'Y 453, 462 (2008) (explaining that, in response to the decision in *Callaway*, the Corps expanded its definition of "navigable waters" to include "(1) tributaries of navigable waters; (2) interstate waters and their tributaries; (3) non-navigable intrastate waters whose use or misuse could affect interstate commerce, and; (4) all freshwater wetlands that were adjacent to waters covered under the Act").

[87] *See, e.g.*, Rapanos v. United States, 547 U.S. 715 (2006); United States v. Robison, 521 F. Supp. 2d 1247 (N.D. Ala. 2007) (scathing denunciation of both *Rapanos* and the 11th Circuit's interpretation of it), *reh'g en banc denied,* 521 F.3d 1319 (11th Cir. 2008), *cert. denied*, 129 S. Ct. 630 (2008).

[88] LAZARUS, *supra* note 41, at 72.

[89] EPA has the authority to veto dredge and fill permits issued by the Corps of Engineers, 33 U.S.C. § 1344(j) (2006), although EPA rarely exercises that veto power. *See* Lance D. Wood, *Section 404: Federal Wetlands Regulation Is Essential*, 7-Summer NAT. RESOURCES & ENV'T 7, 55 (1992); Katharine J. Teter, Robert C. Widner & Carol Deck, *Long Arm of Uncle Sam: Federal Environmental Issues in Siting Decisions*, 7-Winter NAT. RESOURCES & ENV'T 9, 9 (1993).

the nation's waters.[90] But as Alyson Flournoy has noted, "[o]ne turns to the statute for adequate direction on its purposes in vain. . . . [S]ection 404 is . . . a statute whose most frequently cited mission is to protect wetlands but which fails to mention wetlands. In section 404, Congress left key questions not only unanswered but unasked."[91] As a result, the scientific and technical assumptions upon which Congress rested its creation of the dredge and fill permit program are shrouded in uncertainty.

6. *Technology-Based vs. Water Quality-Based Controls*

A final technical assumption that shaped the 1972 CWA is based on the history of pre-1972 federal water pollution control legislation. The CWA, unlike the Clean Air Act adopted in 1970, relies as its first line of defense against pollution on technology-based discharge controls, rather than the achievement of ambient quality standards.[92] This choice flowed directly from the lessons legislators drew from experience with the pre-1972 legislation. That experience made it clear that available scientific knowledge was not adequate to identify cause-and-effect relationships between particular discharges and ambient water quality problems.[93] The inability to make those causal links hampered federal and state policymakers both in selecting the effluent

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[90] 33 U.S.C. § 1251(a) (2006).

[91] Alyson C. Flournoy, *Section 404 at Thirty-Something: A Program in Search of a Policy*, 55 ALA. L. REV. 607, 615-16 (2004).

[92] *Compare* 33 U.S.C. § 1311(b) (2006) (requiring compliance by point sources with technology-based effluent limitations), *with* 42 U.S.C. § 7409 (2006) (authorizing EPA to adopt national ambient air quality standards). *See also* SALZMAN & THOMPSON, *supra* note 19, at 144 (explaining that "the CWA reverses the approach of the CAA. Instead of setting ambient water concentrations and working backwards to determine individual emission levels, the CWA starts with individual effluent levels."); LAZARUS, *supra* note 41, at 177 (stating that technology-based standards were the CWA's "first order or business"). The Clean Air Act also contains performance standards, including the standards of performance that apply to new stationary sources, 42 U.S.C. § 7416 (2006), and the nationally uniform standards for controlling motor vehicle emissions. *Id*. § 7421(a). These standards of performance provide some protection in the event that state implementation plans fail to achieve the national ambient air quality standards by the designated statutory deadlines.

[93] *See* William L. Andreen, *The Evolution of Water Pollution Control in the United States – State, Local, and Federal Efforts, 1789-1972: Part I*, 22 STAN. ENVTL. L.J. 145, 158 (2003) [hereinafter Andreen, *Evolution I*] (arguing that a shift away from an ambient quality-based approach "was crucial if water pollution was actually going to be tackled effectively within a reasonably prompt period of time since the implementation of water quality standards was fraught with so many technical and policy problems.").

limitations to impose on individual dischargers and in demonstrating for enforcement purposes that particular dischargers had caused violations of state water quality standards.[94] The Senate committee report found that state environmental officials were still trying to establish relationships between pollutants and uses of receiving waters because of

> the great difficulty associated with establishing reliable and enforceable precise effluent limitations on the basis of a given stream quality. Water quality standards, in addition to their deficiencies in relying on the assimilative capacity of receiving waters, often cannot be translated into effluent limitations – defendable in court tests, because of the imprecision of models for water quality and the effects of effluents in most waters.
>
> Under this Act the basis of pollution prevention and elimination will be the application of effluent limitations. Water quality will be a measure of program effectiveness and performance, not a means of elimination and enforcement.
>
> The Committee recommends the change to effluent limits as the best available mechanism to control water pollution. With effluent limits, the Administrator can require the best control technology; he need not search for a precise link between pollution and water quality.[95]

The decision to achieve the CWA's goals primarily through the adoption and enforcement of technology-based effluent limitations that Congress directed EPA to develop and apply to point sources was thus a product of necessity. That decision emerged from the technical difficulties, revealed through experience with the pre-1972 laws, in translating water quality standards into enforceable effluent limitations for individual dischargers. The switch to a technology-based approach would facilitate enforcement by "mak[ing] it unnecessary to work backward from an overpolluted body of water to determine which point sources are responsible

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[94] *See* LAZARUS, *supra* note 41, at 72 (noting that "Congress deliberately decided against having water quality standards be the primary basis for pollution control because of the sheer complexity of determining cause and effect of pollutants in aquatic systems" and that pre-1972 experience indicated that regulation tied to cause-and effect relationships between particular discharges and impacts on receiving water quality "would quickly become mired in protracted factfinding and scientific uncertainty"); SALZMAN AND THOMPSON, *supra* note 19, at 143-44 (stating that "the problems that arose in implementing the 1965 Water Quality Act . . . convinced Congress that the states would find it difficult to translate water quality standards into numeric effluent limitations for individual point sources").

[95] S. REP. NO. 92-414 (1971), *reprinted in* 1972 U.S.C.C.A.N. 3668, 3675.

and which must be abated."[96] The focus on technology-based controls was therefore pragmatic. In choosing to force point sources to reduce discharges to the extent it was technologically and economically feasible to do so, Congress essentially concluded that compliance with technology-based controls would serve as a pragmatic surrogate for achieving the levels of discharge reductions needed to secure the Act's fishable-swimmable waters goal as quickly as possible. But the focus on technology-based controls also appears to have reflected a moral judgment that polluters should be forced to reduce their discharges to the maximum amount that technology allowed.[97]

B. Political and Social Policy Assumptions

As the discussion in the previous section indicates, the CWA of 1972 was largely shaped by a series of scientific and technical assumptions that Congress made that affected the objectives, scope, and nature of the new legislation. That discussion also makes it clear that Congress grappled with more than just technical considerations. The CWA was the product of a series of contestable political and social policy assumptions, too.[98] This section explores additional assumptions of this kind, including those that determined the allocation of authority to

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[96] EPA v. Calif. ex rel. Water Res. Bd., 426 U.S. 200, 204 (1976). *See also* Andreen, *Evolution II*, *supra* note 24, at 270 ("One of the main reasons to create a system in which polluters would be assigned precise, technology-based permit limitations was to make the statute more easily enforceable. No longer would the Act limit enforcement to instances in which public health or welfare was endangered or where the government could show proof that a particular discharge had caused a particular violation of water quality standards."); Oliver A. Houck, *Of Bats, Birds, and B-A-T: The Convergent Evolution of Environmental Law*, 63 MISS. L.J. 403, 417-18 (1994) [hereinafter Houck, *Bats*] (arguing that "best available technology side-stepped the age-old and irresolvable arguments of whether 'significant' harm existed and who was 'causing' it and began to abate the pollution itself").

[97] *See* Amy Sinden, *The Tragedy of the Commons and the Myth of a Private Property Solution*, 78 U. COLO. L. REV. 533, 554 n.64 (2007) (discussing approach to controlling pollution that is based on "a moral imperative that industries must reduce pollution as much as possible"); *see also* Andreen, *Evolution II*, *supra* note 24, at 266 (asserting that the Senate Public Works Committee's decision to move to a technology-based approach was in part philosophical, premised on the idea that polluters no longer had the right to pollute or to rely on the assimilative capacity of receiving waters). The adoption of nationally uniform, technology based controls also reflects "a moral argument that environmental risk exposure is involuntary and thus protection levels should be the same for all citizens, regardless of the cost of achieving them, and perhaps even higher for vulnerable populations. This argument is one of the fundamental principles of the environmental justice movement." A Dan Tarlock, *Safe Drinking Water: A Federalism Perspective*, 21 WM. & MARY ENVTL. L. & POL'Y REV. 233, 250 (1997).

[98] *See, e.g.*, *supra* notes 76-78 and accompanying text (discussing Congress's unwillingness to require mandatory controls for nonpoint sources to avoid infringing on state and local regulatory prerogatives).

control water pollution between EPA and the states and the respective roles of government and the public in overseeing implementation and enforcement of the statute's requirements.

1. *Cooperative Federalism*

Five years before Congress adopted the CWA, Professor Hines identified "the central problem raised by substantial federal involvement in water quality control–accomplishing national objectives of restoring water quality while maintaining appropriate respect for local institutions."[99] Most of the pollution control statutes that Congress adopted during the 1970s, including the CWA, reflected a legislative commitment to the model of cooperative federalism, which involves "shared governmental responsibilities for regulating private activity."[100] That commitment is clearly enunciated in the statutory policy declaration

> to recognize, preserve, and protect the primary responsibilities and rights of States to prevent, reduce, and eliminate pollution, to plan the development and use (including restoration, preservation, and enhancement) of land and water resources, and to consult with the Administrator [of EPA] in the exercise of his authority under [the CWA]."[101]

In addition, Congress declared a policy that state authority to allocate water quantities not be superseded, abrogated, or impaired by the enactment of the CWA.[102]

Although the effort to improve and protect water quality was to be a cooperative one, there is no question that Congress sought to significantly increase the federal government's

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[99] Hines III, *supra* note 1, at 799. *See also id*. at 800 (arguing that "reconciliation of the continually expanding federal involvement in water quality management with the policy of local program primacy has become increasingly difficult over the last decade"); *id*. at 859 ("Over the years, the most vexing issue raised by the activities of the federal government to improve water quality has been the proper relationship between local and federal water pollution abatement problems. Each attempt to broaden the federal involvement in water quality control has met with spirited resistance premised on the primacy of state rights in the pollution control field.").

[100] Robert L. Glicksman, *From Cooperative to Inoperative Federalism: The Perverse Mutation of Environmental Law and Policy*, 41 WAKE FOREST L. REV. 719, 737 (2006) (quoting 1 GEORGE CAMERON COGGINS AND ROBERT L. GLICKSMAN, PUBLIC NATURAL RESOURCES LAW § 5:3 (2d ed. 2007)). The article explores in depth the roots, aims, and fate of cooperative federalism in federal environmental legislation. Federalism issues can be traced back to the Constitution treating the states as sovereigns that are distinct from the federal government. *Id.*

[101] 33 U.S.C. § 1251(b) (2006).

[102] *Id*. § 1251(g).

role.[103] Before 1972, Congress had relied on the states to "lead the national effort to prevent, control and abate water pollution," with the federal government's role being limited to one of supporting and assisting the states.[104] The new legislation would attempt to "restore the balance of Federal-State effort" by, among other things establishing "a direct link between the Federal government and each industrial source of discharge into the navigable waters" through EPA's promulgation of nationally applicable, technology-based effluent limitations.[105] Some believe that the impetus for heightening the federal role was "the overriding perception that water quality was not improving, and that the states could not be depended on to improve the situation."[106] The effect was to "nationalize[ ] the business of water pollution control in the United States, relegating the states, whose authority had long dominated the area, to a largely secondary, supporting role."[107]

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[103] The U.S. Supreme Court has even called this approach "taking a stick to the states." Train v. Natural Res. Def. Council, Inc., 421 U.S. 60, 64 (1975).

[104] S. REP. NO. 92-414 (1971), *reprinted in* 1972 U.S.C.C.A.N. 3668, 3669.

[105] *Id*., *reprinted in* 1972 U.S.C.C.A.N. 3668, 3669. Professor Hines stated in 1967 that although policymakers long assumed that local control was the most efficient means of dealing with water quality problems, "[o]ver time, as the pollution problem has steadily worsened, the wisdom of this judgment increasingly has been called in question." Hines III, *supra* note 1, at 800.

[106] *See e.g.,* Victor B. Flatt, *A Dirty River Runs Through It (The Failure of Enforcement in the Clean Water Act)*, 25 B.C. ENVTL. AFF. L. REV. 1, 13 (1997). Others have noted that during the 1950s and 1960s, "state and local governments began to recognize the importance of environmental quality and adopted first generation environmental controls." Adler, *Fable*, *supra* note 23, at 96. By 1966, every state had adopted some sort of water pollution legislation. *Id.* Professor Adler contends that the "conventional fable is that federal environmental regulation was necessary because states failed to adopt adequate environmental measures," and that this perspective "ignores the substantial environmental progress in many areas prior to the enactment of most major federal environmental laws." *Id. But see supra* note 21.

Congress also relegated the Corps of Engineers, which had been responsible for administering the Refuse Act of 1899's permit program, to a supporting rather than a starring role under the CWA. The House report professed "the highest regard for the integrity and abilities of the Corps," but stated that the President and Congress agreed when EPA was created "that it would be the single agency responsible for leading the battle against pollution. Although other agencies such as the Corps have a tremendous role to play in this battle, it must be a supportive role. The administration of the extremely important [NPDES] permit program is not a supportive role. Indeed, this permit program as envisioned by the Committee may well be the most important facet of the new water pollution control program." H.R. REP. NO. 92-911, at __ (1972). Accordingly, EPA, not the Corps, would supervise the NPDES permit program. The Corps remained responsible for issuing dredge and fill permits in the first instance, but subject to EPA veto. 33 U.S.C. § 1344(j) (2006).

[107] Andreen, *Water Quality Today*, *supra* note 77, at 537.

Even though the partnership between EPA and the states was by no means an equal one, the states retained important authority and discretion.[108] First, Congress afforded each state the option of applying to EPA for permission to administer the NPDES permit program for point sources located within its jurisdiction. If a state permit program meets CWA requirements, EPA is obliged to approve it and withdraw from issuing NPDES permits in that state.[109] Second, the Act preserves not only the authority and jurisdiction of the states to control water quantity allocation,[110] but also the authority to adopt discharge controls for point sources that are more stringent than those adopted by EPA.[111] Consequently, EPA's technology-based controls are floor, not ceiling preemptive.[112] The House Committee responsible for adoption of the 1972 CWA noted the "extreme importance in assuring the States of the right to adopt or enforce provisions at least as strict as those established in this legislation."[113]

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[108] Despite this authority, Congress built several safeguards into the Act to deal with the possibility that states would not perform up to its expectations. As indicated below, for example, EPA retained the authority to veto individual state permits. 42 U.S.C. § 1342(d)(2) (2006). Congress also authorized EPA to suspend or withdraw approval for state NPDES permit programs if a state fails to administer the program in accordance with its CWA responsibilities. *Id*. § 1342(c). Further, as indicated below, Congress subjected state water quality standards to veto by EPA and vested the federal agency with the power to promulgate standards for a state whose standards are not consistent with the CWA or if EPA determines that a federal standard is necessary to meet the requirements of the CWA. *Id*. § 1313(c)(4).

[109] *Id*. § 1342(b). EPA retains the authority to veto individual state permits if it finds them to be "outside the guidelines and requirements" of the CWA. *Id*. § 1342(d)(2). Congress also sought to allocate authority to issue (and veto) dredge and fill permits. *See* § 1344(g)-(j); H.R. REP. NO. 92-911, at ___ (1972) ("The Committee believes that the States ought to have the opportunity to assume the responsibilities that they have requested. If, however, a State fails to carry out its obligations and misuses the permit program, the Administrator is fully authorized . . . to withdraw his approval of a State program.").

[110] 33 U.S.C. §§ 1251(b), (g), 1370(2) (2006).

[111] *Id*. § 1370(1). The Act also preserves state power to address water pollution through common law remedies. *Id*. § 1365(e).

[112] For discussion of the distinction between floor preemption (which precludes displacement of federal standards by weaker state standards) and ceiling preemption (which precludes displacement of federal standards by more stringent state standards), see Robert L. Glicksman & Richard E. Levy, *A Collective Action Perspective on Ceiling Preemption by Federal Environmental Regulation: The Case of Global Climate Change*, 102 N.W. U. L. REV. 579, 583 (2008).

[113] H.R. REP. NO. 92-911, at ___ (1972).

Third, Congress vested in the states the responsibility to adopt water quality standards (subject to EPA veto),[114] despite the failure of the pre-1972 legislation that relied on a water quality-based approach to controlling water pollution. This time, however, water quality standards did not represent the sole or even the first line of defense against water pollution. Instead, the state water quality standards would serve as safety nets in case EPA's technology-based effluent limitations failed to provide an acceptable level of water quality.[115] Once the water quality standards were in place, point sources would be obliged to comply with any effluent limitations more stringent than applicable technology-based controls to the extent necessary to assure compliance with the water quality standards.[116]

Fourth, as discussed above,[117] water allocation and quantity remained the prerogatives of the states. Finally, Congress's failure to mandate control for nonpoint sources essentially left it up to the states to determine whether to control runoff from those sources and, if so, how to do so. Congress chose to steer clear of significant federal involvement in both of these areas because of its desire to avoid intruding on the exercise of traditional state police power prerogatives in applying land use controls and administering allocative water law.[118]

2. *Supplemental Citizen Enforcement*

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[114] 33 U.S.C. § 1313(c) (2006).

[115] The House Committee explained the function of state water quality standards as follows:

> Even though section 301(b)(1) (A) and (B) requires the setting of effluent limitations consistent with best practicable control technology currently available, the Committee intends that if the sum of the discharges from point sources meeting such effluent limitations would preclude the meeting of water quality standards in existence on the date of enactment of the 1972 Amendments, or those promulgated pursuant to section 303, new and more stringent effluent limitations would have to be established consistent with such water quality standards.

H.R. REP. NO. 92-911, at ___ (1972). *See also id*. at ___ ("Water quality standards will be utilized for the purpose of setting effluent limitations in those cases where effluent limitations for point sources would not be consistent with such standards.").

[116] 33 U.S.C. § 1311(b)(1)(C) (2006).

[117] *See supra* note 110 and accompanying text.

[118] *See, e.g.*, 33 U.S.C. § 1251(b) (2006) (stating policy to preserve state rights to plan the development and use of water resources).

One of the glaring deficiencies of the pre-1972 water pollution control legislation was the weakness of its enforcement mechanism.[119] Congress set out to strengthen the enforcement process by, among other things, providing concurrent enforcement authority in EPA and the states.[120] In addition, it crafted a citizen suit provision, which enables individuals and public interest groups to sue either point sources alleged to be in violation of their regulatory obligations or EPA if it fails to perform a nondiscretionary duty.[121] Citizen suits provide a safety valve in the event that federal and state regulators fail to enforce the law vigorously, whether as a result of cooptation by regulated entities[122] or funding or personnel deficiencies.[123]

The House report explained that it intended plaintiffs in citizen suits to act as "private attorneys general" and that the citizen suit provision would "provide[ ] an open door for those

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[119] *See* William L. Andreen, *Motivating Enforcement: Institutional Culture and the Clean Water Act*, 24 PACE ENVTL. L.J. 67, 68 (2007) [hereinafter Andreen, *Institutional Culture*] ("The pre-1972 federal water pollution control program had languished for years due to spotty and ineffectual efforts to exact compliance with its water quality objectives. Thoroughly disenchanted with that pattern of impotence, Congress set out to cure the problem, not only by establishing an enforceable pollution control strategy, but also by strengthening the enforcement process itself.").

[120] 33 U.S.C. § 1319 (2006).

[121] 33 U.S.C. § 1365 (2006). For discussion of the impact of citizen suits under federal environmental legislation to force agencies to perform nondiscretionary duties, see Robert L. Glicksman, *The Value of Agency-Forcing Citizen Suits to Enforce Nondiscretionary Duties*, 10 WIDENER L. REV. 353 (2004) [hereinafter Glicksman, *Agency-Forcing*].

[122] *See, e.g.*, Matthew D. Zinn, *Policing Environmental Regulatory Enforcement: Cooperation, Capture, and Citizen Suits*, 21 STAN. ENVTL. L. J. 81 (2002); Glicksman, *Agency Forcing*, *supra* note 121, at 383-85; *see also* Andreen, *Evolution II*, *supra* note 24, at 286 (asserting that the CWA's citizen suit provision is one of several in the statute that reflect "Congress' skepticism about EPA's ability or even the willingness of EPA or any expert administrative agency to continuously and vigorously perform its regulatory mission").

[123] *See* Andreen & Jones, *supra* note 86, at 44 (citing reports that from 1997 to 2007 "enforcement funding to EPA regions decreased 8 percent in inflation-adjusted terms, and regional officials report that they reduced the number of enforcement staff by about 5 percent to address funding shortages."). *Cf.* James R. May, *Now More than Ever: Trends in Environmental Citizen Suits at 30*, 10 WIDENER L. REV. 1, 1 (2003) (arguing that the Clean Air Act's citizen suit provision, adopted in 1970, was "borne in a fulcrum of necessity due to inadequate resources and resolve"). Professor May finds citizen suits under the environmental statutes generally to have been a resounding success:

> Citizens suits work; they have transformed the environmental movement, and with it, society. Citizen suits have secured compliance by myriad agencies and thousands of polluting facilities [and] diminished pounds of pollution produced by the billions . . . .The foregone monetary value of citizen enforcement has conserved innumerable agency resources and saved taxpayers billions.

Id. at 3-4. Professor May's article compares the number of EPA referrals to the Department of Justice for civil enforcement compared to citizen suits under the CWA for the period 1995-2002, and the numbers of consent decrees reached in government enforcement actions and citizen suits for the period 1995-2001. *Id*. at 42-43. He concludes that citizen suits generally, which are filed at the rate of at least once a week, "help advance the rule of law and keep agencies honest." *Id*. at 47.

who have legitimate interests in the courts, and encourages more meaningful participation in the administrative processes."[124] The Senate report added that plaintiffs in citizen suits would perform "a public service," and that it authorized courts to award litigation costs[125] to prevailing plaintiffs in recognition of that role.[126]

C. Legal Assumptions

One final key assumption that Congress relied on in adopting the 1972 CWA concerned the scope of its authority to regulate the activities responsible for causing impaired water quality. The core provision of the CWA prohibits the unpermitted discharge of pollutants.[127] The Act defines such a discharge as the addition of pollutants to "navigable waters" from any point source.[128] As the discussion above indicates, judicial treatment, especially at the Supreme Court, of the statutory term "navigable waters" has engendered chaos. Although the Court has never invalidated the CWA, or held that its application to a particular discharge is unconstitutional, it has relied on concerns that the Act's application to intrastate waters and isolated wetlands might exceed the bounds of Congress's authority under the Commerce Clause[129] as a justification for interpreting the scope of the dredge and fill permit program narrowly.[130]

The CWA's drafters seemed to have had no concern that the anticipated broad coverage of the Act's discharge prohibitions and permit programs might run afoul of any limits on federal

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[124] H.R. REP. NO. 92-911, at ___ (1972). *See also* May, *supra* note 123, at 6-7 (describing how citizen suits enhance public participation).
[125] *See* 33 U.S.C. § 1365(d) (2006) (authorizing courts in citizen suits to award litigation costs, including attorneys fees, to prevailing or substantially prevailing parties when a court determines that it is appropriate to do so).
[126] *See* S. REP. NO. 92-414 (1971), *reprinted in* 1972 U.S.C.C.A.N. 3668, 3747.
[127] 33 U.S.C. § 1311(a) (2006).
[128] 33 U.S.C. § 1362(12)(A) (2006).
[129] U.S. CONST. art. I, § 8, cl. 3.
[130] *See* Rapanos v. United States, 547 U.S. 715, 738 (2006) (plurality opinion) (stating that the Corps' interpretation of "navigable waters" "stretches the outer limits of Congress'' commerce power and raises difficult questions about the ultimate scope of that power"); Solid Waste Agency of N. Cook County v. United States Army Corps of Eng'rs, 531 U.S. 159, 172-74 (2001) (identifying "significant constitutional questions" in broad interpretation of the scope of the dredge and fill permit program). Some lower courts have gone further. *See, e.g.*, United States v. Wilson, 133 F.3d 251, 257 (4th Cir. 1997) (invalidating Corps' regulatory definition of "waters of the United States" to the extent that it authorized regulation of intrastate, nonnavigable waters "which could affect interstate commerce").

regulatory power derived from the Commerce Clause. The House report, with considerable prescience, expressed reluctance about using the term "navigable waters" lest it be interpreted narrowly by the courts. The Committee stated:

> One term that the Committee was reluctant to define was the term "navigable waters." The reluctance was based on the fear that any interpretation would be read narrowly. However, this is not the Committee's intent. The Committee fully intends that the term "navigable waters" be given the broadest possible constitutional interpretation unencumbered by agency determinations which have been made or may be made for administrative purposes.[131]

Similarly, a Senate report explained that the Act was consciously drafted to avoid the narrow interpretations of the scope of regulatory jurisdiction that had helped thwart implementation of the 1965 Water Quality Act.[132] According to the report, such broad applicability was necessary to achieve the statute's goals because "[w]ater moves in hydrologic cycles and it is essential that discharge of pollutants be controlled at the source. Therefore, reference to the control requirements must be made to the navigable waters, portions thereof, and their tributaries."[133] The conference committee confirmed the intent to afford the term "navigable waters" "the broadest possible constitutional interpretation."[134]

The legislative record does not appear to provide any basis for believing that legislators doubted the adequacy of congressional power to cover all relevant portions of the hydrological cycle (at least with respect to surface waters).[135] The concern was that courts might interpret the scope of the statute more narrowly than Congress intended, not that the courts would find that the intended scope outstripped delegated legislative authority under the Constitution. But the

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[131] H.R. REP. NO. 92-911, at ___ (1972).
[132] S. REP. NO. 92-1236, at 144 (1972).
[133] S. REP. NO. 92-414 (1971), *reprinted in* 1972 U.S.C.C.A.N. 3668, 3742-43.
[134] S. REP. NO. 92-1236, at 144 (1972).
[135] *But cf* Rapanos v. United States, 547 U.S. 715, 731-32 (2006) (plurality opinion) (noting that "the CWA authorizes federal jurisdiction only over 'waters,'" and that "[t]he only natural definition of the term 'waters,' our prior and subsequent judicial constructions of it, clear evidence from other provisions of the statute, and this Court's canons of construction all confirm that 'the waters of the United States' in § 1362(7) cannot bear the expansive meaning that the Corps would give it" in extending it to certain wetlands adjacent to traditionally navigable waters).

Supreme Court's decisions in *Lopez* and *Morrison* later raised doubts about the limits of congressional power under the Commerce Clause that did not exist when Congress adopted the CWA in 1972.[136] Those newly enunciated limits eventually prompted the Court to interpret the intended scope of the CWA narrowly to avoid raising constitutional federalism questions.

IV. THE REALITY OF CWA IMPLEMENTATION

Congress based its quest "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters"[137] on the premises discussed in part III above. More than three and-a-half decades later, pollutant discharges have not been eliminated and not all surface water bodies have achieved fishable-swimmable status. Nevertheless, significant progress toward these goals has been made. This part briefly assesses the impact of the CWA on surface water pollution and aquatic ecosystems and assesses what light the Act's fate sheds on the initial assumptions.

A. The CWA's Impact on Pollution and Wetlands Protection

By all accounts, the CWA has made significant inroads into the nation's water pollution problems. EPA reported in 2002 that the statute's technology-based effluent limitations, as applied to point sources through the NPDES permit program, "has achieved tremendous success in controlling point source pollution and restoring the nation's waters. By 1990 over 87% of the major municipal facilities and 93% of major industrial facilities were in compliance with NPDES permit limits."[138] Despite treating one-third more waste, discharges of organic wastes from

[136] United States v. Morrison, 529 U.S. 598 (2000); United States v. Lopez, 514 U.S. 549 (1995). Both decisions invalidated federal legislation as beyond the scope of the Commerce Clause, a result that, before *Lopez*, the Supreme Court had not reached in decades.
[137] 33 U.S.C. § 1251(a) (2006).
[138] U.S. EPA, OFFICE OF WATER, PROPOSED WATER QUALITY TRADING POLICY (April 25, 2002) (*quoted in* GLICKSMAN ET AL., *supra* note 3, at 580).

publicly-owned waste treatment facilities have dropped 23 percent, while similar discharges from industrial facilities have decreased 40 percent.[139] Further, as Bill Andreen notes:

> Dissolved oxygen levels have increased downstream from point source discharges all over the country, and the improvements are so significant that they can often be discerned throughout entire river basins. The greatest improvements, however, can be seen in many rivers and lakes located in urban, industrialized areas, which in the past suffered most from point source discharges. Truly extraordinary progress, therefore, has been experienced in places as diverse as the Delaware estuary and the Chattahoochee River, New York Harbor, and the Potomac estuary. The progress, moreover, is not limited to just conventional pollutants, but includes heavy metals and toxic water pollutants.[140]

As Oliver Houck put it, "[t]he 1972 Amendments worked. . . . By any measure—number of dischargers on permit, pounds of pollution abated, stream segments improved, fisheries restored to waters where they had not been seen for decades—the Act has made its case in court and, by its imitation, to the world."[141]

Further, there seems to be widespread agreement that the decision to rely on technology-based controls instead of an ambient quality-based approach as the principal tool for cleaning up the nation's waters was a wise one. In general, EPA has had relatively little difficulty identifying available technologies for the purpose of establishing effluent limitations, and the elimination of the need to prove a cause-and effect link between individual discharges and impaired receiving

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[139] Andreen *Water Quality Today*, *supra* note 77, at 591. *Compare* Andreen & Jones, *supra* note 86, at 15 (discussing 2000 EPA study which found that, from 1973 to 1995, the amount of discharges of biological oxygen demanding materials from industrial point sources fell by 40 percent).

[140] Andreen, *Water Quality Today*, *supra* note 77, at 591.

[141] OLIVER HOUCK, THE CLEAN WATER ACT TMDL PROGRAM: LAW, POLICY, AND IMPLEMENTATION 3-4 (2d ed. 2002).

water quality has facilitated enforcement.[142] Moreover, the improvements in water quality traceable to the adoption and implementation of the CWA have proven to be affordable.[143]

The picture is not entirely rosy, however. A significant percentage of surface water bodies continue to have water quality that is impaired and unsuitable for the uses designated for them under state water quality standards.[144] More than 240 million pounds of toxic chemicals were discharged into the nation's waters in 2005, with approximately 51 million pounds having been released from municipal sewage plants incapable of handling the materials sent to them by indirect industrial dischargers covered by the CWA's pretreatment program. According to one source, "[t]he pretreatment program under the CWA is widely regarded as a failure. Many facilities simply fail to meet pretreatment standards and enforcement [by local governments] is lax," both because of lack of political will and the difficulty of identifying the indirect dischargers responsible for interfering with a POTW's treatment processes.[145] The rate at which direct dischargers violate their NPDES permits is also alarmingly high.[146]

The largest culprit in the nation's remaining surface water quality problems, however, is nonpoint source pollution. By the 1980s, as EPA's technology-based effluent limitations and

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[142] *See* SALZMAN & THOMPSON, *supra* note 19, at 152. *See also* Andreen, *Water Quality Today*, *supra* note 77, at 546 (asserting that "implementation of technology-based effluent limitations . . . has worked and worked well"). Professor Andreen adds that, "[s]etting aside the question of whether the use of technology-based limitations is the most efficient strategy in some theoretical sense, they have produced positive, tangible results when most of the other proposals have either never been tried in this country or have failed." *Id.*

[143] *See* Andreen, *Water Quality Today*, *supra* note 77, at 542-43 (claiming that substantial reductions in water pollution have been "accomplished without causing any significant harm to the economy in terms of employment or growth or investment. It is an amazing success story – a tribute to a regulatory system, which, despite its blemishes, does not deserve all of the criticism that has been hurled in its direction.").

[144] EPA concluded in an inventory of water quality conducted in 2000 that only about 60 percent of assessed stream miles, 55 percent of assessed lake waters, and 50 percent of assessed estuarine miles fully support the designated uses. GLICKSMAN ET AL., *supra* note 3, at 580. *See also* Cannon, *supra* note 77, at 610; SALZMAN & THOMPSON, *supra* note 19, at 142 (arguing that "[t]he CWA in fact has come nowhere close to meeting its goal. Over a third of the waterways surveyed in 2000 still were not fishable and swimmable.").

[145] Andreen & Jones, *supra* note 86, at 16.

[146] One report found that "[d]uring 2005, more than 3600 major facilities (57 percent of about 7000) exceeded their permit discharge limits at least once. Astoundingly, also during 2005, 628 major facilities reported violating their permit requirements in at least half of their monthly reports. When major facilities exceed their permits, they, on average, exceed them by four times the permitted amount." *Id.* at 17.

NPDES permit programs made a significant dent in point source pollution, nonpoint source pollution had become the largest contributor to surface water pollution in the United States.[147] In 2002, EPA reported that nonpoint source pollution was the leading cause of the siltation, nutrients, bacteria, metals (primarily mercury), and oxygen-depleting substances that are responsible for continued impairment of our surface waters.[148] Nonpoint source pollution is responsible for up to three-quarters of the pollution in the waters with the poorest quality, with agricultural activities leading the list as the largest source of nonpoint source pollution.[149] J.B. Ruhl, who has studied the role of agriculture in surface water pollution extensively, charges that "[e]fforts to address nonpoint source water pollution in the CWA and other statutes have been feeble, unfocused, and underfunded."[150]

These figures and accounts confirm Congress's understanding in 1972 that the achievement of adequate water quality depended on the control of nonpoint sources and condemns its failure to codify an adequate mechanism for doing so. Two prominent environmental law scholars have drawn the conclusion that "one is inevitably left with the conclusion that politics has driven the CWA's failure to take on nonpoint pollution in any

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[147] *See* SALZMAN & THOMPSON, *supra* note 19, at 153.

[148] U.S. EPA, NATIONAL WATER QUALITY INVENTORY: 2000 REPORT ES-3 (Aug. 2002) (cited in GLICKSMAN ET AL., *supra* note 3, at 581. *See also* Cannon, *supra* note 77, at 609-10 (discussing nationwide trends in dissolved oxygen concentrations in 2000).

[149] According to J.B. Ruhl:

> [f]arms are the major source of nonpoint water pollution nationally, with farm runoff acting as a primary transport mechanism for fertilizers, animal wastes, pesticides, sediments, and bacteria. For example, commercial fertilizers in farm runoff have widespread and pernicious effects, leading to eutrophication as the nutrient laden runoff promotes rapid algal and plant growth, and attendant consequent depletion of oxygen resources.

J.B. Ruhl, *Farms, Their Environmental Harms, and Environmental Law*, 27 ECOLOGY L.Q. 263, 288 (2000). *See also* Cannon, *supra* note 77, at 611 (claiming that "[w]ater quality problems attributable to rural non-point source pollution continue to be pervasive").

[150] Ruhl, *supra* note 149, at 298. *See also* Cannon, *supra* note 77, at 611 ("Lack of effective management of agricultural non-point source pollution remains the central problem of national water quality policy.").

meaningful way. The agricultural lobby, in particular, has been very successful in weakening or killing off proposals to regulate nonpoint pollution more rigorously."[151]

The status of efforts to protect wetlands ecosystems is also a mixed bag. By one account, since the adoption of the CWA in 1972, the rate at which wetlands are lost has declined about ninety percent.[152] The CWA's dredge and fill permit program, together with conservation programs administered by the Department of Agriculture,[153] cut annual wetland losses in the United States from an average of 555,000 acres in the mid-1970s to about 58,500 acres twenty years later.[154] Yet, according to one report, "experts are virtually unanimous that the biggest problem facing aquatic ecosystems is not pollution, but the destruction and alteration of aquatic habitats."[155] Alyson Flournoy has gone so far as to suggest that it is de facto national policy to "allow the destruction of wetlands at a steady pace."[156] This sorry state of affairs may be attributed to factors that include the absence of appropriate oversight of activities conducted under dredge and fill permits, particularly requirements that permit holders mitigate wetlands loses,[157] and the shifting jurisdictional parameters of the section 404 program (aided and abetted by the splintered and confusing treatment afforded the meaning of "navigable waters" by the Supreme Court). It is not much of a stretch to conclude that the amorphous nature of the goals of the section 404 program and Congress's failure even to mention wetlands in the text of the 1972 Act have impaired efforts to protect aquatic ecosystems.

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[151] SALZMAN & THOMPSON, *supra* note 19, at 154. *See also* Cannon, *supra* note 77, at 622 ("The coalition that successfully prevented regulation of non-point sources in 1972 remains intact and has successfully resisted much more modest efforts since then to bring non-point sources under some level of management.").
[152] Andreen, *Water Quality Today*, *supra* note 77, at 592.
[153] For discussion of some of those programs, see 2 & 3 COGGINS & GLICKSMAN, *supra* note 100, at §§ 19:26, 27:6.
[154] Andreen & Jones, *supra* note 86, at 34.
[155] Robert W. Adler, *Restoring the Environment and Restoring Democracy: Lessons from the Colorado River*, 25 VA. ENVTL. L.J. 55, 61 (2007). *Cf.* Houck, *Wetlands Regulation*, *supra* note 84, at 1245 (stating that that "a loss of fifty percent of America's remaining wetlands would result in increased sewage treatment plant expenditures of up to $75 billion for the removal of a single pollutant, nitrogen, alone").
[156] Flournoy, *supra* note 91, at 610.
[157] *See* Andreen & Jones, *supra* note 86, at 39.

B. The Impact of Cooperative Federalism

Congress's decision to enhance the federal government's role in administering national water pollution control legislation has paid significant dividends. The 1972 legislation has performed much better than its 1948 and 1965 predecessors did. As the discussion above indicates, the nationally uniform technology-based effluent limitations for point sources that form the core of the CWA's efforts to combat water pollution, which have performed admirably, are largely responsible for that success.[158] But the states have not forfeited their role in the process of improving water quality. More than forty states have taken up Congress on its invitation to administer the NPDES permit program in lieu of EPA.[159]

If anything, the statutory programs controlled by the states in the first instance have increased in importance in recent years. As EPA brought more and more point sources under the umbrella of the technology-based effluent limitations, it became increasingly clear that some surface water bodies resisted the improvements envisioned by the CWA. Many surface water bodies failed to comply with state water quality standards, despite implementation of technology-based controls for point sources, largely because of continuing nonpoint source pollution. The statutory safety net – in the form of the state water quality standards – has therefore taken on a larger role.[160] On the one hand, the increasing importance of the state water quality standard program makes Congress's decision not to rely entirely on technology-based controls, despite the failure of an ambient quality-based approach before 1972, look like a smart one. On the other hand, had Congress created an effective mechanism for controlling nonpoint

[158] *See supra* notes 92-97, 142 and accompanying text.
[159] *See* National Pollutant Discharge Elimination System (NPDES), State Program Status, http://cfpub.epa.gov/npdes/statestats.cfm.
[160] *See* GLICKSMAN ET AL., *supra* note 3, at 652-53.

source pollution (such as by requiring states to fashion and enforce best management practices for nonpoint sources), a statutory safety net may not have been as necessary.[161]

State efforts to implement the water quality standard program have not gone smoothly. The statute requires that states with surface water bodies that do not satisfy state water quality standards (known as impaired waters) adopt total maximum daily loads (TMDLs).[162] A TMDL represents the maximum assimilative capacity of the receiving water body to which it applies; aggregate discharges above the TMDL will result in pollutant concentrations higher than those deemed necessary to achieve the designated use.[163] States must limit aggregate discharges by point and nonpoint sources to an amount equal or less than that allowed by the TMDL. But many states ignored their TMDL designation responsibilities for reasons that include funding shortages and lack of political will.[164] To combat this torpor, environmental groups resorted to citizen suits in which they sought court orders mandating that EPA fulfill its nondiscretionary duty to promulgate TMDLs for states that have failed to do so.[165] Although the results in these

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[161] Even with more effective control of nonpoint sources, a safety net in the form of water quality standards still would have been useful in protecting water bodies into which multiple sources discharge and water bodies that have low stream flow, so that discharges concentrate to a greater extent than they do in rivers and streams with higher flow levels. *See, e.g.*, City of Albuquerque v. Browner, 97 F.3d 415, 419 n.4 (10th Cir. 1996) (quoting EPA v. Calif. ex rel. State Water Res. Control Bd., 426 U.S. 200, 205 n.12 (1976)) ("Water quality standards supplement technology-based effluent limitations guidelines 'so that numerous point sources, despite individual compliance with effluent limitations, may be further regulated to prevent water quality from falling below acceptable levels.'"); *cf.* Michael Wenig, *How "Total" Are Total Maximum Daily Loads? – Legal Issues Regarding the Scope of Watershed-Based Pollution Control Under the Clean Water Act*, 12 TUL. ENVTL. L.J. 87, 176-77 (1998) (arguing that it is impossible to determine whether nonpoint source pollution has a relatively small impact on water quality without addressing whether that load is large enough, in conjunction with point source discharges, to cause exceedences of the applicable water quality standards during low flows).

[162] 33 U.S.C. § 1313(d) (2006).

[163] GLICKSMAN ET AL., *supra* note 3, at 665; *see also* Michael P. Healy, *Still Dirty After Twenty-Five Years: Water Quality Standard Enforcement and the Availability of Citizen Suits*, 24 ECOLOGY L.Q. 393, 405 (1997) ("A TMDL defines the maximum amount of a pollutant that a body of water can receive from all point and nonpoint sources each day before a violation of a state WQS will occur.").

[164] *See* Murchison, *supra* note 21, at 573; Cynthia D. Norgart, *Florida's Impaired Waters Rule: Is There a "Method" to the Madness?*, 19 J. LAND USE & ENVTL. L. 347, 353 (2004); Jason Malinsky, *Balancing the Pollution Budget After* Friends of the Earth, 34 ECOLOGY L.Q. 861, 868 (2007); John T. Holleman, *In Arkansas Which Comes First, the Chicken or the Environment?*, 6 TUL. ENVTL. L.J. 1, 59 (1992) (claiming that "the true genesis" of the difficulty in setting TMDLs stems from the "acutely political judgment as to who's ox will be gored").

[165] 33 U.S.C. § 1313(d)(2) (2006).

suits have been mixed,[166] there is little question that implementation of the TMDL program would be even further behind if not for the availability of citizen suits to spur recalcitrant agencies to perform their water quality-related obligations.[167] This outcome seems to support the value of Congress's choice to include in the CWA a citizen suit provision as a means of combating agency inertia.

V. CONCLUSION

The lofty goals Congress set when it adopted the CWA have not yet been met, although significant progress toward them has occurred. It is not the function of this article to assay what the next steps should be in moving to complete the journey toward a no discharge world in which aquatic ecosystems thrive; that is the assigned task of Robert Adler, the author of the companion piece to this article in this volume. Several points seem obvious, however. First, it will take more to eliminate the impaired status of those water bodies that do not currently meet state water quality standards than cracking down harder on point sources through more rigorous technology-based controls (although better enforcement of existing permits and the effluent limitations they contain would help). Instead, a meaningful system of controlling nonpoint sources is essential. Congress must work with the state and local governments to overcome the political barriers that have thus far thwarted efforts to extract from nonpoint sources the same commitments to

[166] *Compare* May, *supra* note 123, at 29 (stating that the TMDL citizen suit litigation "illustrates the reluctance of courts to force agency action absent a date-certain deadline"), *with* Healy, *supra* note 163, at 425 n.158 ("Recent district court decisions suggest however that there may be a limit to the willingness of courts to accept long delays and unspecified deadlines for defining TMDLs. The fact remains that TMDL delays continue to contribute to WQS compliance problems. "); June F. Harrigan-Lum & Arnold L. Lum, *Hawaii's TMDL Program: Legal Requirements and Environmental Realities*, 16 J. NAT. RESOURCES & ENVTL. L. 1, 12 (Summer 2000) (arguing that "[t]he courts have also displayed impatience with state-proffered reasons relating to substantive matters, perceiving them instead as delays in submitting TMDLs").

[167] *See* HOUCK, *supra* note 141, at 5 (stating that "a series of federal court cases in the late 1980s and early 1990s began to crack the defenses. . . . A wave of litigation followed, state by state, compelling listings of impaired waters and schedules for first-ever TMDLs").

reducing discharges that the CWA has already demanded of point sources. Second, a resolution of the definitional quandary over what kinds of waters and wetlands the CWA covers is essential. It is essential to dispel the current "miasma of uncertainty"[168] cast over the meaning of "navigable waters" and "waters of the United States" by the Supreme Court's fractured and confounding opinions in *Solid Waste Agency of Northern Cook County* and *Rapanos*.

One possible approach to dealing with both of those issues is to focus on protecting the integrity of watersheds. EPA has defined a watershed-based approach as one that "focuses multi-stakeholder efforts within hydrologically defined boundaries to protect and restore our aquatic resources and ecosystems. . . ."[169] The agency has identified several basic components of a watershed-based effort to improve water quality. These include the division of the states into natural geographic management areas; the adoption of phased regulatory and non-regulatory actions within each watershed area, including monitoring, assessment, planning, and implementation; the integration of CWA and other water resource programs; and a process that enables stakeholder participation.[170] A watershed-oriented focus makes sense because, as Holly Doremus has pointed out, "[t]he core of the current problem is . . . our failure to bridge the land-water interface and other artificial boundaries we've created."[171] Whether TMDLs can provide the "backbone" of such a watershed-based approach[172] or a different approach is needed is a

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[168] *See* Cyrus P.W. Rieck, *How to Deal with Laboratory Reports Under* Crawford v. Washington: *A Question with No Good Answer*, 62 U. MIAMI L. REV. 839, 839 (2008).
[169] GLICKSMAN ET AL., *supra* note 3, at 693-94 (quoting Memorandum from G. Tracy Mehan, III, U.S. EPA Assistant Administrator, Office of Water, Committing EPA's Water Program to Advancing the Watershed Approach (Dec. 3, 2002)).
[170] *Id*. at 694 (citing U.S. EPA, A Review of Statewide Watershed Management Approaches, Final Report 1 (April 2002)).
[171] Andreen & Jones, *supra* note 86, at 8-9 (quoting Holly Doremus, *Crossing Boundaries: Commentary on "The Law at the Water's Edge,"* in WET GROWTH: SHOULD WATER LAW CONTROL LAND USE? 271 (Craig Anthony (Tony) Arnold ed., Envtl. L. Inst. 2005)). *See also* Robert W. Adler, *Integrated Approaches to Water Pollution: Lessons from the Clean Air Act*, 23 HARV. ENVTL. L. REV. 203, 204 (1999) (urging "a comprehensive, watershed-based approach to aquatic ecosystem restoration and protection to augment the nation's water pollution control strategy").
[172] *See* Adler, *Integrated Approaches*, *supra* note 171, at 205.

question that is beyond the scope of our assignment for this symposium, but it will be interesting to see how the answer crafted by environmental policymakers in the coming years conforms to the initial assumptions on which the CWA was enacted.