

ARTICLES

How “Total” Are “Total Maximum Daily Loads”?:—Legal Issues Regarding the Scope of Watershed-Based Pollution Control Under the Clean Water Act

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I. INTRODUCTION

*"A major experiment in environmental federalism is about to begin."*¹

The "experiment" to which Professor Houck refers is the establishment of "total maximum daily loads" or "TMDLs," a federally mandated, watershed-based program for cleaning up heavily polluted waters.² Although the TMDLs program has been on the books for a long time, it has only recently begun to be implemented as a result of pressure from a wave of citizens suits throughout the United States. This Article addresses legal issues regarding the scope of water bodies and environmental harms covered by the TMDLs program.

The TMDLs "experiment" is a manifestation of a fundamental change occurring in the field of environmental protection, from a narrow focus on individual sources of harm to a more holistic focus on entire ecosystems, including the multiple human sources of harm within ecosystems, and the complex social context of laws, political boundaries, and economic institutions in which those sources exist.³ The ecosystem approach is not a new concept, but in recent years, it has gained an unprecedented level of acceptance. According to one commentator, the ecosystem concept, together with the related concept of "sustainable development," is "sweeping through international, national, state, and local policy and reshaping the appearance of environmental law at all levels."⁴

Considerable effort is being made to implement the ecosystem approach. In the United States, federal agencies are reorganizing themselves to reflect a focus on ecosystems. Additionally, many

1. Oliver A. Houck, *TMDLs III: A New Framework for the Clean Water Act's Ambient Standards Program*, [1998] 28 *Envtl. L. Rep.* (Envtl. L. Inst.) 10,415, 10,438 [hereinafter Houck III].

2. *See id.* at 10,419-20.

3. *See* Robert W. Adler, *Addressing Barriers to Watershed Protection*, 25 *ENVTL. L.* 973, 975-76 (1995).

4. J.B. Ruhl, *An Environmental Rights Amendment: Good Message, Bad Idea*, 11 *NAT. RES. & ENV'T* 46, 47 (1997). Professor Houck has similarly observed that "America is now rushing toward something called the ecosystem management," which he describes as a "whole new species of thought—half science and half religion—[that] has arisen in research, articles, books, management plans and litigation, a new field of conservation biology . . . [which is] changing the language of the game." Oliver A. Houck, *Are Humans Part of Ecosystems?*, 28 *ENVTL. L.* 1, 2 (1998); *see also* Robert B. Keiter, *Beyond the Boundary Line: Constructing a Law of Ecosystem Management*, 65 *U. COLO. L. REV.* 293, 294-95 (1994) (predicting "imminent" and "fundamental" changes in federal natural resources law and policy due to increasing recognition of the need for an ecosystem approach to environmental protection); Adler, *supra* note 3, at 974-76 (observing a "trend toward ecosystem approaches to environmental protection" and noting a "resurgence of watershed proposals" and a "broad based" "watershed revival").

states and municipalities are implementing watershed ecosystem programs in conjunction with private citizens, and citizens themselves are creating numerous ecosystem-based, nonprofit advocacy and educational organizations.⁵ In particular, the Environmental Protection Agency (EPA or the Agency) has, in recent years, developed and encouraged states to adopt an overall watershed ecosystem approach for implementing water quality programs.⁶ In fact, in 1998, the watershed ecosystem approach became one of the EPA's highest priority programs for controlling water pollution.⁷

Despite these numerous ecosystem-based initiatives, there is hardly a consensus over what an ecosystem approach entails.⁸ Advocates of the ecosystem approach generally agree that it is needed because environmental problems often involve linkages among physical, biological, and social components within and among ecosystems.⁹ For example, a watershed ecosystem includes four sets of important, complex linkages: vertical (surface to ground water), horizontal (up- and down-stream), lateral (river channel to riparian zone to flood plain), and temporal (changes in each of the above linkages over time).¹⁰ In turn, these physical watershed components are linked to biological and, in most cases, human communities within watersheds.¹¹ To make matters more complicated, there are

5. See Keiter, *supra* note 4, at 394-95; Adler, *supra* note 3, at 977-78; Water Quality Standards Regulation, 63 Fed. Reg. 36,742, 36,744 (1998) (stating that the "most significant shift in water quality management programs in recent years has been the increased emphasis on the use of watershed based programs"); U.S. ENVTL. PROTECTION AGENCY, CLEAN WATER ACTION PLAN: RESTORING AND PROTECTING AMERICA'S WATERS 11 (1998) [hereinafter CLEAN WATER ACTION PLAN] ("[H]undreds of watershed partnerships . . . have sprung up across the country to address a multiplicity of water quality and natural resource concerns").

6. In its simplest terms, a "watershed" is the "entire surface drainage area which contributes water to a lake or river." Adler, *supra* note 3, at 976. A "basin" is the largest form of "watershed," encompassing the land mass drained by an entire river system. See *id.*; BOB DOPPELT ET AL., ENTERING THE WATERSHED—A NEW APPROACH TO SAVE AMERICA'S RIVER ECOSYSTEMS 7-9 (1993). The EPA describes watersheds as "nature's boundaries for water resources." CLEAN WATER ACTION PLAN, *supra* note 5, at 74.

7. See CLEAN WATER ACTION PLAN, *supra* note 5, at ii-iv (stating that the watershed ecosystem approach is a "major new Clean Water Initiative," one of three broad strategies, and one of four "tools" for achieving clean water); see also *id.* at x, xi, 13-15, 30, 31, & 73-88; Adler, *supra* note 3, at 978 n.16 (noting that the watershed and similar ecosystem approaches are "integral" to the Agency's "overall strategy to achieve sustainable environmental and economic quality").

8. See, e.g., Richard Haeuber, *Setting the Environmental Policy Agenda, The Case of Ecosystem Management*, 36 NAT. RES. J. 1, 5-9 (1996).

9. See, e.g., Adler, *supra* note 3, at 981-91. For a good discussion of the "ecological imperative" for ecosystem approaches, see generally *id.*; DOPPELT, *supra* note 6, at 1-25.

10. See Adler, *supra* note 3, at 982.

11. See *id.* at 981-86.

physical, biological, and social linkages within and among watersheds and other kinds of ecosystems.¹²

These linkages demonstrate the ineffectiveness of solving environmental problems within a given watershed by focusing on one component without considering how that component is linked to others.¹³ For example, regulatory efforts to protect fish in a watershed must focus not only on the harm to fish from domestic sewage plant pollution, but also on the threats to fish from all other sources of water pollution. Those threats may include sources of damage to riparian vegetation, and reductions in stream flows. Moreover, those threats must be evaluated not only in the context of the range of often disjointed laws available to reduce them, but also in the context of laws and other social factors that may be encouraging them.

Advocates of the ecosystem approach generally agree that it can promote the social values of equity and efficiency, as well as environmental protection, by simultaneously addressing all physical, biological, and social causes of environmental problems.¹⁴ The ecosystem approach provides a flexible framework for fairly and efficiently allocating the social and economic costs of environmental protection among all public and private interests.¹⁵

Advocates also generally agree that the holistic approach is difficult to define and implement because of the same complex physical, biological, and social linkages which necessitate the approach in the first place.¹⁶ These difficulties include determining the proper kind of ecosystem to use for management purposes and the proper scale within an ecosystem unit.¹⁷ For example, watershed ecosystems, like the Columbia, Mississippi, Hudson, or Connecticut River basins, may have numerous components, which can be broken up into multiple smaller watersheds based on each of the numerous tributaries that feed those large river systems.¹⁸

Defining the appropriate ecosystem scale is problematic because there are usually multiple overlapping ecosystems which make the choice of any one as a basis for planning seem somewhat arbitrary.¹⁹ For example, an alpine meadow in the Rockies can be viewed as a local ecosystem in that it provides habitat for local insects and

12. *See id.*

13. *See id.* at 982-83.

14. *See id.* at 995-1000.

15. *See id.*

16. *See id.* at 991-94.

17. *See id.*

18. *See id.*

19. *See id.*

rodents. However, the meadow may lie within a broader range for grizzly bears and migrating eagles. It may also contain wetlands adjacent to a creek which is part of a larger watershed that ultimately drains sub-alpine forests and prairies. Should the meadow be viewed as an isolated system? Or should it be included as part of an alpine Rocky Mountain ecosystem, part of the watershed to which it belongs, or part of a “grizzlyshed” or “eagleshed”? Intuitively, watersheds are appealing ecosystem “units” because they can be used to cover an entire land mass without overlap, unlike other ecosystem categories which may overlap and/or may not cover an entire land mass.²⁰ Ecosystems defined by bird and mammal migration corridors are examples of these geographically incomplete categories.

It is hard to define not only the appropriate ecosystem unit, but also the appropriate management organization and structure for an ecosystem approach. Ecosystem units do not coincide with political jurisdictions.²¹ Should this approach be driven by federal regulators? What role should local and regional governments, as well as private “stakeholders,” play in the process? How should inter-state and international disputes be resolved?

The advantages and problems inherent in the ecosystem approach present, what Professor Adler describes as, a paradox: the larger the ecosystem unit, and the more comprehensive the harms and social causes addressed, the more holistic the process. Yet, the larger the scale and scope, the more difficult it will be to implement in terms of scientifically modeling the complex physical and biological linkages, and coordinating all the interested bureaucrats, politicians, citizens, and commercial entities.²²

20. See *id.* at 981-86 (describing the advantage of the watershed ecosystem unit). The U.S. Geological Survey has divided up the United States into 2,149 watersheds. See CLEAN WATER ACTION PLAN, *supra* note 5, at 74.

21. See Adler, *supra* note 3, at 991-93.

22. See *id.* at 1088-1104 (discussing the paradox of ecosystem approaches). Still another unresolved question is whether the ecosystem approach demands or stems from a particular kind of environmental ethic. One could argue that an ecosystem approach is necessary from a purely anthropocentric view, because humans themselves are ultimately benefited by living in healthy ecosystems. This argument is supported by Aldo Leopold’s justification for his influential “land ethic,” which judges the morality of actions according to whether they preserve or destroy the land. See ALDO LEOPOLD, A SAND COUNTY ALMANAC 262 (Oxford Univ. Press) (1968). Although Leopold’s “land ethic” is commonly associated with a nonanthropocentric environmental ethic, much of his justification for his “land ethic” is based on human survival. Leopold refers to ethics, from an ecological perspective, as a “limitation on freedom of action in the *struggle for existence*.” *Id.* at 202 (emphasis added). He also refers to the need to extend the concept of ethics to “the land” as an “ecological necessity.” Ethics, according to Leopold, are a “community instinct” for survival, that reflects lack of knowledge about the ecological effects of human conduct. *Id.* at 239. Leopold attacks the notion of humans as “conquerors” of the land,

This Article addresses the paradox of ecosystem management in the context of TMDLs which are now recognized as an important tool for implementing a watershed ecosystem approach under the Clean Water Act (the Act).²³ As provided in section 303(d) of the Act, the TMDLs process involves: (1) identifying waters whose quality is below that prescribed by ambient water quality standards; (2) establishing the total pollution “load” which each of those waters can assimilate without violating water quality standards; (3) assigning allocations of that total load among all pollution sources on those waters; and (4) ensuring that each source does not exceed its allocation through permit conditions or other regulatory or

not because it may disrespect the intrinsic value of the land or its nonhuman inhabitants, but because that notion is “eventually self-defeating.” *Id.* at 241. Leopold emphasizes humans’ dependence on the “biotic pyramid” and, thus, the instrumental value of the pyramid for humans. *Id.* at 251-53. In one breath, Leopold refers to the “right” of nonhuman species to continued existence, but in another he seems to justify this “right” not based on those species’ intrinsic value, but on their instrumental value for preserving the stability of the biotic community as a whole. *Id.* at 240, 246-47 (stating that species “are members of the biotic community, and if (as I believe) its stability depends on its integrity, they are entitled to continuance”).

Of course, viewing ecosystem approaches as valuable for human purposes does not preclude viewing them as valuable for maximizing the “pleasure” or “good” of nonhuman sentient beings or even nonsentient beings, if one believes those entities have intrinsic as well as instrumental value. *See, e.g.*, PETER SINGER, PRACTICAL ETHICS 274-84 (2d ed. 1993) (discussing the range of ethical views regarding the locus of intrinsic value beyond humans). Then again, one might view an ecosystem approach as necessary to respect the intrinsic moral worth of ecosystems themselves. WILLIAM DEVALL & GEORGE SESSIONS, DEEP ECOLOGY: LIVING AS IF NATURE MATTERED 67 (1985).

One author acknowledges that ecosystem approaches may reflect a range of views as to the locus of intrinsic moral values, but he nevertheless believes that this range falls within one general ethical view underlying the ecosystem approach. According to Professor Francis, ecosystem management is based on “ecophilosophy” which he defines as an “array of writings about the relationships of humans to their natural world.” George Francis, *Ecosystem Management*, 33 NAT. RES. J. 315, 317 (1996). Professor Francis describes these writings as sharing the “common theme” of the “need to reject traditional anthropocentric views about human dominance over and exemption from many natural processes and accept instead the realization that humans are members of ecosystems upon which they are totally dependent for their survival.” *Id.* Francis’s dichotomy between an “anthropocentric” view and a view of humans as dependent on ecosystems for their survival is questionable, however, because human “survival” is itself an “anthropocentric” objective.

Francis also suggests that the eco-philosophy underlying ecosystem management generally rejects a utilitarian notion of the environment. *Id.* at 328. Once again, this view makes little sense if human survival is the goal, if a healthy environment is the instrument for achieving that goal. Finally, Francis suggests that ecophilosophy generally requires “[m]ore deference . . . towards Nature” and a greater focus on “adapting human activities to fit better with natural processes.” *Id.* at 319. As noted above, however, this kind of ecosystem respect can still be justified on utilitarian grounds in terms of ecosystems’ value for promoting human survival.

23. Formerly known as the Federal Water Pollution Control Act of 1972, Pub. L. No. 92-500, 86 Stat. 816 (1972) (codified as amended at 33 U.S.C. §§ 1251-1376 (1976 & Supp. V. 1981)).

nonregulatory tools.²⁴ Because of their holistic, comprehensive focus on multiple pollution sources, TMDLs provide a quantitative basis for implementing an ecosystem approach.

Both the EPA and the states have largely ignored the TMDLs process until recently, when citizen-plaintiffs, imbued with the ecosystem consciousness, launched a tidal wave of lawsuits to force the EPA and the states to implement the TMDLs process.²⁵ Spurred by these lawsuits, the EPA now touts the TMDLs program as the “backbone” of its watershed approach.

Although the basic outline of the TMDLs process is straightforward, the process is in fact quite complex and, as provided in section 303(d), raises numerous legal and policy issues.²⁶ Reflecting the paradox of the ecosystem approach generally, many of these issues relate to the fundamental question of just how broad or comprehensive the TMDLs process should be within each state. This question, in turn, raises several closely related sub-questions, including the breadth of states’ waters which should be listed under section 303(d), whether TMDLs should be established for all waters listed under section 303(d), the types of environmental harms that should be addressed by the TMDLs process, and the scope and sources of those harms that should be addressed in a single TMDL. A common theme underlying these questions is whether the TMDLs process should apply to waters polluted solely or primarily by runoff or, in its technical terms, “nonpoint source” pollution.

The Act provides few clear answers to these questions, and the EPA has not filled this legal gap with its own clear, consistent interpretations. This Article suggests, as a partial remedy to resolve these legal uncertainties, that the EPA require states to adopt a

24. 33 U.S.C. § 1313(d) (1997).

25. See, e.g., *Scott v. City of Hammond*, 741 F.2d 992 (7th Cir. 1984) (suit to force the EPA to adopt a TMDL for Lake Michigan); *Alaska Ctr. for the Env't v. Reilly*, 762 F. Supp. 1422 (W.D. Wash. 1991); *Alaska Ctr. for the Env't v. Reilly*, 796 F. Supp. 1374, 1375 (W.D. Wash. 1992), *aff'd sub nom.* *Alaska Ctr. for the Env't v. Browner*, 20 F.3d 981 (9th Cir. 1994) (suit to force the EPA to implement the TMDLs program in Alaska); *Sierra Club, North Star Chapter v. Browner*, 843 F. Supp. 1304 (D. Minn. 1993) (Minnesota TMDLs); *Idaho Sportsmen's Coalition v. EPA*, 43 Env't. Rep. Cas. (BNA) 1289, 1292 (W.D. Wash. 1996) (Idaho TMDLs); *Sierra Club v. Hankinson*, 939 F. Supp. 872 (N.D. Ga. 1996) (Georgia TMDLs); *Natural Resources Defense Council v. Fox*, 909 F. Supp. 153, 156-60 (S.D.N.Y. 1995) (TMDLs for New York State watersheds supplying drinking water for New York City); *Environmental Defense Fund, Inc. v. Costle*, 657 F.2d 275, 294-95 (D.C. Cir. 1981) (unsuccessful suit to force the EPA to adopt a TMDL for salinity in the Colorado River). For an updated list of TMDLs cases, see U.S. Env'tl. Protection Agency, *TMDL Lawsuit Information* (last modified Feb. 12, 1998) <<http://www.epa.gov/owow/tmdl/lawsuit.html>>.

26. See *Houck III*, *supra* note 1, at 10,437 (describing the TMDLs program as “beguilingly simple to describe and frustratingly difficult to implement”).

watershed framework for purposes of determining the breadth of their TMDLs programs. In simple terms, not only is the TMDLs process an important tool for implementing a watershed ecosystem approach, but the latter provides a useful, if not necessary, tool for organizing the TMDLs process.²⁷

Part II of this Article describes how TMDLs fit within the broader regulatory framework of the Act. Part III analyzes the “scope” issues in the context of the identification of heavily polluted waters under section 303(d). Finally, Part IV analyzes issues relating to the scope of the harms addressed by TMDLs generally and to the scope of individual TMDLs.

II. THE BIG PICTURE: THE CLEAN WATER ACT AND TMDLS

The Clean Water Act provides the modern framework for water pollution control in the United States. The general history and structure of the Act has been described in numerous books, articles, and court decisions.²⁸ The Act’s structure is summarized below simply to provide a context for later analysis of the legal issues surrounding TMDLs and to stress the connections between TMDLs and other pollution control programs.

A. Congress’s Ecosystemic Goals and Ambitious Objectives

Congress’s express objective in adopting the 1972 Act was to “restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.”²⁹ This objective is notable, in part, because it is ambitious, and also because of its holistic focus on the overall integrity of the Nation’s waters. This broad focus suggests a concern,

27. This theme builds on Professor Adler’s discussion regarding the benefits of a watershed approach for coordinating the issuance of pollution permits and integrating those permits with other pollution controls under the TMDLs umbrella. See Adler, *supra* note 3, at 995 n.112. The EPA itself has begun to refer generally to the symbiotic relationship between TMDLs and the watershed approach. See CLEAN WATER ACTION PLAN, *supra* note 5, at 79.

28. See, e.g., 2 WILLIAM H. RODGERS, JR., ENVIRONMENTAL LAW (1994); ROBERT W. ADLER ET AL., THE CLEAN WATER ACT 20 YEARS LATER (1993); David S. Baron, *Water Quality Standards for Rivers and Lakes: Emerging Issues*, 27 ARIZ. S. L.J. 559 (1995); Mark Van Putten & Bradley Jackson, *The Dilution of the Clean Water Act*, 19 U. MICH. J.L. REFORM 863 (1986); Drew Caputo, *A Job Half Finished: The Clean Water Act After 25 Years*, [1997] 27 *Envtl. L. Rep. (Envtl. L. Inst.)* 10,574; Oliver A. Houck, *TMDLs: The Resurrection of Water Quality Standards—Based Regulation Under the Clean Water Act*, [1997] 27 *Envtl. L. Rep. (Envtl. L. Inst.)* 10,327 [hereinafter Houck I]; Oliver A. Houck, *TMDLs, Are We There Yet?: The Long Road Toward Water Quality—Based Regulation under the CWA*, [1997] 27 *Envtl. L. Rep. (Envtl. L. Inst.)* 10,391 [hereinafter Houck II]; Alia S. Miles, *Searching for the Definition of “Discharge”: Section 401 of the Clean Water Act*, 28 *ENVTL. L.* 191, 195-200 (1998).

29. 33 U.S.C. § 1251(a).

less with particular sources of harm or particular kinds of harm, than with the overall effects of all harms on aquatic ecosystems.³⁰ Professor Adler describes this objective as “one of the best declarations of an ecosystem-based aspiration in any federal environmental law.”³¹ This broad ecosystem focus is also consistent with the watershed focus of the TMDLs process.

In order to achieve the Act’s ambitious objective, Congress declared a “national goal” that “the discharge of pollutants into the navigable waters be eliminated by 1985.”³² Although courts have not applied Congress’s far-reaching objective and goals literally, they have nevertheless often considered those congressional statements as important guide-posts in construing the Act’s many, and often complex and ambiguous provisions.³³ Court decisions in the TMDLs cases have generally epitomized this common judicial approach.³⁴

30. The Act’s legislative history confirms the ecosystem approach reflected in this statement of objectives. The House Report explained that the word “integrity” in that objective was intended to refer “to a condition in which the natural structure and function of ecosystems [are] maintained.” H.R. REP. NO. 92-911, at 76 (1972) (cited in *United States v. Riverside Bayview Homes, Inc.*, 474 U.S. 121, 132 (1985); *Dubois v. Agriculture Dep’t*, 43 Env’t Rep. Cas. (BNA) 1824, 1840 (1st Cir. 1977)).

31. Adler, *supra* note 3, at 1038. Although that quoted phrase suggests that Congress intended the Act to have a broad, ecosystem-based focus, another phrase in the Act’s purpose section seems inconsistent with this broad focus, by expressing Congress’s policy that the states’ authority to allocate water rights should not be “superseded, abrogated or otherwise impaired” by the Act. 33 U.S.C. § 1251(g) (1997). In *PUD No. 1 v. Washington Dep’t of Ecology*, 511 U.S. 700, 720 (1994), petitioners cited that phrase in section 101(g) of the Act as suggesting that Congress did not intend the Act to regulate water quantity, i.e., the volume or flow of water. As noted in the Part I, quantity or flow is one of four key physical dimensions of a watershed; thus, precluding that dimension from the Act’s coverage would limit the Act’s ability to support a watershed ecosystem approach. A majority of the Supreme Court rejected the petitioners’ argument, however, concluding that states could still allocate proprietary rights to use water but those rights were subject to national water quality concerns under the Act. *See id.* at 723. Taking a holistic ecosystem perspective itself, the majority found the petitioners’ distinction between water quality and quantity “artificial.” *See id.* at 719 (“In many cases, water quantity is closely related to water quality; a sufficient lowering of the water quantity in a body of water could destroy all of its designated uses, be it for drinking water, recreation, navigation or, as here, a fishery.”). The majority also relied on the Act’s definition of “pollution,” in section 502(19), as “the man-made or man induced alteration of the chemical, physical, biological, and radiological integrity of water.” *Id.* According to the majority, this concept “expressly evinces Congress’s concern with the physical and biological integrity of water” and specifically encompassed the “effects of reduced water quantity.” *Id.*; *see also National Wildlife Fed’n v. Gorsuch*, 693 F.2d 156, 179 n.67 (D.C. Cir. 1982) (“Section 101(g) was not intended to take precedence over legitimate and necessary water quality considerations.”).

32. 33 U.S.C. § 1251(a)(1). Congress also set an “interim goal,” “wherever attainable,” of achieving water quality which “provides for the protection and propagation of fish, shellfish, and wildlife” and for water-based “recreation” be achieved by 1983. *Id.* § 1251(a)(2). Congress also declared, as a national “policy,” that the discharge of “toxic” pollutants in “toxic amounts” be prohibited. *Id.* § 1251(a)(3).

33. *See, e.g., Monongahela Power Co. v. Alexander*, 809 F.2d 41, 45-46 (D.C. Cir. 1987) (marking the 1972 legislation as “the ascendancy of water-quality control to the status of a major

Although extremely (and perhaps unrealistically) ambitious, Congress's "national goal" is restrictive in one important respect—it applies to "pollutants" rather than to "pollution." The Clean Water Act defines "pollution" in broad, holistic terms;³⁵ but the Act defines "pollutants" more narrowly as a variety of expressly referenced materials and "heat" that are "discharged into water."³⁶ The "pollutant" definition takes a broad view of the kinds of materials considered "pollutants," e.g., by expressly including biological materials and heat, but does not reflect as broad an ecosystem focus as the Act's definition of "pollution" or as the Act's overriding objective in section 101(a). As discussed in more detail below, Congress's contrasting definitions of "pollution" and "pollutants" and varying uses of those terms throughout the Act, provide fundamental problems in interpreting many of the Act's provisions.³⁷

B. "NPDES" Permits for "Point Sources"

As noted above, Congress set as a goal the elimination by 1985 only of "pollutants," rather than of all ecosystem harms. Congress limited the Act's strongest regulatory tool to only a sub-set of all sources of those "pollutants." Specifically, section 301(a) of the Act prohibits the "discharge of any pollutant" except pursuant to permits issued by the EPA.³⁸ The phrase "discharge of a pollutant" is limited

national priority"); *Sierra Club v. Corps of Engineers*, 772 F.2d 1043, 1055 (2d Cir. 1985) (stating that Congress's far-reaching statutory goals are based on "its belief that man and nature are so intimately connected that to significantly degrade the waters of [the United States] threatens not only the fish, but ultimately man as well"); *see also* PUD No. 1 v. Wash. Dep't of Ecology, 511 U.S. 700, 704 (1994) (referring to several of the Act's goals as "ambitious"); *Natural Resources Defense Council v. Costle*, 568 F.2d 1369, 1371 (D.C. Cir. 1977) (stating that the Act was a "dramatic response to accelerating environmental degradation of rivers, lakes and streams in this country"); *American Frozen Food Inst. v. Train*, 539 F.2d 107, 113-14 (D.C. Cir. 1976); *Baron*, *supra* note 28, at 594 ("Perhaps no other environmental statute is so driven by such an ambitious set of objectives.").

34. *See, e.g.*, *Alaska Ctr. for the Env't v. Reilly*, 762 F. Supp. 1422, 1429 (W.D. Wash. 1991) (rejecting the EPA's position, in part, because it was "inconsistent with the CWA's purpose"); *Alaska Ctr. For the Env't v. Browner*, 20 F.3d 981, 983-86 (9th Cir. 1994) (citing the Act's "laudable but unattained" goal) (acknowledging the district court's finding that its relief was necessary "to bring about any progress toward achieving the congressional objectives of the CWA"); *Idaho Sportsmen's Coalition v. Browner*, 43 Env't. Rep. Cas. (BNA) 1289, 1290-92 (W.D. Wash. 1996) (citing national goal and rejecting EPA's proposed TMDL development schedule, in part, in light of Congress's national goal); *Natural Resources Defense Council v. Fox*, No. 94 Civ. 8424 (PKL), slip op. at 18 (S.D.N.Y. Nov. 12, 1998) (citing national goal in determining how quickly TMDLs were supposed to be established).

35. *See supra* note 31.

36. 33 U.S.C. § 1362(19).

37. Hereinafter, this Article will refer to "pollution" and "pollutants" interchangeably unless either word is cited in quotations.

38. 33 U.S.C. § 1311(a).

only to pollution discharged from a “point source.”³⁹ The Act defines that term, in turn, as “any discernible, confined and discrete conveyance,” and specifically excludes “agricultural stormwater discharges and return flows from irrigated agriculture.”⁴⁰ The precise limits of this definition are unclear, but it generally excludes pollution runoff or “nonpoint source” pollution.⁴¹ Yet, nonpoint source pollution is a significant, if not the largest, source of pollution in United States waters.⁴² Thus, the section 301(a) point source permitting requirements fall far short of addressing Congress’s holistic, ecosystem-based objective in section 101(a). The Act lacks a similar permitting requirement for nonpoint source pollution.

Section 402 of the Clean Water Act authorizes the EPA to issue “National Pollution Discharge Elimination System” (“NPDES”) permits for point sources.⁴³ The Act requires these permits to be

39. *Id.* § 1362(12).

40. *Id.* § 1362(14).

41. *Compare, e.g., Oregon Natural Desert Ass’n v. Dombeck*, 151 F.3d 945, 948 (9th Cir. 1998) (stating that runoff directly from animal grazing is a nonpoint source); *Newton County Wildlife Ass’n v. United States Forest Service*, 46 *Env’t. Rep. Cas.* (BNA) 1694, 1698 (8th Cir. 1998) (finding that runoff from road building and logging operations is a nonpoint source), and *National Wildlife Fed’n v. Gorsuch*, 693 F.2d 156, 172-73 (D.C. Cir. 1982) (stating that a dam that discharges water with a low dissolved oxygen content is not a point source), *with, e.g., Concerned Area Residents for the Env’t v. Southview Farm*, 34 F.3d 114, 123 (2d Cir. 1994) (holding that a large dairy farm is a point source); *Umatilla Water Quality Protection Ass’n v. Smith Frozen Foods*, 44 *Env’t. Rep. Cas.* (BNA) 1385 (D. Or. 1997) (finding that leaky brine ponds are a point source); *United States v. Earth Sciences, Inc.*, 599 F.2d 368, 374 (10th Cir. 1979) (finding that settling pond overflow is a point source); *Sierra Club v. Abston Constr. Co.*, 620 F.2d 41, 45 (5th Cir. 1980) (stating that runoff from mine tailings is a point source when tailing piles are designed so that runoff will likely pass through ditches or other discrete conveyances). For a discussion of the scope of the point source definition, see, for example, *Houck III, supra* note 1, at 10,425; *Miles, supra* note 28, at 196-98.

42. *See* OFFICE OF THE ADM’R, U.S. ENVTL. PROTECTION AGENCY, EPA 100-R-98-006, REPORT OF THE FEDERAL ADVISORY COMMITTEE ON THE TOTAL MAXIMUM DAILY LOAD (TMDL) PROGRAM (1998) [hereinafter FACA REPORT] (“State surveys indicate that non-point sources are significant and widespread contributors of pollution to impaired waters.”); CLEAN WATER ACTION PLAN, *supra* note 5, at 8-9 (“Polluted Runoff is the Most Important Source of Water Pollution” and noting that polluted runoff accounts for the “majority” of the “leading causes of water quality impairments reported by states”); *Miles, supra* note 28, at 200-01 (noting that nonpoint source pollution “continues to have an enormous impact on our nation’s waters”); James M. McElfish, Jr., *State Enforcement Authorities for Polluted Runoff*, [1998] 28 *Env’tl. L. R.* (Env’tl. L. Inst.) 10,181, 10,183 (“[N]onpoint source pollution remains a significant problem.”); Elaine Bueschen, *Pfiesteria Piscicida: A Regional Symptom of a National Problem*, [1998] 28 *Env’tl. L. Rep.* (Env’tl. L. Inst.) 10,317,10,317-21 (“Agricultural runoff is the greatest contributor of pollution in America’s impaired rivers, streams and lakes”); *see also generally* PAUL THOMPSON ET AL., POISON RUNOFF: A GUIDE TO STATE AND LOCAL CONTROL OF NONPOINT SOURCE WATER POLLUTION (1989).

43. For a general explanation of the NPDES permitting program, see *RODGERS, supra* note 28, § 4.26-4.32; *Adler, supra* note 3, at 1038-49; *see also, e.g., Chemical Mfrs. Ass’n v. Natural Resources Defense Council*, 470 U.S. 116 (1985); *Natural Resources Defense Council v. EPA*, 915 F.2d 1314, 1316-17 (9th Cir. 1990); *Trustees for Alaska v. EPA*, 749 F.2d 549, 552-53

based upon a bifurcated set of regulatory targets. One set is “technology-based,” i.e., targets based upon expected pollution reductions resulting from the application of various levels of available technology.⁴⁴ The other set of targets are “water quality-based.”⁴⁵ These targets are called “water quality standards,” and are generally established by states, subject to review and approval by the EPA. The “water quality standards” are set at levels necessary “to protect the public health or welfare, enhance the quality of water and serve the purposes of” the Act.⁴⁶ States establish “designated uses” for each waterbody within each state and corresponding narrative or numeric ambient water quality criteria for various pollutants or stream characteristics which are designed to maintain the designated uses.⁴⁷ Thus, NPDES permits must include “technology-based” effluent standards, established by the EPA, along with “any more stringent limitation, including those necessary to meet water quality standards,” generally established by states.⁴⁸ By addressing characteristics of ambient water quality, state standards themselves apply to point and nonpoint sources.⁴⁹ But under sections 301(a) and 402(a) of the Act, only point sources are subject to NPDES permit requirements aimed at achieving those standards.

(9th Cir. 1984). States can take the lead in issuing NPDES permits to applicable sources within their boundaries pursuant to a delegation by the EPA. *See* 33 U.S.C. § 1342(b).

44. *See* 33 U.S.C. §§ 1281(b), 1314(b), 1316, 1317.

45. *See id.*

46. *Id.* § 1313(c)(2); 40 C.F.R. § 130.3, pt. 131 (1997).

47. *See* 40 C.F.R. § 130.9. Water quality standards also generally include an “antidegradation” rule designed to prevent waters from becoming more polluted and provisions for the issuance of “mixing zones” which are areas immediately downstream of pollution sources in which the pollution is permitted to exceed applicable ambient standards. For a recent, general description of the Act’s water quality standards provisions and the history of their statutory and regulatory development, see Water Quality Standards Regulation, 63 Fed. Reg. 36,742, 36,745-47 (1998) (EPA’s “advanced notice” of a process for changing the Agency’s water quality standards regulations).

48. 33 U.S.C. §§ 1311(b)(1)(C), 1342(a)(1). These “standards” include, not only those adopted by States pursuant to section 303, but also a generic statutory standard which mirrors the national interim goal in section 101(a)(2) and includes the “protection of public water supplies, agricultural and industrial uses.” *Id.* § 1312(a). The EPA is authorized to establish effluent limits when necessary to achieve this generic standard. *See id.*

49. *See, e.g., Oregon Natural Resources Council v. Lyng*, 882 F.2d 1417 (9th Cir. 1989) (referencing Oregon’s ten percent limit on non point sources); *Oregon Natural Resources Council v. United States Forest Serv.*, 834 F.2d 842, 852 (9th Cir. 1987) (addressing merits of challenge to federal timber sale on ground that runoff from bridge and logging road construction would result in violations of state water quality standards for turbidity); *see also* 33 U.S.C. §§ 1342(a), 1311(a).

C. *Other Clean Water Act Programs for Achieving Water Quality Standards*

In addition to the water quality-based targets for NPDES permits, the Act contains several other important water quality-based programs. In section 401 of the Act, Congress gave states the power to essentially veto any federal license or permit, including NPDES permits, if the approved activity will violate a state water quality standard.⁵⁰ Courts have sent mixed signals on the extent to which states' "certification" authority can reflect an ecosystem focus. On the one hand, the Supreme Court in *PUD No. 1 v. University of Washington Department of Ecology* held that, in issuing section 401 certifications for activities that involve federally permitted or licensed point source discharges, states can include conditions to limit aquatic ecosystem harms resulting from other aspects of the same activities.⁵¹ On the other hand, the Ninth Circuit recently construed section 401 as inapplicable to runoff from federally permitted or licensed activities that do not have a related point source.⁵²

The Act also contains a comprehensive, water quality-based planning approach that applies to all pollution sources. Section 208(a) generally requires states to identify areas which have "substantial water quality problems" due to "urban-industrial concentrations or other factors" and to develop "areawide waste treatment management plans" for controlling pollution within those areas.⁵³ Also of note, section 305(b) requires states to submit biennial reports to the EPA which assess the quality of all waters within each state and the adequacy of programs for protecting water quality.⁵⁴

50. See 33 U.S.C. § 1341(a)(1); see also Miles, *supra* note 28, at 205-07; Debra L. Donahue, *The Untapped Power of Clean Water Act Section 401*, 23 *ECOLOGY L.Q.* 201 (1996); Katherine Ransel & Erik Meyers, *State Water Quality Certification and Wetland Protection: A Call to Awaken the Sleeping Giant*, 7 *VA. J. NAT. RESOURCES L.* 339 (1988). Short of a veto, states can add any conditions they consider necessary to ensure that a federally licensed activity will comply with those standards. 33 U.S.C. § 1341 (a)(1).

51. 511 U.S. 700, 710-23 (1994). The Court specifically upheld the state's section 401 certification condition that the activity maintain a minimum stream flow. See *id.* at 712-13. But the logic of the Court's opinion would apply equally to conditions aimed at limiting runoff or other kinds of ecosystem harms which a state believes will cause a violation of its ambient standards, as long as those harms result from the same activity whose point source requires a federal permit or license.

52. See *Oregon Natural Desert Ass'n v. Dombeck*, 151 F.3d 945, 948-50 (9th Cir. 1998). For a discussion of the district court's decision, which the Ninth Circuit overturned, see Miles, *supra* note 28, at 193-94; see also Donahue, *supra* note 50, at 273-74; Katherine P. Ransel, *The Sleeping Giant Awakens*, 25 *ENVTL. L.* 255, 270 (1995).

53. 33 U.S.C. § 1288(a). But see Adler, *supra* note 3, at 1042-44 (noting that section 208 is now "given little attention by EPA and is used only rarely by states").

54. See *id.* § 1315(b).

In 1987, Congress strengthened the Act's water quality-based approach toward toxic pollution. The 1987 Amendments require states to identify various categories of waters not expected to achieve ambient water quality standards due to toxics,⁵⁵ and then requires states to develop water quality-based "individual control strategies" to reduce toxic pollution from point sources on those waters.⁵⁶

The 1987 Amendments also strengthened the Act's approach toward nonpoint source pollution. The Amendments add a "national policy" that nonpoint source control "programs" be "developed and implemented in an expeditious manner so as to enable the goals of [the Clean Water Act] to be met through the control of both point and nonpoint sources of pollution."⁵⁷ The Amendments also add an additional planning component for nonpoint source pollution. Section 319 of the Act requires states to submit reports to the EPA which: (1) identify waters which cannot reasonably be expected to achieve state ambient water quality standards "without additional action to control nonpoint sources of pollution"; (2) describe a process for identifying "best management practices" and other measures for reducing nonpoint source pollution; and (3) identify existing state and local programs for controlling nonpoint source pollution.⁵⁸ Section 319 then requires states and/or the EPA to establish "management programs" for controlling nonpoint source pollution and authorizes the EPA to issue grants for states to implement approved management programs.⁵⁹

In addition to the section 208 and 319 plans, section 304(l) lists and control strategies, and section 305(B) water quality assessments, the Act contains other provisions directly or indirectly supporting comprehensive, water quality-based watershed planning and management.⁶⁰ Several of these provisions address specific waters,

55. See *id.* § 1314(1)(A)-(B).

56. *Id.* § 1314(l)(1)(C)-(D). See generally *National Resources Defense Council v. EPA*, 915 F.2d 1314 (9th Cir. 1990).

57. 33 U.S.C. § 1251(a)(7).

58. *Id.* § 1329(a).

59. See *id.* § 1329(b), (h).

60. See Adler, *supra* note 3, at 1040-45; *id.* at 1070-81 (summarizing the planning provisions); see also 33 U.S.C. § 1252(a) (requiring the EPA to develop "comprehensive programs" to control "pollution" of both surface and ground waters, giving "due regard" to "fish and aquatic life and wildlife, recreational purposes," and water withdrawals for various uses including public water supplies and agriculture); *id.* § 1252(c) (granting federal funds to local planning agencies for their participation in the development of a "comprehensive water quality control plan for a basin or a portion thereof"); *id.* § 1252(c) (requiring EPA to submit a report to Congress on the relationship between Clean Water Act programs and water allocation programs, including recommendations on how to "improve coordination efforts to reduce and eliminate pollution in concert with programs for managing water resources"); *id.* § 1254(r) (allowing

including Lake Michigan, Chesapeake Bay, Puget Sound, and Long Island Sound.⁶¹

D. The EPA's Watershed Approach

The EPA has historically implemented watershed-based planning and management provisions with questionable vigor.⁶² As noted above, however, the Agency has in recent years developed and encouraged states to adopt an overall "watershed approach" for implementing water quality programs.

The EPA's vision of a watershed approach is reflected in a 1996 document entitled "Watershed Approach Framework."⁶³ In that document, the Agency noted that "[m]any public and private organizations are joining forces and creating multidisciplinary and multijurisdictional partnerships" to focus on the country's substantial water pollution problems "community by community and watershed by watershed."⁶⁴ The Agency then stated that "supporting" these watershed approaches is a "high priority" for its national water program, but it emphasized that the approaches themselves should be "locally-driven."⁶⁵

The EPA defined a "watershed approach" as a "coordinating framework for environmental management that focuses public and private sector efforts to address the highest priority problems within hydrologically-defined geographic areas, taking into consideration

research grants on the "structure and function of aquatic ecosystems" and the "ecological characteristics necessary to the maintenance of the chemical, physical and biological integrity of freshwater aquatic ecosystems"); *id.* § 1254(s) (allowing grants for research on the "nature of river systems . . . the relationship between river uses and land uses, and on the effects of development . . . on river systems"); *id.* § 1255(b) (allowing grants to states "to demonstrate, in river basins or portions thereof," methods to "control pollution from all sources . . . including nonpoint sources, together with in stream water quality improvement techniques"); *id.* § 1281(c) (requiring, "[t]o the extent practicable," that "waste treatment management . . . be on an areawide basis and provide control or treatment of all point and nonpoint sources of pollution, including in place or accumulated pollution sources); *id.* § 1289(a) (requiring preparation of specified plans "for all basins in the United States); *id.* § 1324 (requiring states to submit to EPA plans for controlling "pollution" on all "publicly owned fresh water lakes" within each state); *id.* § 1330 (special programs for controlling "point and nonpoint sources of pollution" on each "estuary of national significance").

61. *See, e.g.*, 33 U.S.C. § 1258 (Great Lakes); *id.* § 1266 (Hudson River bottom sediments); *id.* § 1267 (Chesapeake Bay); *id.* § 1268 (Great Lakes); *id.* § 1269 (Long Island Sound); *id.* § 1270 (Lake Champlain).

62. *See* Adler, *supra* note 3, at 1038-49.

63. U.S. ENVTL. PROTECTION AGENCY, EPA 840-S-96-001 WATERSHED APPROACH FRAMEWORK 2 (1996) [hereinafter WATERSHED APPROACH FRAMEWORK].

64. *Id.*

65. *Id.* at 2-5.

both ground and surface water flow.”⁶⁶ Given its focus on locally driven watershed initiatives, it is no surprise that the EPA emphasized the importance of flexibility in designing watershed programs; noting that programs may vary in objectives, priorities, and operational characteristics.⁶⁷ However, the Agency also believed that there are several generic “guiding principles” on which all watershed approaches “should” be based.⁶⁸ The first of these principles—“partnerships”—is that all people “most affected by management decisions” should be “involved throughout and shape key decisions.”⁶⁹ The Agency viewed “broad involvement” as “critical,” in part, because such involvement can “build a sense of community, reduce conflicts, increase commitment to the actions necessary to meet societal goals and, ultimately, improve the likelihood of sustaining long-term environmental improvements.”⁷⁰

Although it supported local participation in watershed planning, the EPA believed that it should retain a major role in such efforts as well. The Agency stated that its responsibilities in supporting watershed approaches included defining and ensuring compliance with “basic water programs,” and developing “national standards and tools.”⁷¹

In addition to “partnerships,” the EPA advocated a “geographic focus” principle for generic watershed approaches.⁷² As its name implies, the principle is that geographic areas define the overall

66. *Id.* at 2.

67. *See id.*

68. *Id.*

69. *Id.*

70. *Id.* at 2-5.

71. *Id.* at 5. The precise extent to which states and local officials and citizens should lead watershed-based pollution control efforts is a particularly unsettled aspect of the EPA’s watershed framework. For a range of views regarding local roles in environmental decision making, see, for example, Rena I. Steinzor, *Reinventing Environmental Regulation: Back to the Past by Way of the Future*, [1998] 28 *Envtl. L. Rep. (Envtl. L. Inst.)* 10,361, 10,365-80 (noting, as a “common theme” among three recent reports on environmental policy reform, the “desirability of devolving decision-making to the state and local level” while, for at least one report, maintaining national standards to “ensure a level playing field among states and to avoid backsliding” and noting the historical justifications for a strong federal role in environmental decision-making); *see also* Caputo, *supra* note 28, at 10,582 (arguing that, while states should play an “important role” in “framing and implementing water quality protection,” the “standard-setting process” should not be “ced[ed]” to the states “without an adequate floor of federal regulation”); Reed D. Benson et al., *Recommendations for an Environmentally Sound Federal Policy on Western Water*, 17 *STAN. ENVTL. L.J.* 247, 264-67 (1998) (proposing a division of federal, state, and local environmental decision-making roles); Adler, *supra* note 3, at 1095-1096 (proposing a division of labor in a model watershed approach).

72. WATERSHED APPROACH FRAMEWORK, *supra* note 63, at 3.

management framework.⁷³ The EPA considered those “areas determined on the basis of hydrologic connections” to be “ideal” management units but did not preclude establishing management units on the basis of political or other factors.⁷⁴ The Agency also noted that the size of the geographic unit of choice is an “important consideration,” because it affects the participants’ roles; the Agency seemed to favor a model of small “nesting” watershed units functioning within units defined by larger river basins.⁷⁵

The EPA labeled its third general principle for watershed approaches as “[s]ound management techniques based on strong science and data.” This mom-and-apple-pie sounding slogan was actually the heart of the EPA’s watershed vision—a six phase process involving: (1) assessing and characterizing natural resources and their dependent communities; (2) establishing goals and objectives; (3) prioritizing problems; (4) developing management options and action plans; (5) implementing preferred plans; and (6) evaluating plans and revising them, as needed.⁷⁶ The EPA stressed the iterative nature of this process, which is necessary to reflect incomplete information on problems and solutions.⁷⁷

The EPA’s watershed framework recognized that the Clean Water Act’s provisions for ambient water quality standards form a “legal baseline” for establishing goals and objectives.⁷⁸ However, the Agency also recognized that water quality standards do not provide a sufficiently holistic measure of ecosystem health. Thus, the Agency noted that watershed programs may reflect the development and use of other environmental indicators as well.⁷⁹ More recently, the Agency has expanded its view of the range of ecosystem harms that

73. *See id.*

74. *See id.* at 7.

75. *See id.*

76. *See id.*

77. *See id.* at 3.

78. *See id.* at 9-10; *see also* Water Quality Standards Regulation, 63 Fed. Reg. 36,742, 36,747 (1998) (describing water quality standards as “essential to a wide range of surface water activities, including . . . setting and revising water quality goals for watersheds”).

79. *See* WATERSHED APPROACH FRAMEWORK, *supra* note 63, at 10-11. The EPA’s examples of management options focused on the Clean Water Act programs for which the Agency is responsible, but the EPA stressed that watershed objectives may reflect those unrelated to the Agency’s federal programs. *See id.* at 10. The EPA also noted that watershed program participants should consider the “full range” of available tools not just in water quality programs, but in “pesticide management, waste management, air pollution control . . . natural resources protection, agriculture programs, water supply, transportation and other related programs.” *Id.* at 11. The list of potential tools should in fact be considerably broader, including planning and zoning, taxes, and other institutions that may significantly, even if indirectly, affect the environment.

can be addressed through the Act's water quality standards, although it continues to insist that watershed approaches should also take advantage of other tools.⁸⁰

The EPA's overall watershed approach framework is revolutionary in its holistic focus on the cumulative effects of a broad range of ecosystem harms, but it is also notable because of its voluntary nature. The Agency offers needed technical advice and limited funds to states for the development of watershed-based programs, but it does not *require* states to adopt an overall watershed approach to implement the various Clean Water Act programs described above.

In its 1998 Clean Water Action Plan, the EPA stepped up its emphasis on states' development of watershed approaches by, among other things, calling for states to develop "Unified Watershed Assessments" and "Watershed Restoration Action Strategies."⁸¹ However, these programs are also voluntary, although they may involve components that are enforceable to varying degrees under the provisions discussed above.⁸²

E. Total Maximum Daily Loads

Ironically, although the wave of TMDLs lawsuits has peaked only recently, the TMDLs provisions in section 303(d) of the Clean Water Act originated in 1972 and have remained virtually unchanged.⁸³ The following subsections describe the TMDLs provisions and discuss TMDLs' functions with respect to the Clean Water Act programs summarized above.

80. See CLEAN WATER ACTION PLAN, *supra* note 5, at 80, 87; Water Quality Standard Regulations, 63 Fed. Reg. 36,742, 36,744-46 (July 1998) (describing "new and emerging sophisticated and integrated analytical tools . . . [that] will increasingly allow states, Tribes, EPA and the public to characterize better the ecological conditions of water resources" in the context of setting and implementing water quality standards and noting that the water quality standards program "should be designed to accommodate effectively the new science").

81. *Id.* at 73-81; Houck III, *supra* note 1, at 10,423-24.

82. See generally CLEAN WATER ACTION PLAN, *supra* note 5.

83. See Water Quality Planning and Management; Reopening of Comment Period, 54 Fed. Reg. 30,765 (July 24, 1989) (noting that section 303(d) is a "longstanding and ongoing" requirement "established by Congress in 1972"); see also Houck I, *supra* note 28, at 10,331 ("The TMDL process represents, in the short life of environmental law, an ancient approach to pollution control.").

1. Section 303(d): Watershed-Based Pollution Control in 800 Words or Less

In a nutshell, section 303(d) provides a multi-step, watershed or stream-based method for achieving ambient water quality standards.⁸⁴ Section 303(d)(1)(A) requires each state to identify all waters within the state for which certain technology-based NPDES permit limits alone are insufficient “to implement any water quality standard” for “such waters.”⁸⁵ Section 303(d)(1)(A) then requires each state to establish a “priority ranking” for identified waters, “taking into account the severity of the pollution and the uses to be made of such waters.”⁸⁶

Next, the Act requires each state to “establish” the “total maximum daily load” of pollution, or “TMDL,” for those waters listed under section 303(d)(1)(A).⁸⁷ These waters will be referred to herein as “303(d) waters” or waters on the “303(d) list.”⁸⁸ TMDLs are required only for those pollutants designated by the EPA as “suitable” for TMDLs calculations.⁸⁹ However, in a 1978 notice, the EPA indicated that all pollutants are generally suitable for TMDL measurement.⁹⁰

The Act directs that TMDLs be set at “level[s] necessary to implement” applicable water quality standards and that they should reflect “seasonal variations” and a “margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality.”⁹¹ According to an EPA Region

84. See 33 U.S.C. § 1313(d) (1997).

85. 33 U.S.C. § 1313(d)(1)(A).

86. *Id.*

87. *Id.* § 1313(d)(1)(C).

88. The 303(d) waters are commonly referred to by courts as “water quality limited segments,” but that terminology is inconsistent with the EPA’s present usage, although the court’s usage stems from that used originally by the EPA. See *Water Quality Planning and Management*, 47 Fed. Reg. 46,668, 46,669-70 (1982) (referring to water quality limited segments as the set of waters requiring TMDLs). In the EPA’s regulations, 303(d) waters, i.e., waters requiring TMDLs, are a subset of “water quality limited segments.” 40 C.F.R. §§ 130.2(j), 130.7 (1997). This confusion is further confounded by the fact that both of those sets of waters as defined by the EPA are actually narrower than the set of waters currently requiring TMDLs defined under section 303(d) itself.

89. See 33 U.S.C. § 1314 (1998).

90. See *Total Maximum Daily Loads Under the Clean Water Act*, 43 Fed. Reg. 60,662 (1978). Section 304(a)(2) required the EPA to make this designation by October 1973. See 33 U.S.C. § 1314(a)(2). The EPA published a proposed pollutant designation in 1973, but it took a court order to force the Agency to issue a final designation. See *Board of County Comm’rs v. Costle*, No. 78-0572 (D.D.C. June 20, 1978); *Total Maximum Daily Loads Under Clean Water Act*, 43 Fed. Reg. 42,303 (1978).

91. 33 U.S.C. § 1313(d)(1)(C). See *Natural Resources Defense Council v. Fox*, No. 94 Civ. 8424 (PKL), slip op. at 28, 30-31 (S.D.N.Y. Nov. 12, 1998) (denying EPA’s motion for

X official, this “margin of safety” requirement reflects Congress’s intent that:

ignorance is no excuse for inaction. . . . No other program has such a strong statutory endorsement for action in the face of an incomplete database. This . . . requirement can encourage the regulated community to support the acquisition of additional data if they feel that the resulting limits are overly stringent.⁹²

Courts have uniformly adopted this interpretation in TMDLs cases.⁹³

The four words comprising the “TMDL” phrase have a clear plain meaning.⁹⁴ But, the EPA has further defined the phrase in a functional sense, by how it applies to pollution sources. Through this definition, the Agency has taken a clear stand that TMDLs should include nonpoint sources. According to the Agency, a TMDL consists of the total of individual “waste load allocations” for point sources and “load allocations” for nonpoint sources and natural background concentrations of a pollutant.⁹⁵ The EPA defines “waste load allocations” (WLAs) as the portions of a receiving water’s “loading capacity” that are allocated to one of the water’s existing or future point sources.⁹⁶ “Load allocations” (LAs) are the portions of a receiving water’s “loading capacity” allocated to one of the water’s existing or future nonpoint or natural sources of pollution.⁹⁷

summary judgment regarding the plaintiff’s claim that the New York TMDLs failed to account for seasonal variations and to include an adequate margin of safety). Section 303(d)(1)(B) contains analogous provisions for total “thermal” discharges. *See id.* § 1313(d)(1)(B). For the sake of brevity, this Article refers only to the Clean Water Act provisions regarding nonthermal pollutant loadings.

92. Tom Wilson, *Taking the Fear Out of TMDLs*, EPA NONPOINT SOURCE NEWS-NOTES, Oct. 1990, at 20.

93. *See, e.g.*, *Alaska Ctr. for the Env’t v. Reilly*, 762 F. Supp. 1422, 1439 n.8 (W.D. Wash 1991); *Natural Resources Defense Council v. Fox*, 909 F. Supp. 153, 157-58 (S.D.N.Y. 1995); *Idaho Sportsmen’s Coalition v. EPA*, 43 *Env’t. Rep. Cas.* (BNA) 1289, 1292 (W.D. Wash 1996); *Sierra Club v. Hankinson*, 939 F. Supp. 865, 871-74 (N.D. Ga. 1996). Consistent with these judicial exhortations, a recent report issued by a federal advisory committee on TMDLs, the “FACA” committee, stated that “lack of certainty should not delay TMDL development.” FACA REPORT, *supra* note 42, at 27-28; *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).

94. The words “total” and “maximum” appear to be redundant, but could nevertheless be read to reflect Congress’s view of the importance of the concept.

95. 40 C.F.R. § 130.2(h) (1997); *Water Quality Planning and Management*, 50 *Fed. Reg.* 1774, 1780 (1985). As relevant here, the EPA defines the term “load” as the “amount of matter . . . that is introduced into a receiving water.” 40 C.F.R. § 130.3(e).

96. 40 C.F.R. § 130.3(h), (g).

97. *See id.* § 130.3(g), (h). The EPA performs somewhat of a sleight-of-hand by defining “loading capacity” as the maximum amount of loading which a water can receive without exceeding the applicable water quality standards. *See id.* § 130.2(f) (1997). That concept would seem to be equivalent to the plain meaning of the statutory term “total maximum daily load.”

By focusing on states' efforts in identifying 303(d) waters and in establishing TMDLs for those waters, these provisions of section 303(d) suggest that Congress intended states to take the lead in implementing the TMDLs process. However, Congress also envisioned that the EPA would oversee states' efforts and promptly correct any mistakes made by states. Section 303(d)(2) requires each state to submit to the EPA "the waters identified and the loads established" under section 303(d)(1).⁹⁸ Section 303(d)(2) provides that the EPA "shall" either "approve" or "disapprove" states' submissions within thirty days and, in the event of disapproval, promulgate its own 303(d) list and/or TMDLs "not later than" thirty days after the disapproval.⁹⁹

The thirty-day deadlines for the EPA's response to state submissions of lists and TMDLs are extremely ambitious. Congress provided a similarly ambitious deadline for states' commencement of the TMDLs process. Under section 303(d)(2), states' "first such submission" of 303(d) lists and TMDLs was due within 180 days after the EPA's identification of pollutants subject to TMDLs.¹⁰⁰ However, Congress was not consistent in its sense of urgency. In contrast with these clear, short time-frames, section 303(d)(2) provides that the remaining state submissions were due simply "from time to time."¹⁰¹

Finally, section 303(d)(3) provides that for all waters other than those listed under section 303(1)(A), states "shall" estimate TMDLs "at a level that would assure protection and propagation of a balanced indigenous population of fish, shellfish, and wildlife."¹⁰² Unlike the state/federal scheme in section 303(d)(2), however, section 303(d)(3) does not expressly require states to submit TMDLs adopted under that

The EPA's definition of "TMDL," however, is a subset of the statutory term or the Agency's "loading capacity" concept, i.e., that portion of a water's loading capacity that has been *allocated* to point and/or nonpoint or natural sources. *Id.* § 130.3(c). In theory, the difference between the EPA's "TMDL" definition and its "loading capacity" concept is that the former does not expressly include the margin of safety required by section 303(d)(1)(C) and which is implicit in the EPA's concept of "loading capacity." It is unclear whether this theoretical distinction is significant, as a practical matter. The EPA's regulations specifically require that TMDLs include a "margin of safety," even though the regulations don't specifically define "TMDL," or the component waste load and load allocations, to include a safety margin. *Id.* §§ 130.2(g)-(i). For purposes of this Article, "TMDL" will be treated as synonymous with the EPA's "loading capacity" concept.

98. *See* 33 U.S.C. § 1313(d)(2) (1998).

99. *See id.* Once adopted or approved by the EPA, TMDLs are required to be incorporated into states' section 303(e) "continuing planning processes" for controlling water pollution. *Id.* § 1313(e)(3)(C).

100. *See id.* § 1313(d)(2).

101. *Id.*

102. *Id.* § 1313(d)(3).

section to EPA, nor provide for any other kind of EPA oversight role with respect to those TMDLs.

As described above, section 303(d) is hardly a model of legislative clarity. To date, courts interpreting TMDLs provisions have struggled to interpret how the EPA should react when states do not make any or sufficient “submissions.”¹⁰³ In addition to failing to expressly indicate what happens when there are no submissions, section 303(d) fails to define how many TMDLs must be included in the first round of TMDL submissions.¹⁰⁴ Also, with respect to timing, the section’s “time to time” schedule for states’ second and subsequent submissions is difficult to reconcile with the express, short

103. In *Scott v. City of Hammond*, 741 F.2d 992, 998 (7th Cir. 1984), the Court overcame this problem by construing section 303(d), together with Congress’s ambitious objectives, as intending that a state’s inaction could amount to a “constructive submission” triggering EPA’s mandatory duty to respond under section 303(d)(2). However, the Seventh Circuit failed to articulate a clear definition of what level of state inaction amounted to a “constructive submission” and remanded the case to the district court to make that determination. *Id.* at 996-98. In *National Wildlife Fed’n v. Adamkas*, 1991 U.S. Dist. LEXIS 4037, at *13, the court interpreted *Scott* to mean that a constructive submission occurred only when a state failed to submit “any” TMDLs. The district court in *Alaska Ctr. for the Env’t v. Reilly*, 762 F. Supp. 1422, 1426-29 (W.D. Wash. 1991), held that Alaska’s failure to submit any TMDLs was a “constructive submission” and deferred deciding what other circumstances could give rise to a constructive submission. Subsequent court decisions relegated the constructive submission theory to the narrow circumstances defined in *NWF*, but developed alternate bases for requiring the EPA to adopt TMDLs given the states’ slow pace in developing TMDLs themselves. See *Idaho Sportsmen’s Coalition v. EPA*, 43 Env’t Rep. Cas. (BNA), 1289, 1292-94 (W.D. Wash. 1996); *Sierra Club v. Hankinson*, 939 F. Supp. 865, 870-72 (N.D. Ga. 1996). But see *Sierra Club, North Star Chapter v. Browner*, 843 F. Supp. 1304, 1311-13 (D. Minn. 1993) (stating that there was no constructive submission given Minnesota’s TMDL submissions to date, without considering how long it would take Minnesota to complete all necessary TMDLs at that pace); *Natural Resources Defense Council v. Fox*, 909 F. Supp. 153, 158 (S.D.N.Y. 1995) (stating that whether state actions cited in defense to constructive submission theory are truly TMDLs are triable issues of fact). A recent district court decision in a lawsuit to force the EPA to develop TMDLs in Louisiana revived the constructive submission doctrine. See *Sierra Club v. Clifford*, No. 96-0527, at 2-3 (E.D. La. Sept. 22, 1998) (Order and Reasons). The court affirmed the report of a Special Master, which correctly applied the constructive submission doctrine with reference, not to whether a state has done anything at all, but to how far the state has to go to complete its TMDLs. See Report of Special Master at 31-32 (on file with author); see also *American Canoe Ass’n v. EPA*, No. 98-979-A, slip op. at 18-23 (E.D. Va. Dec. 18, 1998) (Memorandum Opinion) (citing the “constructive submission” doctrine as grounds for rejecting EPA’s motion to dismiss claim that Agency has a nondiscretionary duty to establish TMDLs in the face of state inaction); *Natural Resources Defense Council v. Fox*, No. 94 Civ. 8424 (PKL), slip op. at 10-18 (S.D.N.Y. Nov. 12, 1998) (finding that the EPA has discretion to decide when a “constructive submission” occurs, but that discretion is reviewable under the Administrative Procedures Act); *Hayes v. Browner*, No. 97-CV-1090-BV, Order at 7-10 (N.D. Ok. Oct. 29, 1998) (adopting “constructive submission” doctrine as grounds for denying EPA’s motion to dismiss plaintiffs claim that the EPA had a mandatory duty to adopt TMDLs in the face of Oklahoma’s failure to do so for eighteen years).

104. See *Natural Resources Defense Council v. Fox*, No. 94 Civ. 8424 (PKL), slip op. at 13 (S.D.N.Y. Nov. 12, 1998) (finding that the first round of submissions need not cover all 303(d) waters).

deadlines for states' first submissions and for the EPA's response to all state submissions. The statutory terms relating to the scope of the TMDLs process are discussed *infra* in Parts III and IV.

2. Functions of the TMDLs Process

According to Professor Houck, the TMDLs process provides the "blueprint for compliance" with water quality standards.¹⁰⁵ For this reason, he considers section 303(d) "pivotal" to the political compromise that was necessary for the passage of the landmark 1972 legislation.¹⁰⁶ In more general terms, the TMDLs process promotes Congress's far-reaching goals by filling in gaps and generally strengthening the regulatory programs described above. These functions are summarized below.

The first step in the TMDLs process—identification of 303(d) waters—is closely tied to (if not also largely redundant of) the waterbody identifications and/or overall water quality evaluations required by sections 208, 304(l), 305(B), and 319.¹⁰⁷ Together, these evaluations provide an overall assessment of the magnitude, types, and sources of water pollution, and a framework for prioritizing pollution problems.

Identifying those waters for which technology-based limits inadequately protect ambient water quality standards provides a basis for determining when the NPDES program needs to be adjusted or supplemented with other pollution control programs. NPDES inadequacies can occur where there is more than one point source discharging into a single waterbody and/or where there are nonpoint sources of pollution or other kinds of harm to the waterbody.¹⁰⁸

105. Houck I, *supra* note 28, at 10,344; *see also* RODGERS, *supra* note 28, § 4.21, at 315 ("The point of the [TMDLs] exercise, quite clearly, is to make sure the water quality standards are met. The mathematics of the matter . . . permit a precise accounting of the complete system.").

106. *See* Houck II, *supra* note 28, at 10,401. That compromise was between one set of congressmen who advocated a technology-based approach to replace the water quality-based approach under then-existing law, and another set who were satisfied with the water quality-based approach. *See* Houck I, *supra* note 28, at 10,335-37. In Professor Houck's view, Congress solved this conflict by adopting the technology-based approach but also retaining and strengthening the water quality standards approach through section 303(d). *See id.* at 10,337 (noting that the pre-1972 Act "provided neither a mandate nor a blueprint for using standards to clean up polluted waters. Section 303(d) provided both.").

107. For EPA's perspective on how several of these lists relate, *see*, for example, National Pollutant Discharge Elimination Systems; Surface Water Toxics Control Program, 54 Fed. Reg. 1300, 1305-06 (1989).

108. *See, e.g.*, National Pollutant Discharge Elimination System; Surface Water Toxics Control Program, 54 Fed. Reg. 23,868, 23,873 (1989) (stating that the TMDL process includes "procedures for identifying and controlling multiple discharges to the same receiving water").

The next steps in the TMDLs process—establishing TMDLs and pollutant allocations among all sources—provide a technical basis for achieving ambient water quality standards and for evaluating the merits of using different tools to achieve those reductions. Waste load allocations are incorporated directly into NPDES permits for all point sources discharging into a given waterbody and, thereby, ensure that the NPDES permits account for the cumulative impacts of multiple pollution sources.¹⁰⁹ TMDLs, and corresponding load allocations for nonpoint sources, provide a technical basis for determining the impacts of those sources on state water quality standards and for assessing the adequacy of existing and proposed programs for controlling nonpoint source pollution under sections 208, 319, and 401, as well as under other federal and state laws.¹¹⁰

While providing this technical “blueprint” for water quality standards compliance, TMDLs also serve other functions. By focusing on watershed or stream-wide pollution loads and allocations, the TMDLs process can facilitate the development of equitable watershed-based pollution control plans.¹¹¹ The TMDLs program’s comprehensive focus can also provide the technical basis for developing efficient programs for achieving ambient water quality standards.¹¹² Among the methods that are considered most efficient are private, market-like, pollution trading schemes in which polluters can buy and sell rights to discharge certain pollution quantities. TMDLs or TMDL-like schemes have been touted as providing a regulatory framework for pollution trading, especially between point and nonpoint sources, because they include all polluters and provide

109. Waste load allocations can also be used to derive “individual control strategies” for toxic pollution under section 304(l)(1)(D) and to establish supplemental water quality-based effluent limits under section 302. See National Pollutant Discharge Elimination System, Surface Water Toxics Control Program, 54 Fed. Reg. at 23,879, 23,886-89; Water Quality Planning and Management, 50 Fed. Reg. 1774, 1782 (1985) (notice of final TMDL regulation at 40 C.F.R. § 130.7).

110. See, e.g., Wilson, *supra* note 92, at 20-21; FACA REPORT, *supra* note 42, at 42 (recommending that, to implement load allocations, states should use a “combination of best management practices and any requirements of State and federal law for nonpoint sources” (emphasis omitted)); Houck III, *supra* note 1, at 10,425-35 (describing pollution control programs which TMDLs can serve).

111. See Adler, *supra* note 3, at 996-98 (discussing how a TMDL-like watershed approach can promote equitable pollution control solutions).

112. See, e.g., Natural Resources Defense Council v. Fox, 909 F. Supp. 153, 156 (S.D.N.Y. 1995) (“The benefit of this approach is that it facilitates the state’s ability to meet its water-quality standards by controlling those sources of pollution that are easiest to control.”) (referring to “efficient[] control”); Adler, *supra* note 3, at 998-1000 (regarding benefits of watershed approach generally for promoting efficient pollution control).

an environmentally-based overall pollution limit, i.e., a kind of market size, within which trading can occur.¹¹³

Of course, the goals of equity and efficiency may be competing, rather than complementary. The point here is simply that TMDLs can provide a framework for pursuing those goals to whatever extent they are mutually or individually desired.¹¹⁴

Finally, TMDLs' comprehensive focus on all pollution sources and on total assimilative capacities provides a useful planning tool for zoning and other decisions by local officials and the public regarding the extent and nature of acceptable future growth.¹¹⁵ Ironically,

113. See, e.g., Ann Powers, *Reducing Nitrogen Pollution on Long Island Sound: Is There a Place for Pollutant Trading?*, 23 COL. J. ENVTL. L. 137, 169, 195 (1998) (assessing the merits of a TMDL-based program to trade nitrogen pollution allocations among sewage treatment plants discharging into Long Island Sound); Lawrence J. MacDonnell, *Thinking About Environmentally Sustainable Development in the American West*, 18 J. LAND, RES. & ENVTL. L. 123, 133-34 (recommending TMDLs as providing "opportunities" for pollutant trading among point and nonpoint sources); Esther Bartfield, *Point-Nonpoint Source Trading: Looking Beyond Potential Cost Savings*, 23 ENVTL. L. 43, 51-52, 58, 72-74, 105 (1993); Adler, *supra* note 3, at 999-1000 (explaining that TMDLs make pollution trading "more feasible"); William Taylor & Mark Gerath, *The Watershed Protection Approach: Is The Promise About to Be Realized?*, 11 NAT. RES. & ENV'T 16, 20 (1996) (describing case studies of pollutant trading within TMDLs context); Surface Water Toxics Control Program and Water Quality Planning and Management Program, 57 Fed. Reg. 33,040, 33,048 (1992) (touting TMDLs as means to promote point/nonpoint source trading). There is considerable controversy as to whether pollution trading schemes further environmental protection objectives. This Article does not attempt to resolve that complex issue.

114. TMDLs' role in promoting equitable, efficient solutions is shown by the following simplified example. A TMDLs analysis might show that the actual daily load of a pollutant on a given river is 150 pollution units, 50 units more than the river's daily assimilative capacity of 100 units. According to the TMDLs analysis, there are three sources of pollution in the stream. One source is an active industrial point source with an NPDES permit which allows the source to discharge 40 units daily. This source spent \$500,000 for the equipment to meet this limit and would have to spend an additional \$1 million to eliminate its pollution entirely. The second source discharges 40 daily units of runoff from an active agricultural operation. This operation is spending no money on pollution control, and would likewise have to spend \$1 million to eliminate its pollution. The third source is discharging 70 daily units of runoff from unreclaimed tailings of an abandoned mining operation on state land. It would cost the state \$750,000 to pay for the grading, vegetation, and other work necessary to eliminate that runoff entirely. The TMDLs framework provides the means for identifying the most socially efficient method for the stream basin to achieve water quality standards: paying \$750,000 to reduce 70 daily units of runoff from the abandoned mine. Since the loading that needs to be reduced is only 50 daily units, that solution also provides a 20 daily unit margin to allow for the addition of new pollution sources which might otherwise contribute positively to the local economy. Considering equities as well as efficiency, the best solution might be for each of the two sources to contribute \$250,000 toward the state's \$750,000 cost of cleaning up the abandoned mine. On the other hand, the equities might dictate that the \$750,000 be incurred entirely or primarily by the state and agricultural polluter, since the industrial polluter has already incurred \$500,000 in pollution control costs. Although a TMDL analysis does not dictate a certain allocation of pollution limits and accompanying costs, this example shows that the TMDL process provides the necessary framework for equitable, efficient allocation of pollution limits and costs.

115. Professor Rodgers described the result of this function in somewhat draconian terms: "[W]hat is anticipated is a theoretically simple and complete allocation of available capacity. . . .

TMDLs or TMDL-like programs have been embraced by economists from both traditional, and nontraditional or “ecological,” economics schools, because they promote the development of both market-driven pollution programs and consideration of the ecological limits to growth.¹¹⁶

The EPA long ignored section 303(d).¹¹⁷ But the agency now refers to it as the “technical backbone” for the Agency’s watershed management approach toward pollution control.¹¹⁸ More recently, the

Full allocation means no-growth, and no new entrants, unless they buy their way in or are the coincidental beneficiaries of retirements elsewhere.” RODGERS, *supra* note 28, § 4.18, at 281. But this prediction ignores the position of those who argue, at the macroeconomic scale at least, that economic growth can be fueled by technological improvements. See Michael M. Wenig, *Making Sense of Growth and Sustainable Development: Several Responses to Herman Daly’s Latest Book*, 28 ENVTL. L. 235, 254 (1998) (analyzing the opposing views in the “limits to growth” debate). The important point is that ecological limits like those provided by TMDLs are necessary to spur the market to develop those technological improvements. See *id.* at 255.

116. See Bartfield, *supra* note 113, at 43-44; HERMAN E. DALY, BEYOND GROWTH—THE ECONOMICS OF SUSTAINABLE DEVELOPMENT 52-57 (1996).

117. Professor Houck describes the TMDLs implementation history succinctly as follows:

The picture that . . . emerge[s] [following Congress’s enactment of the Clean Water Act in 1972] is that of a federal agency moving slowly, pressed by other priorities and shielded by what it considered to be unreviewable discretion; states moving even more slowly, confident that they were not in line of fire and that this was not a priority for EPA or anyone else, the action nudged forward by infrequent and inconclusive lawsuits, then catapulted forward by a recent wave of suits imposing significant compliance requirements on short deadlines; and a frantic scramble by federal and state agencies both to evade and comply.

Houck II, *supra* note 28, at 10,392. Prof. Houck’s article provides the most comprehensive historical account (through 1997) of the TMDLs program. See also, e.g., Diane K. Conway, *TMDL Litigation: So Now What?*, 17 VA. ENVTL. L. J. 83, 93-102 (1997). For an update on the TMDLs litigation, see U.S. Env’tl. Protection Agency, *TMDL Litigation by State 4/10/98*, (updated July 22, 1998) <<http://www.epa.gov/owow/tmdl/lawsuit1.html#f>>.

118. See U.S. Env’tl. Protection Agency, *TMDL Overview*, para. 3 at 2 (Nov. 1996) <<http://www.epa.gov/owow/tmdl>>; see also, e.g., 57 Fed. Reg. 33,040-45 (1992) (noting the goal of improving TMDL implementation as a “key initiative” for implementing a “comprehensive watershed protection process”); U.S. ENVTL. PROTECTION AGENCY, EPA 440/4-91-001, GUIDANCE FOR WATER QUALITY-BASED DECISIONS: THE TMDL PROCESS (1991) (visited Feb. 6, 1999) <<http://www.epa.gov/owow/tmdl/index.html>> [hereinafter 1991 GUIDANCE] (stating that TMDLs provide the “mechanism to address” problems “in a comprehensive manner” where technology-based controls are “inadequate”); Water Quality Planning and Management, 50 Fed. Reg. 1774 (1985) (describing TMDLs as “important elements of [states’] W[ater] Q[uality] M[anagement] plans”); Surface Water Toxics Control Program and Water Quality Planning and Management Program, 57 Fed. Reg. 33,040-41, 33,048 (1992) (describing section 303(d) as a “key element[] of the water quality management process”) (emphasizing that the TMDLs process “provides an effective means” for implementing watershed approaches) (describing TMDLs benefits in terms of benefits of watershed approaches generally). As an EPA Region X Office of Water Chief commented, in the context of nonpoint source pollution:

At a minimum, [TMDLs] force us . . . to clearly identify our problem waters, to determine our pollution reduction targets, and to define the actions we need to achieve those desired reductions. At a maximum, TMDLs can actually provide us with the

EPA's Clean Water Action Plan referred to TMDLs as the "first step" in the development of watershed restoration action strategies and indicated that, in "most cases," TMDLs and accompanying WLAs will form the "core" of those strategies.¹¹⁹ The EPA's water program chief similarly referred to the TMDLs program as "crucial to success" in achieving water quality goals "because it brings rigor, accountability, and statutory authority to the process."¹²⁰ The recent FACA Report similarly concludes that TMDLs are the Act's "primary mechanism" for addressing impaired waters and notes that, of all the Act's programs, only TMDLs "focus broadly" on the cumulative threats to those waters.¹²¹

3. Criticisms of the TMDLs Approach

Although the TMDLs process has considerable theoretical merit, it raises significant practical and ethical questions. As to the latter, the water quality-based approach generally has been criticized because it purportedly presumes that some level of pollution is acceptable; a technology-forcing approach by contrast, supposedly seeks to continually reduce pollution levels toward a zero discharge goal.¹²² In

legal muscle we need to achieve those pollution reduction goals. In this imperfect world, who could ask for anything more?

Wilson, *supra* note 92, at 22.

119. CLEAN WATER ACTION PLAN, *supra* note 5, at 79.

120. Robert Perciasepe, *MEMORANDUM: New Policies for Establishing and Implementing Total Maximum Daily Loads (TMDLs)*, Aug. 8, 1997, at 1 (visited Oct. 20, 1998) <<http://www.epa.gov/owow/tmdl/ratepace.html>> [hereinafter Perciasepe Memorandum].

121. FACA REPORT, *supra* note 42, at 5; *see also* Houck III, *supra* note 1, at 10,424 ("TMDLs are not an adjunct to watershed planning; rather, they are the *basis* of watershed planning." (emphasis in original)); Caputo, *supra* note 28, at 10,582 (stating that TMDLs are a "crucial mechanism" for achieving ambient water quality goals); Steinzor, *supra* note 71, at 10,360 (summarizing recommendations of a multi-stakeholder report that referred to TMDLs as the "foundation" for goals and milestones of watershed management activities to address nonpoint source pollution); Bueschen, *supra* note 42, at 10,322 ("TMDLs may be the most effective federal legal tool that can be used to compel states to control nonpoint source pollution in order to meet requisite water quality standards."); Benson et al., *supra* note 71, at 261 (citing TMDLs as the Act's "means of assigning responsibility for control of nonpoint source pollution" and noting that the TMDLs process "may provide one of the best vehicles for working closely with local interests such as watershed councils"); John T. Holleman, *In Arkansas Which Comes First, The Chicken or the Environment*, 6 TUL. ENVTL. L.J. 21, 54-60 (1992) (recommending TMDLs for the control of runoff from poultry feedlots); Baron, *supra* note 28, at 578 (describing TMDLs as a "key plank in the national campaign for clean water"); Bartfield, *supra* note 113, at 74 (noting that TMDLs "mark the first step towards an integrated, comprehensive approach to protecting water quality"); Taylor & Gerath, *supra* note 113, at 20 (stating that the watershed approach is "driven in large part by CWA requirements that waters in noncompliance with water quality standards be brought into compliance through a budget allocation of all contaminant loadings").

122. *See, e.g.*, RODGERS, *supra* note 28, § 4.18, at 281-82 (stating that section 303(d)

reality, however, these dichotomies are not so simple; both approaches may reflect cost considerations that preclude elimination of pollution altogether or both might result in the elimination of certain pollutants.¹²³ Moreover, the TMDLs process applies when technology-based standards have failed,¹²⁴ and is thus a supplement to, rather than a substitute for, the Clean Water Act's technology-based pollution control programs.

A TMDL might be considered a hindrance to the zero discharge goal of technology-based programs if it is used to allow communities to invite additional pollution sources up to the maximum allowable load.¹²⁵ However, the technology-based approach neither precludes such growth, nor places any limits on growth. At least TMDLs require communities to address limits on growth.

Perhaps more serious than these underlying ethical issues are questions regarding the practicality of the TMDLs process. These questions involve the time and costs of establishing TMDLs,¹²⁶ and

reflects the historical . . . assumption that assimilation of wastes is a fit and proper function of a watercourse. In a sense, Section 303(d) represents contingent planning by the Congress for the day when the no-discharge objective is abandoned in favor of basin level allocations of assimilative capacity);

Adler, *supra* note 3, at 998 (noting environmentalists' concern that a watershed approach will generally be used to loosen existing point source permits); Houck I, *supra* note 28, at 10,330 (arguing that the water quality standards approach rests on an ethic of "human use," while the technology-based approach reflects a "new ethical premise, that water should simply be clean").

123. Water quality criteria are theoretically established without regard to compliance costs, but those costs may be reflected in the establishment of designated uses to which those criteria are targeted, and in polluter-specific "mixing zones," which are areas downstream of discharge points in which water quality standards may be violated. See RODGERS, *supra* note 28, § 4.16, at 255, 257 (describing exemptions and changes in designated uses due to "economic necessity"); *id.* § 4.18, at 275 (stating that costs are irrelevant to the adoption of numeric criteria).

124. See *supra* text at notes 85, 108; *infra* Part III.B.2.

125. At the heart of this issue lies the Clean Water Act and the EPA regulatory provisions regarding the "antidegradation" components of states' water quality standards. This Article does not attempt to solve the mystery of how the Act's antidegradation rule relates to TMDLs, although that mystery is sure to be unraveled soon by courts, if not also by Congress. See John Harleston, *What Is Antidegradation Policy: Does Anyone Know?*, 5 S.C. ENVTL. L.J. 33 (1996).

126. See Houck III, *supra* note 1, at 10,436-37 (referring to TMDLs as "an expensive and time-consuming courtship of state and regulated interests, particularly nonpoint discharge industries"); Steinzor, *supra* note 71, at 10,375 (noting the "very large increase in government spending" necessary to "breathe life into crippled efforts like . . . TMDLs"); Mark T. Pifher, *The Clean Water Act: Cooperative Federalism?*, 12 NAT. RES. & ENVT. 34, 36 (1997) ("Exactly how the states, with their limited financial resources, will function under the data-intensive TMDL burden remains to be seen."); RODGERS, *supra* note 28, § 4.18, at 283-84 (referring to the overwhelming number of waters subject to TMDLs); Craig N. Johnston, *Don't Go Near the Water: The Ninth Circuit Undermines Water Quality Enforcement*, 24 ENVTL. L. 1289, 1314 (1994) (noting that it costs Oregon DEQ one million dollars to establish one TMDL for one river).

whether TMDL calculations are scientifically defensible.¹²⁷ The cost critics have not addressed whether TMDLs, although initially costly, may avoid certain regulatory and other social costs or whether the magnitude of costs saved are significant in relation to the costs of establishing TMDLs.¹²⁸ The science critics also generally fail to acknowledge: (1) the contribution of water quality-based discharge limits to the success of NPDES permits in controlling point source pollution to date, (2) the scientific uncertainties inherent in the alternative technology-based approach, and (3) the limitations of the technology-based approach for achieving desired levels of water quality.¹²⁹ In simple terms, the science may be imperfect and at times even rudimentary, but “it’s all we got” to make progress beyond what is achievable through technology-based standards.¹³⁰

Still other criticisms are that TMDLs and accompanying load allocations are useless for regulating runoff because, unlike pollution from point sources, runoff generally cannot be “treated” to meet specific, desired “discharge” levels. This criticism misses the point. Regardless of whether or not nonpoint controls can “fine-tune” pollution concentrations, TMDLs can provide an indication of whether those control methods are sufficient to achieve desired ambient water quality standards. If not, they can indicate whether

127. See, e.g., Lawrence S. Bazel, *Water Quality Standards Maximum Loads, and the Clean Water Act*, 34 HASTINGS L.J. 1245, 1246 (1983) (citing a report concluding that “most maximum loads were likely to be scientifically unsound”); Bartfield, *supra* note 113, at 74 (“EPA often does not have the detailed modeling information necessary to explain the impact of pollution on receiving water quality and to translate water quality standards into appropriate effluent limitations.”); RODGERS, *supra* note 28, § 4.18, at 281, 283-84 (stating that section 303(d) is a “monument to the ambitions of rational decision making” and referring to the “sheer guesswork” in TMDLs calculations). The scientific validity of water quality standards themselves, and establishing even individual permit limits based on those standards, has long been questioned. See Houck III, *supra* note 1, at 10,415-16; Steinzor, *supra* note 71, at 10,322; Caputo, *supra* note 28, at 10,578-79; Healy, *supra* note 93, at 396, 426-29; RODGERS, *supra* note 28, § 4.18, at 270 (“One of the great contradictions of the 1972 Amendments was the decision to retain and even strengthen the water quality standards whose failures were chiefly responsible for shifting the attack to control at the source.”).

128. See, e.g., Conway, *supra* note 117, at 119-20 (noting that states’ per-TMDL costs will likely decrease as they gain experience in establishing TMDLs).

129. Regarding the second of these three factors, see *Chemical Mfrs. Ass’n v. EPA*, 899 F.2d 344, 348-60 (5th Cir. 1989) (addressing numerous complex, science-based challenges to technology-based effluent limits for the organic chemical manufacturing industry). It would be interesting to compare the degrees of scientific uncertainties inherent in the TMDLs process with the uncertainties typically inherent in governments’ use of economics and other social sciences to formulate major public policies.

130. Houck III, *supra* note 1, at 10,424 (favoring TMDLs “not because they are scientifically bulletproof, comprehensive, or efficient, but because they are objective, measurable, and the only approach so far that can be enforced by law”).

runoff needs to be collected and treated like pollution from point sources, or handled by some other method.

Absent feasible controls on runoff, point sources may question the fairness of TMDL allocations which require that point sources bear the brunt of pollution reductions necessary to achieve water quality standards. While valid on fairness grounds, this criticism is precisely what is needed to create the political pressure that will spur additional nonpoint source reductions.¹³¹

Finally, there is some question about whether society can achieve TMDLs and accompanying allocations, even if they could be scientifically derived.¹³² One response to this fundamental criticism is that the kinds of quantitative limits provided by TMDLs are necessary to spur society to adopt the life-style changes or to develop the new technologies necessary to overcome these major hurdles.

While providing responses to the criticisms listed above, this author does not mean to suggest that the TMDLs process is simple to implement and has no practical limitations. However, this author does believe that the TMDLs process should be pursued to the fullest practical extent because it provides a technical, flexible framework for addressing cumulative sources of watershed harm; in short, it promotes an ecosystem approach. Moreover, the point of this Article is to show that the ecosystem approach provides a rational basis for defining the limits of the TMDLs process and, where necessary, to account for its shortcomings.

III. THE SCOPE OF WATERS IDENTIFIED UNDER SECTION 303(d)

Most judicial effort in TMDLs cases to date has been spent struggling to define when the EPA must act in the face of state inaction.¹³³ However, courts have also begun to address a host of complex issues involving the adequacy of states' submissions, focusing on the 303(d) listing stage of the TMDLs process. In 1992, the EPA began requiring states to submit 303(d) lists biennially.¹³⁴ As

131. See *id.* at 10,420 (“Ratcheting down further on point sources . . . who are now carrying the entire brunt of the cleanup, presents some obvious equity problems—although it also presents the prospect of their alliance in efforts toward nonpoint source management.”); Caputo, *supra* note 28, at 10,582 (predicting that point sources will likely push for legislative reform to force nonpoint sources to bear more of the burden of pollution reductions necessary to meet applicable TMDLs).

132. See FACA REPORT, *supra* note 42, at I-5 (dissenting view of municipal representatives: “We know of no one . . . who is able to suggest how urban stormwater runoff can be addressed to meet water quality standards”); Bazel, *supra* note 127, at 1254 n.69.

133. See cases cited *supra* note 103 and accompanying text.

134. See 40 C.F.R. § 130.7(d)(1) (1997).

of the last round of list submissions, due in April, 1998, all states had adopted EPA-approved 303(d) lists.¹³⁵ Courts in numerous pending TMDLs cases are likely to be asked to determine the adequacy of these submissions.¹³⁶ A central question in these judicial reviews will be: What is the proper scope of a 303(d) list?

This question breaks down into several sub-questions: What are the criteria for listing? What is the degree of certainty required to justify various listing decisions? And what kinds of data and data collection efforts are necessary to support those decisions? The legal context for these three sets of issues will be discussed below. Before addressing these issues, however, it is necessary to address the legal significance of including a waterbody on a 303(d) list. This significance likely determines the willingness of states and others to add waters to 303(d) lists. In other words, there is no point addressing the scope of 303(d) listing without being aware of the consequences of listing decisions.

A. *The Legal Significance of 303(d) Listing*

The most obvious significance of the 303(d) list is that TMDLs must be developed only for waters included on the list.¹³⁷ As Professor Houck has observed, “what remains unlisted remains largely unremedied.”¹³⁸ There are two other potential consequences of 303(d) listing, as discussed below.

1. The Stick: Must TMDLs Be Established for All Listed Waters?

Section 303(d)(1)(C) provides that states “shall” establish TMDLs “for the waters identified in paragraph (1)(A)” of section 303(d).¹³⁹ Although this sentence does not expressly use the word “all” prior to “waters,” the word seems implicit in its command. Put another way, Congress would likely have chosen different language

135. See FACA REPORT, *supra* note 42, at 4.

136. See Houck III, *supra* note 1, at 10,417-18 (stating that polluters are likely to challenge the latest round of expanded 303(d) lists).

137. Specifically, the statute provides that TMDLs shall be developed “for the waters identified in paragraph (1)(A)” of section 303(d). 33 U.S.C. § 1313(d)(1)(C). Once again, in section 303(d)(3), Congress indicated that TMDLs should be developed for nonlisted waters, but Congress wrote this provision in seemingly unenforceable terms.

138. Houck II, *supra* note 28, at 10,398; see also Houck III, *supra* note 1, at 10419 (“Polluted waters are not going to get addressed by the TMDL program—or even thought about—unless they are acknowledged in the first place.”). This is true, at least, with respect to remedies generated by the TMDLs process.

139. 33 U.S.C. § 1313(d)(1)(C).

had it intended that TMDLs be established for only some of the waters identified pursuant to section 303(d)(1)(A).

The EPA seems to concur with this interpretation.¹⁴⁰ However, the Agency's position is ambiguous because of its confused descriptions of the actual set of waters that must be identified under section 303(d)(1)(A), and because its listing criteria are narrower than those in the statute itself.¹⁴¹ Courts have also presumed that TMDLs must be established for all listed waters; the FACA Report adopts a similar position.¹⁴²

Although this interpretation seems straight forward, it raises a complex issue: some of the kinds of ecosystem harms that may require a state to add a waterbody to its 303(d) list may not be the kinds for which TMDLs can or should be developed. If these harms are the only harms to a given waterbody, then a waterbody may be listed but not subject to a TMDL. The potential discrepancy between the sets of harms that can necessitate listing, and the harms for which TMDLs must be developed is discussed in Part B below. Assuming, for the moment, that this discrepancy exists, it raises the question of the utility of adding a waterbody to a section 303(d) list if a TMDL will not be established for it.

There are several possible answers to this question. Perhaps the most obvious explanation is that the plain language of section 303(d)(1)(A) suggests that Congress intended waters which otherwise satisfy the listing criteria to be listed, whether or not TMDLs will ultimately be established for them. Another possible answer is that, whether or not a TMDL can be established may simply not be obvious

140. See Perciasepe Memorandum, *supra* note 120, at 3 (“[W]e need an overall plan for completing and approving TMDLs for *all* listed waters.” (emphasis added)). The Agency's previous guidance sent mixed signals on this issue. See Total Maximum Daily Loads Under Clean Water Act, 43 Fed. Reg. 60,662, 60,663-64 (1978) (stating that “identification triggers the States' requirements to develop TMDLs,” and that TMDLs must be calculated for “all segments” identified under section 303(d). *But see* Water Quality Planning and Management, 47 Fed. Reg. 46,668, 46,669 (1982) (proposed regulation revisions; EPA “strongly encourages states to fully implement the WLA/TMDL public planning process for all water quality limited waters. If this process cannot be carried out for all WLA/TMDLs, States should attempt to implement it for major regulatory decisions.”).

141. See *infra* Part III.B.2.

142. See FACA REPORT, *supra* note 42, at 4 (“States have not adequately implemented the requirement in section 303(d)(3) to complete TMDLs for *all* waters.”); *id.* at 23 (recommending that the EPA issue regulations requiring states to prepare schedules to develop TMDLs for “*all*” waters listed pursuant to § 303(d)(1)); *id.* at 25 (“TMDLs must be developed for *all* waters that States must list under . . . § 303(d)(1).” (emphasis added)); see also *Alaska Ctr. for the Env't v. Reilly*, 796 F. Supp. 1374, 1378 (W.D. Wash. 1992); *Sierra Club, North Star Chapter v. Browner*, 843 F. Supp. 1304, 1307 (D. Minn. 1993); *Idaho Sportsmen's Coalition v. EPA*, 43 Env't Rep. Cas. (BNA) 1289, 1292-93 (W.D. Wash. 1996); *Sierra Club v. Hankinson*, 939 F. Supp. 865, 872 (N.D. Ga. 1996).

at the listing stage of the process. At that stage, the full scope of the water quality problem may not yet be known, so it may be impossible to determine whether a TMDL will apply. Listing the waterbody, however, even with a low priority, will generate more impetus for the state and other stakeholders to obtain the necessary information and, possibly, to solve the water quality problems.¹⁴³ That impetus would be especially strong if, as suggested in the next section, listing precludes additional pollution on listed waters.

2. The Club: Can Additional Pollution be Allowed on a Listed Water Pending Development of a TMDL?

In addition to generally necessitating a TMDL, listing a waterbody under section 303(d)(1)(A) may, pending development of a TMDL, legally preclude the EPA or a state NPDES permitting agency from increasing the waterbody's existing point source pollution load from existing or new point sources. Section 303(d) does not expressly state this rule, but it is arguably implicit in the requirements of sections 301(b)(1)(C), 401(a), and 402(a), that new or revised NPDES point source permits must include effluent limits necessary to "meet" or "comply with" water quality standards.¹⁴⁴ It is difficult to imagine how an NPDES permit allowing *additional* pollution into a 303(d) waterbody that, by definition, is not meeting water quality standards could satisfy this requirement.¹⁴⁵ Anti-degradation components of state water quality standards reinforce this implicit legal consequence of 303(d) listings for those waters subject to the anti-degradation requirements.

EPA regulations appear to reflect this implied requirement.¹⁴⁶ The regulations prohibit the issuance of an NPDES permit to a new source if the source's pollution "will cause or contribute to the violation of water quality standards."¹⁴⁷ A new pollutant source

143. See Houck III, *supra* note 1, at 10,436 (stating that the numbers of waters included on recent 303(d) lists "provide clear and convincing evidence that the nation's remaining water quality problems are far larger than admitted, which admission, as any recovering alcoholic will testify, is the first step toward recovery"); McElfish, *supra* note 42, at 10,182 ("The identification and disclosure of particular impaired waters can lead to political pressures at the state level to adopt control and abatement measures.").

144. See 33 U.S.C. § 1311(b)(1)(c), 1341(a), § 1342(a).

145. Of course, this logic would apply not only to new NPDES permits that propose to allow additional pollution from new or existing sources, but also to revised NPDES permits that merely retain existing pollution limits for existing point sources.

146. See *also* Conway, *supra* note 117, at 117-18 (same interpretation).

147. 40 C.F.R. § 122.4(i) (1996). The following sentence in the above-quoted EPA regulation actually, if only indirectly, links waters listed under section 303(d) with waters that are in "violation of water quality standards." That sentence provides that new sources proposed for

cannot help but “contribute” to a violation of the applicable standards for that pollutant on a waterbody that was listed because of violations of those same standards, even if pollutant loading from the new source will be offset by an equivalent load reduction from an existing source.¹⁴⁸ The EPA’s regulations for reissuing permits from existing sources mirror the statutory provisions cited above and, thus, should be interpreted to preclude permit reissuance pending the development of a TMDL.¹⁴⁹

According to the FACA Report, states have not “always” implemented these restrictions and, in particular, the EPA has not “emphasized” the new source restriction.¹⁵⁰ To date, only two decisions in TMDLs cases have addressed citizens’ concerns with these lax approaches, and they have done so in somewhat different, although not necessarily inconsistent, fashions. In its remedial order in the Georgia TMDLs lawsuit, *Sierra Club v. Hankinson*, the district court directed the EPA to “comply with” 40 C.F.R. 122.4(i) “regarding the prohibition on new sources or new dischargers that will cause or contribute to a violation of water quality standards.”¹⁵¹ In the context of a TMDLs lawsuit, this order implies that the Agency may not allow new sources on 303(d) waters for which TMDLs have not yet been completed. Additionally, the court indicated that it would “consider” prohibiting the EPA from issuing new permits for *existing* sources of pollutants “of concern” on 303(d) waters.¹⁵² However, the court did not make this threat in recognition of a legal prohibition on reissuing permits for existing sources, but as a potentially appropriate

waters which meet the section 303(d)(1)(A) listing criteria must show that their requested permit allows pollution at levels that are consistent with any applicable pollutant “load allocation” established for that water. *Id.*

148. See Houck III, *supra* note 1, at 10,420. If the new source can show that contemporaneous load reductions from one or more other sources are sufficient, not only to offset the additional pollution from the new source, but to preclude the total loading from all sources from exceeding the water quality standards of concern, then the EPA’s regulatory prohibition would not apply. Under these circumstances, however, the waterbody would no longer qualify for listing under section 303(d). And, thus, the showing should comply with applicable standards of proof for de-listing. Because it is tantamount to a TMDL analysis before the TMDL has been done, the claim of water quality standards compliance should be accepted only after rigorous scrutiny. Although this scenario raises complex questions of proof and timing, it reflects just the kind of flexible give and take among multiple pollution sources that the TMDLs process is designed to foster.

149. See 40 C.F.R. § 122.44(d) (1997).

150. See FACA REPORT, *supra* note 42, at 17.

151. 939 F. Supp. 872, 874 (N.D. Ga. 1996).

152. See *id.* at 874 n.4.

remedy if the EPA fell behind in meeting the court-ordered schedule for developing TMDLs.¹⁵³

In the Idaho TMDLs lawsuit, the district court refused the plaintiffs' request that a blanket injunction be issued prohibiting the EPA from permitting new source pollution on 303(d) waters lacking TMDLs.¹⁵⁴ However, this refusal resulted from the court's view that the blanket prohibition was "premature" on the "present record."¹⁵⁵ The plaintiffs had not shown that the issuance of any particular permit "would result in a violation of water quality standards."¹⁵⁶ Like the *Hankinson* Order's express reference to 40 C.F.R. § 122.4(i), the *Idaho* order seems to impliedly acknowledge the applicability of that regulatory prohibition to 303(d) waters. However, the *Idaho* court's use of the term "result" is narrower than the EPA prohibition which applies to new sources that "result in" or "contribute to" standards violations.¹⁵⁷ It is unclear what case-specific circumstances the *Idaho* court felt might preclude a finding that a new source on a 303(d) water would not be subject to the EPA's prohibition.

The EPA's regulation and the two TMDLs decisions cited above provide a reasonably strong argument that a water's 303(d) listing precludes new or revised NPDES permits that allow additional pollution, although it is unclear what facts need to be demonstrated to support the argument in any given case. However, the Supreme Court's 1991 decision in *Arkansas v. Oklahoma* may suggest that this preclusionary rule is inapplicable in any circumstance.¹⁵⁸ In that decision, the Court rejected a circuit court conclusion that the Act "prohibit[ed] any discharge of effluent that would reach waters already in violation of existing water quality standards."¹⁵⁹ The Court concluded that the Act lacked any such prohibition.¹⁶⁰ However, the Court did not discuss or acknowledge the prohibition contained in 40 C.F.R. 122.4(i), or the implied statutory prohibition underlying that regulation.

The Court actually cited the TMDLs process as one of the Act's mechanisms for "allocat[ing] the burden of reducing undesirable

153. *See id.*

154. *See Idaho Sportsmen's Coalition v. EPA*, 43 *Env't. Rep. Cas.* (BNA) 1289 (W.D. Wash 1996).

155. *Id.*

156. *Id.*

157. *See id.*

158. 503 U.S. 91, 107-08 (1992).

159. *Id.* at 107.

160. *See id.*

discharges between existing sources and new sources.”¹⁶¹ However, the Court’s approach of allowing additional pollution pending a TMDL would seem to make the TMDL allocation process more difficult than if the Court preserved the pollution status quo during that interim period. There is no indication in the *Arkansas* opinion that the inter-state water at issue was already listed under section 303(d), so it is possible that the Court might have reached a different conclusion had that formal designation been made.¹⁶² Nevertheless, the *Arkansas* decision certainly throws into question the applicability of the EPA’s regulatory prohibition on 303(d) waters and for that matter, the legitimacy of the prohibition in any context.¹⁶³

The above discussion addressed permitting restrictions on additional pollution from new or existing *point* sources. Because the Clean Water Act lacks permitting requirements for nonpoint sources, no such equivalent permit restrictions apply for additional pollution from nonpoint sources pending the development of a TMDL. However, through section 313(a) of the Clean Water Act, there may be an equivalent restriction for nonpoint sources on federal land. That section provides that all agencies “engaged in any activity” generating runoff, “shall be subject to, and comply with all Federal, State, interstate, and local requirements . . . respecting the control and

161. *Id.* at 108.

162. The Court’s decision was also based on its concern that the circuit court had reached its holding *sua sponte*. *See id.* at 98. Thus, the Court might have reached a different result had the lower court’s legal conclusion been proffered by one of the parties, especially the EPA. Likewise, the Supreme Court seemed impressed by the administrative law judge’s findings that the new source at issue would have only a negligible impact on the water quality standards problem. *See id.* at 111-14. Once again, the Court might have reached a different legal conclusion if it was shown that the new source was going to make a significant contribution to an already bad pollution problem, especially, if the inter-state political dispute underlying *Arkansas* did not exist.

163. Another confusing, but potentially relevant, court decision is *Upper Chattahoochee Riverkeeper Fund, Inc. v. Atlanta*, 46 *Env’t Rep. Cas.* (BNA) 1135 (N.D. Ga. 1997), a citizen suit to enforce an NPDES permit which prohibited discharges from Atlanta’s sewage treatment facilities. The district court in that case rejected the plaintiffs’ claim with respect to certain toxic pollutants after finding that, while those pollutants made the ambient standards problem worse, they did not “cause” the problem. *See id.* at 1154. However, the court accepted the plaintiffs’ claim with respect to another pollutant, finding that this pollutant “caused” water quality standards violations even though the court acknowledged that there were other sources of the same pollutant on the same waterbody. *See id.* The court’s distinction between the two pollutants is hardly clear. The court was not interpreting the “cause or contribute” phrase in 40 C.F.R. § 122.4(i) (1997), but the court’s decision is potentially relevant because it addressed whether certain pollutants were “causing” water quality standard violations. However, given the court’s confusing explanation of its differing conclusions as to which pollutants “caused” water quality standard violations, the decision provides little help in interpreting the EPA’s regulatory prohibition for new sources which “cause or contribute” to exceedences of water quality standards.

abatement of water pollution.”¹⁶⁴ The Ninth Circuit has held in two cases that this provision requires federal agencies to ensure that nonpoint source pollution emanating from federal lands does not violate state water quality standards.¹⁶⁵ It remains to be seen whether the Supreme Court’s *Arkansas v. Oklahoma* decision would preclude a court, pursuant to section 313(a), from prohibiting new runoff into 303(d) waters running through federal lands.

State laws governing activities that generate nonpoint source pollution may directly or indirectly incorporate states’ water quality standards and, thus, might also require restrictions on those activities pending TMDL development.¹⁶⁶

In sum, there is at least a considerable risk that a state inclusion of a waterbody on a 303(d) list might effectively preclude the introduction of additional pollution into that waterbody, pending the development of a TMDL containing a specific allocation for that pollution. This risk has likely discouraged states concerned about promoting economic development from adopting an expansive approach toward listing 303(d) waters, whether or not this concern is explicit in their written listing methodologies. While growth restrictions may be burdensome, it is also likely that the preclusion of additional pollution sources on 303(d) waters pending TMDL development may spur the timely development of TMDLs and, more importantly, encourage polluters and state and local officials to work collectively to remedy the existing pollution problems on those waters.¹⁶⁷ Of course, this kind of collective problem-solving is what the ecosystem approach is all about.

164. 33 U.S.C. § 1323(a) (1997).

165. See *Oregon Natural Resources Council v. Lyng*, 882 F.2d 1417, 1424 (9th Cir. 1989) (considering whether timber sales in national forests would violate state water quality standards); *Oregon Natural Resources Council v. United States Forest Service*, 834 F.2d 842, 850-52 (9th Cir. 1987) (same).

166. For a summary of these state laws governing nonpoint source pollution, see McElfish, *supra* note 42, at 10,182-201.

167. Some of the FACA members suggested that restrictions on new or additional pollution would actually have adverse environmental consequences, by “encourag[ing] development to spread to less-polluted areas with fewer restrictions on land or water use.” FACA REPORT, *supra* note 42, at 17. Assuming that businesses do re-locate in response to these factors, relocation seems unlikely to cause significant adverse consequences in “less-polluted” areas if those areas are subject to an enforceable anti-degradation standard which prevents their water quality from becoming considerably more polluted. Nevertheless, this concern raises the difficult policy and ethical question of whether there should be environmental “sacrifice zones” in order to spare the environment in other regions. This approach, in turn, raises significant environmental justice questions if there are people living in the sacrifice zones. Whether or not this approach has merit in a particular case, it can be addressed within the framework of an ecosystem approach. Even within an ecosystem approach, that kind of policy debate should be addressed in the context of states’ determination of the designated uses for given waterbodies; once those uses

The FACA Report recognized the environmental value of this regulatory restriction, but nevertheless suggested that the EPA could allow “exceptions” if states show “parameter-specific net progress” toward achieving applicable water quality standards.¹⁶⁸ The Committee recommended that the EPA encourage states to develop “watershed characterizations” and “stabilization plans” as the framework for demonstrating this “net progress.”¹⁶⁹ The analysis in the remainder of this Article supports the FACA’s recommendation that the EPA should encourage states’ use of watershed-based planning for organizing TMDL-related activities. However, this author questions whether states and the EPA would have the mettle to apply the FACA’s proposed “net progress” exception sparingly enough to avoid diminishing the benefit of the 303(d) list as an impetus for cleanup efforts. At any rate, the EPA needs to clarify its own position regarding whether 303(d) listing precludes additional pollution.

B. Listing Criteria

The listing stage of the TMDLs process raises a basic conflict related to the paradox of the ecosystem approach. Ideally, given the functions of the TMDLs process and the watershed approach which it serves, TMDLs should be established for all waters within each state.¹⁷⁰ In other words, TMDLs should provide a quantitative basis for all state and federal pollution programs. This ideal may well be impractical, however, at least in the short term. States argue that they are having a hard enough time garnering the resources necessary to develop TMDLs for all waters required to be listed under section 303(d)(1)(A).¹⁷¹ If this is true, they surely lack the resources

have been established (and until they have been revised), they should be enforced rather than ignored.

168. See FACA REPORT, *supra* note 42, at 17 (“The Committee strongly believes . . . that the existing restrictions on new or additional discharges provide sources with a powerful incentive to clean up the water even before a TMDL is completed and must be actively implemented by the States and enforced by EPA.” (emphasis omitted)).

169. See *id.* at 17-18.

170. This comprehensive approach is reflected expressly in section 303(d)(3), which provides that states “shall” estimate TMDLs for all waters not already included on states’ lists pursuant to section 303(d)(1)(A). See 33 U.S.C. § 1313(d)(3) (1997). However, Congress did not require the EPA to review states’ 303(d)(3) submissions or, by implication, their constructive (non)submissions, so the EPA has not pushed states to develop these TMDLs nor attempted to develop them itself. See *id.*

171. See FACA REPORT, *supra* note 42, at 72-75 (noting states’ lack of resources); Houck III, *supra* note 1, at 10,435 (“TMDLs arrive on the doorstep [of states] like a litter of stray cats—with many unpleasant requirements and little money to provide for them.”).

necessary to develop TMDLs for all other waters, as well. Attempting to develop complex TMDLs for all waters could result in poorly developed TMDLs and a misallocation of scarce resources needed for high priority waters. If 303(d) lists do not include all states' waters, what then is the proper scope of the lists?

1. A Nondiscriminatory Approach to Types of Harm and Types of Sources of Harm

Can a state distinguish among different types of harms when deciding whether to include a waterbody on its 303(d) list? Section 303(d)(1)(A) provides a clear response to this question by requiring listing if a waterbody is not expected to meet “any” applicable “water quality standard,” i.e., without regard to the cause of the water quality standard violation.¹⁷² In particular, this section does not limit listing to waters violating applicable standards only by “pollutants,” or “point sources” of pollutants, as defined in sections 502(6) and (14) of the Act. In fact, section 303(d)(1)(A) affirmatively suggests that states need to consider a broader range of harms than “pollutants” as the basis for 303(d) listing, by referring expressly to the extent of “pollution” as a basis for ranking 303(d) waters.¹⁷³ As noted previously, the Act defines “pollution” consistent with the holistic theory of the ecosystem approach, as essentially any human-caused harms.¹⁷⁴

The reference to “water quality standards” in section 303(d)(1)(A) itself implies that the types of harm and sources of harm are irrelevant for listing purposes. Some water quality standards are specific to a particular pollutant. But, as standards for *ambient* water quality, these pollutant-specific standards do not distinguish between point and nonpoint sources of the specific pollutants. Other water quality standards are “parameter”-specific, like standards for turbidity or temperature.¹⁷⁵ Yet, these parameters may be violated by several different kinds of pollutants as well as other kinds of “pollution,” as well as by several different sources of those harms. Narrative water quality standards, and the “designated use” portions of states' water quality standards, could be exceeded by an even broader range of harms and/or sources of harm than parameter or pollutant-specific

172. See 33 U.S.C. § 1313(d)(1)(A).

173. See *id.*

174. See *id.* § 1367(19); *supra* note 31.

175. In simple terms, turbidity is an inverse measure of the amount of light that passes through a water column. See, e.g., *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 364 n.2 (1989).

standards. All of these kinds of water quality standards are relevant for 303(d) listing purposes.

The EPA agrees with this interpretation of the scope of “standards” relevant for 303(d) listing purposes.¹⁷⁶ However, it does not appear that the Agency has consistently enforced this interpretation in its review of states’ 303(d) lists.¹⁷⁷ The EPA has also consistently interpreted section 303(d)(1)(A) to require listing of a water impaired by a “pollutant,” whether or not the state can identify the source of the pollutant or whether the water is impaired solely or primarily by nonpoint sources.¹⁷⁸ However, at least one court has

176. The EPA’s regulations define “water quality standards” for 303(d) listing purposes as those standards established under section 303, including numeric and narrative criteria, designated uses, and antidegradation standards. See 40 C.F.R. § 130.7(b)(3) (1997); Surface Water Toxics Control Program and Water Quality Planning and Management Program, 57 Fed. Reg. 33,040, 33,045-46 (1992); see also U.S. Evtl. Protection Agency, *TMDL Overview*, at par. 4 (Nov. 1996) <<http://www.epa.gov/owow/tmdl>> (noting that states must “consider all aspects of their water quality standards, including designated beneficial uses, numeric and narrative criteria to protect uses, and antidegradation policies”). This broad reading of “standards” is consistent with the Supreme Court’s holding in *PUD No.1 v. Washington Dep’t of Ecology*, 511 U.S. 700, 714-18 (1994), that the designated use portion of states’ standards are enforceable independently of any water quality criteria designed to implement them.

177. For example, in *Sierra Club v. Hankinson*, the district court expressed “concern” with the EPA’s approval of Georgia’s 1994 303(d) list, in part, because it appeared that Georgia had failed to consider waters that violated the state’s narrative water quality criteria for purposes of 303(d) listing. 939 F. Supp. 865, 870 (N.D. Ga. 1996). In *Idaho Sportsmen’s Coalition v. EPA*, 43 Env’t. Rep. Cas. (BNA) 1289, 1297-98 (W.D. Wash. 1996), the district court likewise noted that states had to consider violations of their designated uses and antidegradation standards in identifying waters that were not meeting the state’s water quality standards for 303(d) purposes. The court rejected the EPA’s approval of Idaho’s 1992 303(d) list on several grounds, but it is not clear from the opinion whether the court believed that the state had failed to identify waters violating its designated uses and antidegradation standards. See *id.* at 1300-02.

The Agency has also not explained how TMDLs can be established with respect to “mixing zones” authorized under states’ water quality standards. See 40 C.F.R. § 131.13 (1997). By authorizing pollution at levels exceeding applicable water quality criteria, mixing zones are in inherent conflict with the concept and purpose of TMDLs. Which should come first, the TMDL or the mixing zone? Under a truly holistic watershed approach, a total loading calculation should come first, after which individual mixing zones could be considered, if allowed at all, in conjunction with the design of an allocation scheme and in light of the cumulative effect of multiple mixing zones, combined with other harms that are within and outside the scope of the applicable TMDL.

178. See Robert Wayland, *Memorandum: National Clarifying Guidance for 1998 State and Territory Section 303(d) Listing Decisions* 5-6 (Aug. 17, 1997) <<http://www.epa.gov/owow/tmdl/lisgid.html>> [hereinafter Wayland Memorandum]; Surface Water Toxics Control Program and Water Quality Planning and Management Program, 57 Fed. Reg. at 33,045 (“Section 303(d) requires the States to identify all impaired waters regardless” of the source of impairment.); Geoffrey H. Grubbs, *Memorandum: Supplemental Guidance on Section 303(d) Implementation* 2 (Aug. 13, 1992) <<http://www.epa.gov/owow/tmdl/html>> [hereinafter 1992 Grubbs Memorandum] (stating that the listing process “is not affected by the source of pollution and applies equally to segments affected by point sources only, a combination of point and nonpoint sources, and nonpoint sources only”); Geoffrey H. Grubbs, *Memorandum: Guidance for 1994 Section 303(d) Lists*, 1 (Nov. 26, 1993) <<http://www.epa.gov/owow/tmdl/html>> [hereinafter 1993

chided the Agency for not applying this approach in practice.¹⁷⁹ In its most recent guidance, the EPA has even required states to list waters believed to be impaired by airborne pollutant sources, whether or not those pollutants originated within the receiving states' boundaries, and even if the specific pollutant(s) causing the impairment could not be identified.¹⁸⁰ All of these interpretations are consistent with the plain meaning of section 303(d)(1)(A).

Although taking a broad approach to listing with respect to "pollutant" sources, the Agency apparently has drawn the line at "pollutants" by allowing states to forego listing (in the 1998 round at least) those waters impaired "solely" by sources other than "pollutants," including "physical barriers to fish migration."¹⁸¹ This narrow approach is inconsistent with the Agency's other position, and the plain meaning of section 303(d)(1)(A), that waters must be listed based on violations of water quality standards, i.e. without regard to *what* is causing those violations.¹⁸² The Agency's "pollutant"-based listing approach also contradicts its position that impaired waters should be listed even if specific pollutants cannot be identified.¹⁸³ This contradiction arises because, for at least some of those waters, the unidentified source of harm may not be a "pollutant." Finally, the EPA's narrow approach ignores the reference in section 303(d)(1)(A) to "pollution" rather than to "pollutants."¹⁸⁴

The EPA seems to justify its "pollutant" focus on the ground that TMDLs can only be developed for "pollutants."¹⁸⁵ This justification is poorly explained, and contradicts prior EPA guidance suggesting

Grubbs Memorandum] (stating that the "303(d) list provides a comprehensive inventory of waterbodies impaired by all sources, including point sources, nonpoint sources, or a combination of both"); 1991 GUIDANCE, *supra* note 118, at 2 ("Lack of information about certain types of pollution problems . . . should not be used as a reason to delay implementation of water quality-based controls."); 1992 Grubbs memorandum, *supra*, at 4 ("Particular sources . . . should not be entirely excluded [from 303(d) lists] simply because they are difficult to address.")

179. See *Idaho Sportsmen's Coalition v. EPA*, 43 *Env't. Rep. Cas. (BNA)* 1289, 1299-1301 (W.D. Wash. 1996) (citing EPA guidance that listing should not be premised on the identification of particular pollution sources, as grounds for rejecting EPA's approval of Idaho's decision to forego listing several streams exceeding ambient sediment and temperature standards due to insufficient information regarding the "cause" of those exceedences).

180. See Wayland Memorandum, *supra* note 178, at 5.

181. *Id.* at 6 (providing that states should list waters "impaired by an unknown source . . . as long as there is a pollutant associated with the impairment"); *id.* at 7 (regarding physical barriers to fish migration).

182. See *supra* note 176 and accompanying text.

183. See *supra* note 178 and accompanying text.

184. See 33 U.S.C. § 1313(d)(1)(A) (1997).

185. See Wayland Memorandum, *supra* note 178, at 6-7 (stating that waters impaired solely by physical barriers to fish migration need not be listed because "there is no pollutant to allocate and the TMDL process is not appropriate").

that TMDLs may be appropriate for a whole range of harms that fall within the broader definition of “pollution” under the Act.¹⁸⁶ Moreover, as the previous part of this Article suggests, the 303(d) listing and its attendant consequences serve valuable environmental objectives even if it appears at the listing stage that a TMDL may not cure the cause of a water quality impairment. The EPA’s pollutant-based listing focus ignores this important role of the listing process.

Understandably, the FACA Report did not recommend a uniformly broad or narrow approach toward the relevant types of sources and harms for listing purposes. The entire committee agreed that all types of water quality standards, including designated uses, narrative and antidegradation standards, should be used as targets for listing purposes.¹⁸⁷ Unlike the EPA, the entire FACA committee believed that waters should be listed, even if impaired by physical structures, physical modifications of water courses, or alterations of river flow.¹⁸⁸ None of these harms are “pollutants,” but all are nevertheless considered “pollution” under the Act. However, the committee was unable to reach a consensus on whether waters should be listed if impaired solely by atmospheric deposition or even by nonpoint sources of “pollutants.”¹⁸⁹

Several FACA members apparently argued that the types of pollution controls referenced in section 303(d)(1)(A) indicate Congress’s intent to preclude listing waters polluted solely or primarily by nonpoint sources.¹⁹⁰ That section requires states to list all waters for which certain specified pollution controls “are not stringent enough to implement” applicable water quality standards.¹⁹¹ The listed controls are “effluent limitations required by section 1311(b)(1)(A) and section 1311(b)(1)(B)” of the Act.¹⁹² Section

186. See 1991 GUIDANCE, *supra* note 118, at 19.

187. See FACA REPORT, *supra* note 42, at 12-13.

188. See *id.* at 46-52.

189. See *id.* at 42, 48; Houck III, *supra* note 1, at 10,422 (noting that, although the FACA committee reached consensus on a wide range of issues, the “honeymoon ended at TMDLs for nonpoint sources”).

190. See Houck III, *supra* note 1, at 10,399.

191. 33 U.S.C. § 131(d)(1)(A) (1997). This appears to imply that waters need not be listed under section 303(d) if the designated pollution controls are “stringent enough” on paper to meet applicable water quality standards, but the waters nevertheless violate applicable standards because polluters have failed to comply with those controls. See *DeKalb County v. EPA*, No. 79-969A, at 5-6 (N.D. Ga. Nov. 25, 1980) (Order) (noting that a waterbody wasn’t subject to TMDLs because the polluter had failed to show that it was complying with its technology-based limitations). One wonders how well states can distinguish between violations of water quality standards violations caused by noncompliance with control requirements and violations caused by insufficient control requirements.

192. 33 U.S.C. § 1313(d)(1)(A).

301(b)(1)(A) refers to “best practicable” control technology (BPT) for industries, and to pretreatment requirements under section 307 for discharges into publicly owned treatment works; section 301(b)(1)(B) refers to secondary treatment for existing sewage treatment plants.¹⁹³ In other words, section 303(d) requires states to identify those waters for which BPT controls on point sources “are not stringent enough to implement” applicable water quality standards.

According to some FACA members, by failing to refer to equivalent nonpoint source controls in section 303(d)(1)(A), Congress intended that the TMDLs process not address waters impaired, at least solely or primarily, by nonpoint source pollution.¹⁹⁴ The most obvious counter to this argument is that Congress omitted any reference to technology-based standards for nonpoint sources, simply because there are none in the Act, although section 319 does refer to “best management practices” or “BMPs” for those sources.¹⁹⁵ Moreover, the FACA members’ inference from Congress’s omission is less compelling than the contrary inference that Congress did not mention nonpoint source controls as grounds for avoiding listing waters simply because Congress intended that TMDLs provide the technical basis for establishing those nonpoint source controls. Regardless of which negative inference is stronger, the FACA members’ negative inference does not overcome the affirmative import of the plain language of section 303(d)(1)(A). This plain meaning is consistent with Professor Houck’s conclusions based on his detailed analysis of the legislative history of section 303(d).¹⁹⁶

193. See *id.* § 1311 (b)(1)(A)-(B). Hereinafter, I will refer to the three requirements referenced in section 301(b)(1) collectively as “BPT” unless otherwise noted. Besides BPT, the Act’s “technology-based” arsenal includes “best available technology economically achievable,” “best practicable technology” for certain toxic pollutants, “best conventional pollutant control technology,” and “best available demonstrated control technology” for new sources. *Id.* § 1311(b)(2)(A), (b)(1)(A), (b)(2)(E), 1316 (a)(1). The differences among these multiple technology-based standards are somewhat ambiguous, which is not surprising given the similarities among their labels. For purposes of this Article, the standards differ essentially according to the extent that technology costs are relevant to the EPA’s choice of the “model” pollution control technology and, related to costs, the extent to which the model technology has been applied successfully by the target industry. For a description of these requirements, see RODGERS, *supra* note 28, §§ 4.18, 4.31.

194. See Houck II, *supra* note 28, at 10,399.

195. There are other technology-based standards for point sources, however, which Congress omitted from section 303(d)(1)(A) as a basis for avoiding listing a polluted waterbody. See *supra* note 193.

196. See Houck III, *supra* note 1, at 10,337. Still another problem with the FACA members’ argument is that it fails to account for Congress’s omission of technology-based standards other than BPT for point sources. If Congress’s lack of reference to controls for nonpoint sources implied an intent that the TMDLs process should be inapplicable to those sources, then Congress’s lack of reference to BAT and other controls for point sources might

In sum, there is considerable disagreement and uncertainty over the scope of harms (“pollutants” or “pollution”) and sources of harms (point or nonpoint) which can provide the basis for each 303(d) listing decision. However, the Act provides a relatively clear mandate that waters should be listed based simply on violations of water quality standards, not on what type of harm or source is causing the violations. To the extent that the EPA allows states to distinguish among types and sources of harms for listing purposes, the Agency should require that those distinctions be made only in the context of a comprehensive watershed plan. The watershed plan should identify all possible harms and sources, and provide a detailed explanation of those that can be addressed through the TMDLs process and how that process will dovetail with plans to address the harms and sources that are not included in the TMDLs process. This type of plan would be the functional equivalent of a broad-based 303(d) list, but with perhaps fewer of the legal restrictions on additional pollution that result from 303(d) listing and, thus, without all the useful incentives which flow from those restrictions. Even with this weakness, a watershed planning framework would help to ensure that states’ listing decisions reflect an overall or holistic game plan. This approach would address all harms and would consider the extent to which several harms should be simultaneously addressed.

2. Types of Controls that Can Be Used to Forego Listing a Polluted Waterbody

As noted in the previous part, Congress’s reference to BPT in section 303(d)(1)(A) has fueled a debate about whether the TMDLs process should apply to waters impaired by nonpoint sources. Congress’s reference to BPT has generated another issue relating to the overall scope of the TMDLs process, because the EPA has allowed states to rely on expected pollution reductions from a much broader set of controls than BPT to avoid listing 303(d) waters. The conflict between the statutory approach and the EPA’s approach is discussed below.

Section 303(d)(1)(A) requires states to list all waters for which effluent limits based on BPT “are not stringent enough to implement” applicable water quality standards.¹⁹⁷ It follows logically from this

suggest that Congress intended TMDLs to have only a limited application even to point source pollution. The FACA members’ apparent lack of desire to push their interpretation to this logical conclusion suggests that even they recognize the absurdity of this reasoning.

197. 33 U.S.C. § 1313(d)(1)(A).

requirement that waters not meeting ambient standards after the application of BPT for point sources, if any exist, *must* be included on a 303(d) list, regardless of the availability and effectiveness of other, especially more stringent, technology-based controls on point sources.¹⁹⁸

In contrast to Congress's BPT reference in section 303(d)(1)(A), the EPA allows states to use expected pollutant reductions from BPT, as well as from a wide range of other pollution controls, as grounds to avoid listing. Thus, the EPA's approach contemplates a narrower list than that required by section 303(d)(1)(A). The EPA's approach is reflected in its regulations which provide a confusing two-step listing

198. It also follows logically that waters must be listed *especially* if technology-based controls, which are more stringent than BPT, are insufficient to achieve ambient water quality standards. The Ninth Circuit has turned this statutory logic inside out in a case involving primarily the scope of lists under section 304(l). In *Natural Resources Defense Council, Inc. v. EPA*, 915 F.2d 1314, 1322 n.9 (9th Cir. 1990), the court noted that section 303(d) did not *require* listing of "[t]hose waters for which limitations based on the more demanding best *available* technology—the required level of technology to control toxics—were insufficient." Because TMDLs are required for all 303(d) waters, the court's dicta implies that TMDLs are appropriate when less demanding pollution controls fail to achieve ambient standards, but are inappropriate when more stringent controls fail to achieve ambient standards. Besides being utterly illogical, this twisted reading of section 303(d) in effect renders the TMDLs process inapplicable to toxic pollution which is subject to BAT, not BPT. This result has no basis in section 303(d) and is inconsistent with the EPA's historic position that all pollutants are subject to the TMDLs process. See Wayland Memorandum, *supra* note 178, at 6. Not surprisingly, the court's dicta with respect to the 303(d) issue was apparently self-generated. According to NRDC's counsel, the parties neither briefed the issue nor raised it themselves at the oral argument. Personal Communications with Robert W. Adler, Professor, University of Utah Law School (former NRDC attorney) (Oct. 1998).

In *Alaska Center for the Environment v. Browner*, the Ninth Circuit appeared to ignore its error in *Natural Resources Defense Council v. Fox*, by describing 303(d) lists as comprised of those waters for which any of the Act's technology-based requirements are insufficient to achieve ambient standards. 20 F.3d 981, 983 (9th Cir. 1994). In a more recent case, the Ninth Circuit recognized its inconsistent approaches in the above cases. See *Dioxin/Organochlorine Ctr. v. Clarke*, 57 F.3d 1517, 1527-28 & n.14 (9th Cir. 1995). But the *Dioxin* court only partly corrected its mistake in *Fox*, by concluding that section 303(d) gave the EPA "authority," if not a mandatory duty, to establish TMDLs for waters impaired by toxic pollution prior to the establishment of BAT-based effluent limits for that pollution. See *id.* at 1527; *Idaho Sportsmen's Coalition v. EPA*, 43 *Env't. Rep. Cas. (BNA)* 1292, 1301-03 (W.D. Wash. 1996) ("The listing of an impaired or threatened body of water need not wait until pollution controls have been tried and judged inadequate."); see also Healy, *supra* note 93, at 403-04 n.56 (noting the different approaches between the Ninth Circuit's *Fox* and *Dioxin* decisions).

This issue arose in *Dioxin* in the context of a claim by Columbia River pulp mills that the River was improperly listed under 303(d) because the Agency had not yet established BAT-based NPDES permit limits for dioxin discharges from those mills. See *Dioxin*, 57 F.3d at 1520, 1526. The *Dioxin* court's overall response was that the Agency's failure to implement one pollution control program should not be used as grounds for invalidating the Agency's implementation of another. See *id.* at 1528. The *Dioxin* court's misguided footnote in *Fox* notwithstanding, another response to the pulp mills' arguments should have been that the lack of BAT-based pollution limits was irrelevant, because section 303(d)(1)(A) required that waters be listed regardless of whether BAT controls could achieve water quality standards.

process. In the first step, states must identify “water quality limited segments.”¹⁹⁹ The EPA defines these segments as any where it is “known” that water quality does not meet applicable standards, or is “not expected” to meet standards, “even after the application of the technology-based effluent limitations required by sections 301(b) and 306” of the Act.²⁰⁰ As noted previously, section 301(b) includes not only the BPT, pretreatment, and secondary treatment requirements listed in sub-paragraphs (b)(1)(A) and (B) and referenced in section 303(d)(1)(A), but also several other technology-based standards for point sources.²⁰¹ Thus, the EPA’s first-stage list of “water quality segments” precludes 303(d) listing on the basis of a larger set of technology-based controls than those referenced in section 303(d) itself.

The second step in the EPA’s listing process is to identify “water quality-limited segments still requiring TMDLs.”²⁰² This sub-set of water quality limited segments excludes those waters for which *all* Clean Water Act technology-based limits, as well as any “more stringent” limits required by some other federal, state, or local authority and “other” federal, state, or local “pollution control requirements (e.g., best management practices) . . . are stringent enough to implement” applicable water quality standards.²⁰³

Because section 303(d)(1)(A) refers only to BPT, that section and the EPA’s regulations are squarely at odds over the scope of pollution controls whose expected benefits can be used by states and the EPA to avoid listing a waterbody. The former refers only to BPT, the latter refers to virtually any applicable federal, state, or local pollution controls. In other words, section 303(d) contains more

199. 40 C.F.R. § 130.7(b) (1996).

200. *Id.* § 130.2(j).

201. *See supra* note 193 and accompanying text.

202. 40 C.F.R. § 130.7(b).

203. *Id.* § 130.7(b)(1)(i)-(iii). The EPA’s 1991 TMDLs Guidance creates even more confusion by referring to several different sets of controls warranting exclusion. *See* 1991 GUIDANCE, *supra* note 118, at 1 (technology-based controls); *id.* at 2 (tech-based controls or other legally required pollution controls); *id.* at 4 (tech-based controls alone); *id.* at 6 (tech-based limits required by sections 301(b) and 306 of the Act); *id.* at 6-7 (referring to regulatory definitions). The EPA’s “1996 Draft TMDL Implementation Strategy” refers only to “nationally required” controls, excluding the state or local controls referenced in the Agency’s regulations. *See* U.S. Env’tl. Protection Agency *Draft TMDL Program Implementation Strategy* (Dec. 10, 1996) <<http://www.epa.gov/owow/tmdl/html>> [hereinafter TMDL Draft]; *see also* U.S. Env’tl. Protection Agency, *FACA Home Page at Background Paper #1* (visited Feb. 6, 1999) <<http://www.epa.gov/ttnfaca1/docs.html>> [hereinafter Background Paper #1] (citing different statutory and regulatory criteria in the same breath).

expansive listing criteria than the EPA's regulations.²⁰⁴ Likewise, because the Act requires that TMDLs be established for all listed waters, the Act's listing criteria contemplate the establishment of more TMDLs than the EPA's listing criteria.

Surprisingly, this conflict has received no judicial scrutiny to date. One court appears to have recognized the conflict between the EPA's criteria and the statutory criteria (which it nevertheless misrepresented), but did not decide whether the EPA's approach was lawful.²⁰⁵ Most courts do not appear to have noticed this conflict, with few courts reciting the statutory standard, and most others reciting a hybrid of the statutory standard and the EPA's regulation.²⁰⁶

204. Besides being plainly narrower than the statutory listing criterion, the EPA's listing criteria for its two sets of waters are themselves inconsistent. The EPA's second set is based upon several of the same technology-based standards as those used to define the first set, so that the two sets appear to be redundant rather than consecutive. *See* 40 C.F.R. § 130.7(b). The EPA's definitions also use different standards of proof of water quality violations for each of the two sets. *See infra* text at notes 228-229.

205. *See* *Sierra Club v. Hankinson*, 939 F. Supp. 865, 870 (N.D. Ga. 1996).

206. *See* *Alaska Ctr. for the Env't v. Reilly*, 762 F. Supp. 1422, 1424 (When "technology-based controls" are "found insufficient to clean up certain . . . segments, the Act requires use of a water-quality based approach. States are required to identify such waters and designate them as 'water quality limited.'"); *DeKalb County v. EPA*, No. 79-969A, at 5 (N.D. Ga. Nov. 25, 1980) (Section 303(d) requires TMDLs to be established when "technology-based effluent limitations of section 301 are not stringent enough to meet water quality standards."); *Id.* at 6 (Section 303(d) applies "only if application of the section 301 standards . . . fails to achieve the water quality standards."); *Env'tl. Defense Fund, Inc. v. Costle*, 657 F.2d 275, 294 (D.C. Cir. 1981) ("Section 303(d) . . . requires the states to identify waters where point source controls alone will be insufficient to implement the water quality standards applicable to such waters."); *Idaho Sportsmen's Coalition v. EPA*, 43 *Env't. Rep. Cas.* (BNA) 1289, 1292 (W.D. Wash. 1996) ("TMDLs provide a basis for developing other pollution control measures where tech-based point source controls prove inadequate."); *Natural Resources Defense Council v. EPA*, 915 F.2d 1314, 1322 n.9 (9th Cir. 1990) (noting that section 303(d) requires listing of waters not expected to meet ambient standards after the implementation of BPT); *Natural Resources Defense Council v. Fox*, 909 F. Supp. 153, 156 (S.D.N.Y. 1995) ("States are required to identify those waters which, taking into account technology-based reduction of pollutant discharge, will fail to meet the water quality standard established for those waters."); *Sierra Club v. Hankinson*, 939 F. Supp. at 867-68, 880 (stating that "where [tech-based] controls are insufficient to clean up water bodies, the Clean Water Act mandates use of a water quality based approach and that [e]ach state must . . . identify waters . . . which do not meet these water quality standards"); *Sierra Club, North Star Chapter v. Browner*, 843 F. Supp. 1304, 1307 (D. Minn. 1993) ("[T]he state must identify waters which would not be able to meet the water quality standards even after other Act pollution controls, such as the NPDES permit process, are implemented."); *Neuse River Found., Inc. v. Browner*, No. 4, 96-CV-188-BO(3), 1997 U.S. Dist. LEXIS 20431, at * 2 (E.D.N.C. Nov. 5, 1997) (noting that listing is required for waters for which the "technology-based effluent limitations required by the Clean Water Act are not stringent enough"). The district court in *Scott v. City of Hammond* cited the correct technology-based standards, but still managed to turn the listing criteria in section 303(d) upside down. 530 F. Supp. 288 (N.D. Ill. 1981). The court stated that section 303(d) requires TMDLs for "waterways for which certain requirements of Act §§ 301(b)(1)(A) and (B) are not satisfied." *Id.* at 289. In fact, section 303(d) requires TMDLs for waterways for which water quality standards adopted under section 303(a-c) are not satisfied even after technology-

The conflicting listing criteria appear to reflect quite different philosophies about the role of TMDLs in watershed management. The plain language of section 303(d) implies congressional intent to use TMDLs as the *basis* for establishing, and/or evaluating, the effectiveness of a full range of pollution controls beyond BPT for point sources.²⁰⁷ This approach implicitly recognizes the value of numeric TMDLs and component pollution allocations as threshold planning tools for making efficient, creative choices of pollution control methods. Congress's approach likewise recognizes the value of TMDLs as a mechanism for communities to plan for future growth, whether or not their watersheds are currently achieving ambient water quality standards.²⁰⁸ As one author has stated, "Congress intended maximum loads to encourage rational planning, not as a last-ditch attempt to clean up impossibly dirty waters."²⁰⁹

The EPA's approach, by contrast, presumes that TMDLs are appropriate only as a last resort, to be used only after all other pollution controls have been tried and failed.²¹⁰ The problem with the EPA's position is that the effectiveness of one or more control methods in achieving water quality standards is often far from clear, or the methods may not be implemented immediately. The legitimacy of the EPA's policy thus depends in part on whether the Agency requires a high degree of factual certainty in states' findings that control methods other than BPT will enable a waterbody to achieve water quality standards. The validity of the EPA's policy also depends on whether those controls must be implemented promptly in order to qualify as grounds for precluding listing impaired waters. As will be

based requirements under section 301(b)(1)(A) and (B) *have been satisfied*. See 33 U.S.C. § 1313(d) (1997).

207. See 33 U.S.C. § 1313(d)(1).

208. Of course, if it had wanted to maximize this role, Congress would have required TMDLs for *all* waters, not just those unable to meet water quality standards after the implementation of BPT for point sources. Congress provided for this comprehensive approach in section 303(d)(3), but failed to provide any mechanism for enforcing it, at least, as against the EPA.

209. Bazel, *supra* note 127, at 129.

210. According to the Agency, waters meeting its narrow statutory listing criteria include a number of waters where other legally required pollution controls [than BPT] are sufficient to ensure compliance with [water quality standards] Under such circumstances, establishing TMDLs would not contribute to accomplishing the goals of the Act and could draw resources from areas where there are water quality problems. Therefore, EPA believes it best serves the purposes of the Act to require States to establish TMDLs and submit them to EPA for approval only where such TMDLs are needed to "bridge the gap" between existing effluent limitations, other pollution controls and [water quality standards].

Water Quality Planning and Management, 50 Fed. Reg. 1774, 1775 (1985).

discussed in the next part, the EPA's guidance on the certainty issue is far from clear. Furthermore, the Agency has also given vague guidance on the timing issue.²¹¹

The "last resort" philosophy reflected in the Agency's narrow 303(d) listing criteria is inconsistent not only with the philosophy underlying section 303(d), but with the EPA's own repeated references to TMDLs as providing the technical link to water quality standards, or more generally the "technical backbone" for watershed planning.²¹² The Agency cannot logically refer to TMDLs as "link[ing] the development and implementation of control actions to the attainment of water quality standards," and then direct that TMDLs be established only after all possible "control actions" have been implemented.²¹³

Given this inconsistency, it is not surprising that the Agency cites the task of "determin[ing] more specifically what types of existing and planned controls, especially for nonpoint sources, could eliminate the need for listing as a 'challenge' for the TMDLs program."²¹⁴ This task will be problematic until the Agency reconciles its overall, restrictive listing approach with its broad notion of the role of TMDLs as the "technical backbone" for watershed management.

It is surprising that citizens groups have not yet raised this issue in a judicial forum.²¹⁵ Perhaps, given the large number of waters

211. In one document, the EPA referred to the exclusion of polluted waters from 303(d) lists based upon control methods that will achieve water quality standards "within a reasonable time," and that "are enforceable." Background Paper #1, *supra* note 204, ¶ 1; FACA REPORT, *supra* note 42, at 14-15. In the same document, the EPA referred to the exclusion of waters from 303(d) lists based upon control methods that can achieve water quality standards in the "near future." See Background Paper #1, *supra* note 204, ¶ 1. At another point, the Agency referred to "established" controls as justification for avoiding listing a waterbody under section 303(d). See *id.* In other documents, however, the Agency has made it clear that controls must be implemented within the next two-year 303(d) listing cycle in order to qualify as grounds for excluding impaired waters from 303(d) lists. See Wayland Memorandum, *supra* note 178, at 3. Of course, this rule will be far less rigorous if, as has been suggested, the EPA extends the listing cycle from two years to five years. The FACA Report concurred with the EPA's current use of a two-year listing cycle as a benchmark for relying on controls to avoid listing impaired waters. See FACA REPORT, *supra* note 42, at 14-15.

212. See *supra* note 118 and accompanying text.

213. 1991 GUIDANCE, *supra* note 118, at 19. Similarly, the EPA cannot logically state that BMPs for nonpoint sources "should be based on [load allocations] developed using the TMDL process," while also allowing states to preclude listing a waterbody under section 303(d) on the basis of BMPs for those same sources. *Id.* at 24.

214. Background Paper #1, *supra* note 204.

215. In fact, several plaintiffs in TMDLs cases have expressly adopted the EPA's approach in settlements with the Agency. See *American Littoral Soc'y v. EPA*, No. 96-489 (E.D. Pa. 1997) <<http://www.epa.gov/owow/tmdl/html>>; *Pacific Coast Fed'n of Fishermen's Ass'n v. Browner*, No. 95-4474 MHP (N.D. Cal. Mar. 6, 1997) (Consent Decree). In *Sierra Club v. Hankinson*, the plaintiffs challenged the EPA's approval of Georgia's 1994, 303(d) list on numerous grounds,

requiring TMDLs under even the EPA's more restrictive listing approach, TMDLs plaintiffs are reluctant to pile even more work on the Agency by forcing it to expand its listing criteria.²¹⁶ The FACA Report at least recognized the inconsistency between the scope of controls referenced in section 303(d)(1)(A) and in the EPA's regulations, but the advisory committee did not make any recommendations on how it should be resolved.²¹⁷

3. The Factual Bases for Listing Decisions

The previous discussion regarding which pollution controls can be used to avoid 303(d) listing relates closely to a set of broader, more complex questions regarding the degree of certainty and the kinds of data used by both states and the EPA in making various listing decisions. One of these questions regards the level of certainty states and the EPA should apply to factual findings required to identify 303(d) waters. These findings address, among other things, (1) whether a waterbody is currently violating water quality standards; (2) if additional pollution is expected, how that addition will affect a waterbody's ability to meet applicable water quality standards; and (3) if additional pollution controls are expected to be implemented, how those controls will affect a waterbody's ability to meet applicable standards.²¹⁸

including the list's exclusion of numerous polluted waters that were "reasonably expected" to attain water quality standards "through implementation of best management practices" (BMPs). 939 F. Supp. 865, 870 (N.D. Ga. 1996) (citing the EPA brief). Rather than challenge the EPA's reliance on the BMPs, per se, as outside the scope of statutorily-designated controls, the plaintiffs appeared to argue that Georgia had not adequately demonstrated that the BMPs would work. *See id.*

216. *See, e.g.,* Houck III, *supra* note 1, at 10,436 (citing EPA projections of roughly 20,000 impaired waters); RODGERS, *supra* note 28, § 4.18 (noting that regulators were deterred from establishing TMDLs by the overwhelming number of waters qualifying for listing under section 303(d)).

217. *See* FACA REPORT, *supra* note 42, at 10-13.

218. These findings can be made in the context of deciding whether to either add a waterbody to a 303(d) list or to remove a waterbody from the list. Presumably, the factual burdens of proof for these findings should be at least as stringent for de-listing decisions as for listing ones. *See* Conway, *supra* note 117, at 109 (suggesting that the EPA has held states to a more stringent standard of proof for de-listing than for listing decisions). *But see* Houck III, *supra* note 1, at 10,418, 10,436 (noting that some states are developing more restrictive criteria for adding waters to 303(d) lists).

A related issue is whether a state can delist a waterbody after a TMDL has been developed for it, but before the TMDL has been fully implemented and the loading reductions necessary to meet applicable ambient standards have been achieved. The EPA allows such delisting. *See* Wayland Memorandum, *supra* note 178, at 7. However, the statute makes no such express allowance and impliedly forbids it by requiring listing on the basis of water quality impairment, rather than on the basis of what steps have been taken (besides adopting BPT for point sources), to remedy the impairment. The FACA Report recommends that the EPA require states to keep

Another question related to the factual basis for 303(d) listing is what type of existing data states and/or the EPA should compile to identify and evaluate waters for listing. Still another question is what level of effort states and/or the EPA should make in order to gather new data for listing purposes. These questions are significant, in part, because of the requirement, which is implied by the plain language of section 303(d), that each round of 303(d) lists include *all* waters that are known to fit the statutory listing criteria.²¹⁹ Several policies favor this comprehensive listing approach over one in which only a portion of waters meeting the section 303(d) listing criteria are listed. A comprehensive listing approach facilitates the statutorily required task of prioritizing waters subject to TMDLs; it provides federal and state agencies and the public with a more accurate sense of the magnitude of a state's pollution problems. It also provides polluters on listed waterbodies with notice that TMDLs will, or at least may, ultimately be established. Notice, in turn, gives polluters a chance to plan in advance for the likely costs of additional pollution control. Also, together with the legal consequences of 303(d) listing discussed above, notice may encourage polluters to initiate actions to reduce pollution, or to collect additional information about pollution levels in order to avoid facing potentially more drastic actions resulting from a TMDL.²²⁰

The EPA appears to agree that each 303(d) list submission must include all waters which are known to meet the appropriate criteria for listing, but it is questionable whether the Agency has vigorously enforced this requirement to date.²²¹

waters on their 303(d) lists until they have actually attained ambient standards, arguing that this approach "might speed TMDL implementation . . . and thus further the major objective of § 303(d)(1): restoring impaired waters." FACA REPORT, *supra* note 42, at 18-20. This policy will be even more compelling if the EPA decides to extend the attainment deadline for 303(d) listing purposes beyond the current two-year cycle for revising 303(d) lists. *See id.* at 42 (discussing whether the EPA should require that TMDL submissions include demonstrations that the TMDL will attain water quality standards by a certain date).

219. *See supra* Part III.A.1.

220. *See supra* note 143 and accompanying text.

221. *See* 40 C.F.R. § 130.7(b)(1) (1997) (requiring listing of "those water quality-limited segments still requiring TMDLs"); 57 Fed. Reg. 33,040, 33,045 (1992) (stating that section 303(d) requires identification of "all" impaired waters). *But see* TMDL Draft, *supra* note 204 (noting without disapproval that some states have excluded waters from 303(d) lists based on decisions that those waters "do not need TMDLs because other kinds of activities are planned or underway to restore them"). One Court recently impliedly rejected the Agency's lax approach in enforcing this rule. *See American Canoe Ass'n v. EPA*, No. 98-979-A, slip op. at 15-17 (E.D. Va. Dec. 18, 1998) (Memorandum Opinion) (denying EPA's motion to dismiss plaintiff's claim that EPA abused its discretion by approving Virginia's 303(d) list when it failed to include all shown to be impaired).

While supported by sound policy, the requirement that states include in their lists *all* waters meeting the listing criteria is problematic because water quality monitoring data is generally scarce.²²² Because of this scarcity, state and EPA policies regarding the level of certainty and kinds of data required for listing decisions, directly affect the strength of the TMDLs process as a tool for achieving water quality standards. For example, the TMDLs process would have little coverage if the EPA required definitive evidence of water quality impairment to warrant consideration of a waterbody for listing, but allowed mere speculation regarding the success of future pollution controls to justify excluding a waterbody from the list. Likewise, the TMDLs process would have a narrow application if states made little effort either to compile existing data from all sources, or to gather, or promote others' efforts to gather, additional data. On the other hand, a liberal approach to the certainty and data sufficiency questions might lead to the development of inadequate or otherwise wasteful TMDLs.²²³

The following is a discussion of the legal aspects of the EPA's and states' attempts to strike a balance between these competing policies.

a. Factual Certainty in 303(d) Listing Decisions

Section 303(d)(1)(A) requires states to list those waters for which the designated technology-based effluent limits "are not stringent enough to implement" any applicable water quality standard.²²⁴ This phrase does not directly address the level of factual certainty necessary for listing decisions. However, Congress's ambitious objectives underlying the Act, the importance of water

222. See, e.g., FACA REPORT, *supra* note 42, at 3 ("More and higher quality data on water quality are needed for proper identification of impaired waters and to support TMDL development."); *id.* at 10 (noting that limited resources are available for monitoring and that only a fraction of all waters are monitored); Background Paper #1, *supra* note 204, at 4 ("Collecting and evaluating data . . . is a crucial challenge in the Section 303(d) listing process, because of the technical difficulty involved, the cost of performing additional monitoring, and the effect of these determinations in determining 'impairment' and priority ranking."); Advanced Notice of Proposed Rulemaking, 63 Fed. Reg. 36,744 (July 7, 1998) (noting the need for "better" water quality data but "recogniz[ing] . . . that efforts to obtain such data, and develop the analytical capacity to integrate it into existing regulatory programs, could encounter significant resource constraints in some States and Tribes"); *Sierra Club v. Clifford*, No. 96-0527 (E.D. La. Sept. 22, 1998) (Order and Reasons) ("[T]he waters for which Louisiana has monitoring data constitute only a fraction of the surface waters in the State.").

223. See FACA REPORT, *supra* note 42, at 10 ("It is critical that § 303(d)(1) listing decisions be based on high quality, sound scientific information."); see also Conway, *supra* note 117, at 103-04 (criticizing the sufficiency of data used by states to make 303(d) listing decisions).

224. 33 U.S.C. § 1313(d)(1)(A).

quality standards for meeting those objectives, the importance of TMDLs for achieving water quality standards, and Congress's intent that TMDLs ultimately be established for all states' waters, suggest that Congress did not intend that a high degree of factual certainty would be necessary to justify listing a waterbody under section 303(d).²²⁵ Similarly, Congress could not reasonably have intended to rely on technology-based limits to avoid 303(d) listing based upon the speculative effectiveness of those limits. Additionally, states should not be allowed to remove a waterbody from a 303(d) list based upon mere speculation as to its quality.

This reading of section 303(d)(1)(A) is supported by section 303(d)(1)(C), which requires that TMDLs include a "margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality."²²⁶ Several courts have logically construed this provision as reflecting congressional intent to prohibit "lack of knowledge," i.e., lack of certainty, from becoming an excuse to avoid establishing TMDLs.²²⁷ It would make little sense for Congress to have prohibited lack of knowledge from precluding TMDL development, on the one hand, but to have sanctioned lack of knowledge as grounds for excluding waters from the 303(d) list, on the other.

The question remains whether there is an appropriate standard of certainty that should apply to the factual basis for each listing decision. The EPA has not tackled this problem. Like section 303(d)(1)(A), the Agency's regulations use the phrase "not stringent enough" to define the list of "water quality limited segments still requiring TMDLs."²²⁸ The Agency uses different terminology, however, with respect to the level of knowledge necessary to identify "water quality limited segments." That classification applies to waters for which violations of water quality standards are either "known" or are "expected," after the implementation of certain technology-based controls.²²⁹ Those terms are inherently imprecise.²³⁰

225. *But see* Houck III, *supra* note 1, at 10,417-18 (stating that the timber and agriculture industries have "given notice of their intent, in the name of 'sound science,' to challenge listings of waters and identification of sources based on anything short of dispositive evidence"); *id.* at 10,410 (noting, in the context of EPA's TMDL development schedule, an "inevitable compromise between the eternal need for more information and the equally pressing need to, at last, get the show on the road").

226. 33 U.S.C. § 1313(d)(10)(C).

227. *See supra* note 93 and accompanying text; FACA REPORT, *supra* note 42, at 7 ("Lack of certainty is not an excuse for inaction.").

228. 40 C.F.R. § 130.7(b)(1)(iii) (1997).

229. *See id.* § 130.2(j).

Moreover, it is unclear whether, by using “known” or “expected,” the EPA intended to make the level of factual certainty in identifying water quality limited segments different from that for identifying those water quality limited segments “still requiring TMDLs.” This ambiguity is compounded by the Agency’s redundant definitions of those two categories of waterbody lists.²³¹

In addition, the EPA’s regulations require states to consider various other Clean Water Act waterbody lists, data categories, and other information in identifying 303(d) waters.²³² However, the regulations do allow states to determine essentially what probative value to give those information categories in compiling 303(d) lists, as long as the states provide a written methodology for making that determination and a “rationale” for not using any of the EPA’s categories of “existing and readily available data and information.”²³³

The EPA’s guidance addresses the factual certainty issue in the specific context of factual findings regarding whether control methods will remedy existing water quality impairment. The Agency has specified that point source controls can provide the basis for excluding a waterbody from a 303(d) list if those controls are included as “appropriate effluent limits in NPDES permits.”²³⁴ The EPA’s guidance indicates that states’ reliance on nonpoint source controls to avoid a 303(d) listing requires “a more thorough analysis of [those controls’] technical and implementation feasibility.”²³⁵ This

230. See Houck II, *supra* note 28, at 10,397 (stating that what is “expected” is “in the eye of the beholder”).

231. See *supra* note 204. At least one court has used the “not expected” standard in the EPA’s definition of “water quality limited segments,” rather than the facially more restrictive “are not” standard in the EPA’s definition of those segments “still requiring TMDLs.” *Idaho Sportsmen’s Coalition v. EPA*, 43 *Env’t. Rep. Cas.* (BNA) 1289, 1296 (W.D. Wash. 1996) (citing 40 C.F.R. § 130.2(j) (1994)).

232. See 40 C.F.R. § 130.7(b)(5); 54 *Fed. Reg.* 1300, 1311 (1989); *Surface Water Toxics Control Program and Water Quality Planning and Management Programs*, 57 *Fed. Reg.* 33,040, 33,047 (1992) (providing that states need not justify exclusion of all state waters from their 303(d) lists; documentation requirement applies only to “the list as a whole”).

233. 40 C.F.R. § 130.7(b)(5), (6)(iii). The EPA does not appear to have enforced this requirement. In *Idaho Sportsmen’s Coalition v. EPA*, the district court rejected the EPA’s approval of Idaho’s 1992 303(d) list, in part, because neither the state nor the EPA had provided a “rational explanation for . . . a list containing only thirty-six bodies of water in the face of scientific monitoring data and other evidence showing that hundreds of waters were impaired or threatened.” 43 *Env’t. Rep. Cas.* (BNA) at 1300.

234. Background Paper #1, *supra* note 204, ¶ 5.

235. *Id.* The Agency’s guidance also states that nonpoint source controls can be used to avoid listing a waterbody only if the controls are expected to achieve water quality standards “by the next listing cycle (that is, in two years)” and, if those controls were not yet implemented, only if the state developed an “implementation schedule” for those controls. *Id.*; see also FACA REPORT, *supra* note 42, at 15.

more stringent standard for nonpoint source controls seems reasonable, because they are not as readily enforceable as point source controls. In addition, given the EPA's and states' historical focus on point source controls, the technical basis for many nonpoint source controls may well be less developed than those for point source controls. However, it is not at all clear why the mere inclusion of a point source control as an effluent limit in an NPDES permit should be sufficient grounds for presuming that that control will achieve ambient water quality standards on a waterbody presently not achieving those standards. Current science may be as yet uncertain as to whether the effluent limit at issue "will," if complied with, result in the achievement of the relevant ambient standard, especially if the effluent limit was not designed to reflect the cumulative discharge from multiple pollution sources.

In short, given the generally ambitious congressional objectives underlying the Clean Water Act and the EPA's praise for the value of TMDLs, the levels of certainty required for various factual components of 303(d) listing decisions should be designed to promote, rather than frustrate, the use of TMDLs. It is unclear what precise standard of certainty is appropriate to serve this function, but the EPA's deference to the states on the appropriate standard will likely lead to further confusion and inconsistent state applications of the TMDLs process. The Agency should develop its own ground rules on this issue to ensure national consistency in states' implementation of section 303(d).

b. Gathering Data to Compile 303(d) Lists

The efforts states should make in compiling existing and new water quality information is closely related to the degree of certainty required for listing decisions. States generally lack sufficient data to assess the quality of all waters within their boundaries. When data does exist, it is often inaccessible because it is scattered among federal, state, and local agencies; academics; citizens; and commercial sources.²³⁶ The states' expected level of effort to compile data from these sources and to collect new data could, like the level of certainty used for various listing decisions, significantly determine the scope of waters to which the TMDLs process will be applied.²³⁷

236. See CLEAN WATER ACTION PLAN, *supra* note 5, at 17-18, 66; Conway, *supra* note 117, at 106.

237. See FACA REPORT, *supra* note 42, at 10 (describing well-designed monitoring programs as "vital").

As with the required level of factual certainty, the Clean Water Act does not address the data collection issue squarely. Section 303(d)(1)(A) provides that “[e]ach State shall identify those waters within its boundaries” which meet the criteria for listing under that section.²³⁸ In one sense, the requirement that states “identify” their polluted waters is unconditional; section 303(d) does not limit the “identification” to existing data or to certain sources of data. Thus, a literal reading of that provision shows that Congress intended states to commit whatever effort is necessary to assess the quality of all of its waters or, at least, of all those waters where pollution is expected to occur.

Is this literal reading warranted? On the one hand, this reading is consistent with ambitious congressional objectives underlying the Act generally, and with the importance of water quality standards and TMDLs in meeting those objectives. On the other hand, this ambitious requirement must be tempered with the difficulties and expense of water quality monitoring. A strong case can be made that, from this perspective, whether or not states have “identified” all polluted waters must be evaluated, not in absolute terms and with respect to a single round of 303(d) listing, but in terms of the “reasonableness” of the states’ near and long term data compiling and collecting efforts.

These compiling and collection efforts can be characterized roughly into three categories: (1) compiling data within the state agency responsible for producing 303(d) lists; (2) compiling data collected by other sources, including other state sources, federal and local sources, and citizens and private polluters; and (3) collecting new data and developing programs for the collection of data by other sources. The next part of this Article addresses the first and second of these three categories; the following section addresses the third.

i. Defining “Existing and Readily Available” Data

The EPA’s regulations address how far states should go in compiling existing data by requiring states to compile “all existing and readily available water quality-related data” for 303(d) listing purposes.²³⁹ The Agency defines this phrase to include, “[a]t a minimum,” lists of polluted waters compiled under other Clean Water

238. 33 U.S.C. § 1313(d)(1)(A) (1997).

239. 40 C.F.R. § 130.7(b)(5) (1997); *see also* National Pollutant Discharge Elimination System, Surface Water Toxics Program, 54 Fed. Reg. 1300, 1311 (1989) (explaining the origin of this standard).

Act provisions, waters whose nonattainment of ambient standards is shown by “dilution calculations or predictive models,” and waters whose pollution problems have been “reported” by other public and private sources.²⁴⁰ There are several problems with this approach. First, the EPA’s regulations do not require that state officials actually investigate the files of these sources, only that the officials “actively solicit[.]” these sources to submit data they may be collecting.²⁴¹ This approach is therefore limited by a source’s willingness to provide monitoring data when “solicited” by states. Although it would be unreasonable to expect state officials to *require* all of those sources to divulge their water quality data, there are less draconian approaches which still might provide more useful information than mere data solicitations. For example, the EPA could require, as a condition for its approval of states’ 303(d) lists, that states develop programs for actually coordinating monitoring efforts among all sources and providing a central office to compile monitoring data collected from those diverse sources.²⁴²

In addition, the EPA’s express list of data sources in its regulations does not include raw ambient monitoring data collected by state environmental agencies or submitted to them by polluters satisfying their NPDES permit requirements.²⁴³ The list does not even include existing reports summarizing any such data.²⁴⁴ Although the EPA did not intend the list to be an exclusive definition of “existing and readily available” water quality data, the Agency does not appear to require states to review raw data, or reports summarizing that data, except to the extent that such data has already been reviewed for compiling the other lists which fall within the Agency’s definition of “existing and readily available” data.²⁴⁵ The only court to have squarely addressed this issue has disagreed with the EPA’s approach.²⁴⁶

240. 40 C.F.R. § 130.7(b)(5)(i)-(iv); *see also* Surface Water Toxics Control Program and Water Quality Planning and Management Program, 57 Fed. Reg. 33,040, 33,047 (1992) (emphasizing that the four categories are not inclusive).

241. 40 C.F.R. § 130.7(b)(5)(iii).

242. *See* FACA REPORT, *supra* note 42, at 11 (recommending that the EPA encourage states to collaborate with various stakeholders in identifying water quality problems).

243. *See* 40 C.F.R. 130.7(b)(5).

244. *See* FACA REPORT, *supra* note 42, at 10-12 (stating a preference for listing decisions based on monitored data subject to quality assurance and quality control).

245. *See* Surface Water Toxics Control Program and Water Quality Planning and Management Programs, 57 Fed. Reg. at 33,047.

246. *See* *Sierra Club v. Hankinson*, 939 F. Supp. 865, 870 (N.D. La. 1996) (noting, for purposes of its review of the EPA’s approval of Georgia’s 1994 list, its concern that Georgia failed

It is also questionable whether the EPA has vigorously required states to consider even those categories of data expressly listed by the EPA. In *Idaho Sportsmen's Coalition*, the district court rejected the EPA's approval of the 303(d) list Idaho submitted in 1992, in part, because the list, without explanation, failed to include hundreds of polluted waters identified on various other Clean Water Act lists or reported by other agencies.²⁴⁷

ii. Collecting Data That Is Not "Readily Available"

The EPA's requirement, that states use only "existing" and "readily available" data, sanctions the status quo. Thus, those states with poor ambient monitoring programs do not need to increase their monitoring levels for 303(d) purposes, because doing so would arguably require the collection of data that is not "readily available."²⁴⁸ By not requiring states with poor ambient monitoring programs to improve monitoring efforts, the EPA's regulation would seem to contradict the requirement in section 303(d) that states "identify" all heavily polluted waters.²⁴⁹

Another EPA regulation does require that states establish "appropriate monitoring methods and procedures . . . necessary to compile and analyze data on the quality of [their] waters."²⁵⁰ That regulation also notes that one of the uses of its monitoring data includes the TMDLs process.²⁵¹ However, the EPA has not indicated that this is an express criterion for its review of states' 303(d) lists.

to use "all existing readily available water quality-related data and information such as Discharge Monitoring Reports, Quarterly Noncompliance Reports, and available EPA databases").

247. See *Idaho Sportsman Coalition v. EPA*, 43 Env't. Rep. Cas. (BNA) 1289, 1300-02 (W.D. Wash. 1996). In *Sierra Club v. Clifford*, a Special Master in the Louisiana TMDLs lawsuit concluded that the EPA "may" have committed a similar violation in approving that state's 303(d) list, but the Master recommended that the district court forego ruling on the issue until after the EPA filed an "administrative record" of its approval decision. No. 96-0527 (E.D. La. Sept. 22, 1998) Special Master's Report at 23-24, *aff'd* Order and Reasons at 1-2; see also *American Canoe Ass'n v. EPA*, No. 98-979-A, slip op. at 15-17 (E.D. Va. Dec. 18, 1998) (denying EPA's motion to dismiss plaintiff's claim that EPA improperly approved Virginia's 303(d) list because the list failed to include waters shown to be impaired based on data included in 40 C.F.R. § 130.7(b)).

248. In the EPA's view, its approach will "encourage each State to continually improve its monitoring and assessment programs so that every biennial submission of lists reflects continually updated data." National Pollutant Discharge Elimination Surface Water Toxics Program, 54 Fed. Reg. 13,000, 13,111 (1989). However, this encouragement seems unlikely to result from a basic requirement that states must use only "existing" and "readily" available data.

249. See *supra* Part III.A.1; FACA REPORT, *supra* note 42, at 11-12 (recommending that the EPA encourage states to improve their water quality monitoring).

250. 40 C.F.R. § 130.4(a) (1997).

251. See *id.* § 130.4(b).

To partially address the lack of existing data, the FACA Report recommended that states maintain a list of waters, separate from their 303(d) list, for which “some data” showed impairment.²⁵² In the FACA committee’s view, this list would provide states with a basis for prioritizing their efforts to collect additional monitoring data.²⁵³ However, this proposal suffers from a lack of “sticks” to encourage states to actually collect, or require polluters or land managers to collect, the requisite data on waters suspected of being impaired. To provide this encouragement, the EPA should require states to identify data gaps, propose a plan for filling those gaps, and periodically demonstrate progress toward filling those gaps, as conditions for the EPA’s approval of revised 303(d) lists. If states fail to satisfy these conditions, the EPA should add the waters on the alternate list proposed by the FACA committee to states’ 303(d) lists. The legal consequences of adding these waters, discussed at the outset of this section, should provide the requisite incentive for states and other relevant stakeholders to collect the data necessary for a technically sound 303(d) listing decision.

Courts hearing TMDLs lawsuits have not yet been asked to decide whether the EPA must adopt this kind of approach to spur states to remedy monitoring deficiencies, but the courts have made at least tentative steps in addressing those problems. In its decision at the liability stage of the Alaska TMDLs lawsuit, the district court in *Alaska Center for the Env’t v. Reilly (Ace I)* concluded that, because of Alaska’s inaction, the EPA was “required . . . to initiate its own process of promulgating TMDLs, including any and all necessary steps needed to effectively identify the appropriate waterbodies at issue.”²⁵⁴ At the remedy stage, the plaintiffs alleged that there was “insufficient ambient water quality monitoring in Alaska to identify all water quality limited segments.”²⁵⁵ Attempting to remedy this problem, the court issued an order requiring the EPA to prepare a report addressing gaps in Alaska’s water quality monitoring, to identify steps the Agency could take to fill those gaps, and to take those steps.²⁵⁶ The court concluded that this relief was within the court’s “broad discretion in fashioning appropriate injunctive relief”

252. See FACA REPORT, *supra* note 42, at 12.

253. See *id.*

254. 762 F. Supp. 1422, 1429 (W.D. Wash. 1991).

255. *Alaska Ctr. for the Env’t v. Reilly (Ace II)*, 796 F. Supp. 1374, 1380 (W.D. Wash. 1992).

256. See *id.* at 1380-81.

in order to remedy the EPA's long delay in reviewing the state's constructive submission of no 303(d) lists or TMDLs.²⁵⁷

In *Sierra Club v. Hankinson*, the district court followed the approach of the court in *Ace III* by stating that "monitoring may be an appropriate equitable remedy" if the plaintiffs ultimately prevailed on their challenge to the EPA's approval of Georgia's 1994 303(d) list.²⁵⁸ However, the parties later settled this claim so the court never reached the issue.²⁵⁹ The court did grant the EPA's motion for summary judgment on a related monitoring claim, concluding that the EPA did "not have a mandatory duty to monitor a state's waters under the Clean Water Act."²⁶⁰

While the absence of an express duty to monitor supports this conclusion, it is not difficult to infer a monitoring duty from section 303(d), if the section is read in light of the Act's goals.²⁶¹ As noted above, states must identify *all* waters within their boundaries that meet the section 303(d) listing criteria.²⁶² It follows from this requirement that, if a state's 303(d) list fails to identify all such waters, the list is inadequate and the EPA must disapprove it. If a state has poor monitoring capabilities, it is fair to presume that the state is not identifying all of its 303(d) waters and, thus, its list is similarly defective. In other words, in performing its duty to review states' lists, the EPA must consider whether states have the monitoring capability to "identify" all 303(d) waters. Serious monitoring deficiencies would therefore seem to be grounds for "disapproval" of states 303(d) lists. Disapproval on this ground, in turn, gives rise to

257. *Id.* The Ninth Circuit affirmed the district court's relief, finding that it reflected "great [judicial] restraint." *Alaska Ctr. for the Env't v. Browner (Ace III)*, 20 F.3d 981, 986-87 (4th Cir. 1994). Ironically, this doctrine of broad equitable discretion was entrenched in the jurisprudence of the Act's citizens suits, originally, as a justification for judicial abstention. In *Weinberger v. Romero-Barcelo*, 456 U.S. 305 (1982), the Supreme Court affirmed a district court's refusal to enjoin Navy air bombers from using a coastal waterbody for target practice without an NPDES permit for the explosive "discharges." *See id.* at 307. In so holding, the Court accepted the EPA's argument that the Act's citizens suit provision gave district courts broad discretion to fashion equitable relief, rather than requiring courts to automatically enjoin any Act violation. *See id.* at 320; *see also* RODGERS, *supra* note 28, § 4.6 (noting that the *Weinberger* decision "has rapidly become a classic in the literature of the role of utilitarian remedies in qualifying absolutist rights"). The *Act III* and *Ace II* decisions extended this principle from one justifying no relief, to one justifying aggressive judicial intervention.

258. 939 F. Supp. 865, 870 (N.D. Ga. 1996).

259. *Sierra Club v. Hankinson*, 939 F. Supp. 872, n.1 (N.D. Ga. 1996).

260. 939 F. Supp. at 870.

261. *See ACE I*, 762 F. Supp. at 1426 ("In determining whether the EPA has a mandatory duty . . . the court looks to traditional principles of statutory construction."); *id.* at 1429 ("Rather than construing EPA's mandatory duties in an overly narrow manner, traditional statutory interpretation directs that the court give life to the spirit of the Act.")

262. *See supra* Part III.A.1.

an enforceable duty on the part of the EPA to “identify” all 303(d) waters.

In short, the EPA has an implied mandatory duty, subsumed within section 303(d)’s express duties, to make at least reasonable efforts to shore up poor state monitoring programs. Given the costs of monitoring water quality, “reasonable” efforts might not require sending field personnel to physically monitor all portions of all state waters. However, a “reasonable” effort might include developing a remedial program which, like the report required in *Ace II*, assesses gaps in a state’s ambient monitoring programs, identifies methods for filling those gaps, and includes commitments by various sources to implement those methods.²⁶³

The EPA should include clear objectives in the ambient monitoring program so that the Agency and ultimately the courts can assess the adequacy of states’ attempts to improve their monitoring capabilities to “identify” all waters needing TMDLs. Once again, a watershed approach would seem to facilitate these tasks, by providing a comprehensive picture based on information collected to date, of water quality problems, or gaps in knowledge of problems, for purposes of targeting further monitoring efforts.

If the EPA has an implied mandatory duty to establish an ambient monitoring game plan, must courts nevertheless wait until a state’s TMDLs process has fallen into the kind of Alaska-like “administrative purgatory” before enforcing that duty?²⁶⁴ If Congress’s ambitious objectives and the importance of water quality standards and TMDLs are to be taken seriously, the answer must be no. Even if a state is making regular 303(d) list submissions, and even if those submissions reflect thorough consideration of all “existing and readily available” water quality data, the overall listing process would violate the Act if it was evident that the state’s data collection efforts were inadequate to identify all possible waterbody candidates for 303(d) listing. Thus, it would be appropriate for a court to order the EPA to prepare a monitoring “game plan” at any point in the listing process at which this shortcoming becomes evident.

263. See *Ace II*, 796 F. Supp. at 1380-81. The settlement of the Georgia TMDLs lawsuit roughly followed this approach. See *Sierra Club v. Hankinson*, Consent Decree at 6 and Settlement Agreement at 5 (on file with the author).

264. *Ace I*, 762 F. Supp. at 1429 (quoting *Citizens for a Better Env’t v. Costle*, 515 F. Supp. 264, 274 (N.D. Ill. 1981)).

C. Conclusion

There is considerable uncertainty regarding both the scope of waters which should be listed under section 303(d) and the full range of consequences of including waters on that list. This uncertainty arises, in part, from ambiguities in the text of section 303(d), but also from fundamental policy disagreements. Those disagreements relate to the level of effort which states should be expected to make in determining which of their waters do not meet water quality standards, and to the kinds of harms which the TMDLs program should address. The latter disagreements are reflected even more directly in the context of issues regarding the scope of actual TMDLs as discussed in the following section of this Article.

IV. THE SCOPE OF TMDLS

With a few exceptions, the courts' TMDLs decisions to date have focused primarily on issues relating to the timing of TMDL development and, to a lesser extent, on the scope of 303(d) lists. However, as more and more TMDLs are developed, issues regarding the legality of individual TMDLs will likely be the subject of considerable judicial attention.²⁶⁵ Several of these issues relate to the scope of TMDLs and thus, like the issues discussed in the previous section, provide a specific context for considering the paradox of ecosystem management discussed at the beginning of this Article.²⁶⁶

Issues relating to the scope of TMDLs generally fall into three categories: (1) the scope of harms that should actually be subject to a TMDL loading allocation, i.e., whether TMDLs should include allocations for only "pollutants" or for all sources of "pollution"; (2) the scope of those harms that should be covered in a single TMDL; and (3) the scope of sources which should be required to make pollution reductions in order to achieve any given TMDL. The relationship between TMDLs and nonpoint pollution sources is an especially prominent theme in each of these three scope issues.

265. See Houck III, *supra* note 1, at 10,417 ("Up to this point . . . the courts have been able to avoid the content, or lack of content, of the TMDLs themselves"; noting that several pending cases "question the substance of what is currently being proffered as TMDLs," and that "[y]et another round of citizen suits can be expected over the contents and, then, the implementation of TMDLs.") ("The litigation will not be all from the citizen side.").

266. Besides issues relating to the scope of TMDLs, there are issues regarding the content of TMDLs, chief among which, are whether states' TMDL submissions should include plans for implementing the TMDL's allocations and whether those implementation plans should be designed to achieve ambient standards within a certain time frame after the states' adoption of the TMDLs. See FACA REPORT, *supra* note 42, at 37-42.

A. *What Are TMDLs For, Anyway?*

Part III showed that the EPA and others have questioned whether waters should be included on 303(d) lists if they are impaired by harms other than “pollutants.” Some have also questioned whether waters impaired primarily or solely by nonpoint source “pollutants” should be included. These scope questions have also been raised in the context of determining the scope of harms that should be subject to a TMDLs loading analysis and subsequent load allocations. As in the listing context, these scope questions relate directly to the paradox of ecosystem management. Ideally, all ecosystem harms should be subject to numerical loading and allocation calculations to maximize TMDLs’ value of providing the “technical backbone” or “blueprint” for a watershed approach.²⁶⁷ As a practical matter, however, not all harms may be susceptible to a numerical loading and allocation exercise; some harms may be susceptible only at such a basic level that the resulting TMDL resembles more of a narrative management plan than a technical blueprint. Some harms may be described in numerical terms, but may lack control methods which can be evaluated in those terms. If valid, these practical concerns suggest limitations on the extent to which TMDLs can provide technical rigor for a watershed approach. The following is a discussion of the legal context for determining the scope of harms subject to TMDLs.

1. At a Minimum, TMDLs Cover all “Pollutants” “Suitable” for TMDLs “Calculations”

Section 303(d)(1)(C) appears, at least superficially, to provide clear legal limits on the scope of harms subject to TMDL calculations. It requires that TMDLs be established for those “pollutants” which the EPA identifies as “suitable” for a TMDL “calculation.”²⁶⁸ The following sections explore the components of this legal standard.

a. “Pollutants”

Section 502(6) of the Clean Water Act defines “pollutants” as a variety of expressly referenced materials and “heat,” when “discharged into water.”²⁶⁹ Although this definition is narrower than

267. See FACA REPORT, *supra* note 42, at 4 (“[T]he use of a broad watershed approach, considering all water quality problems and their related causes and solutions, is to be preferred and encouraged.”).

268. See 33 U.S.C. § 1313(d)(1)(C) (1997).

269. *Id.* § 1362(6). The list of materials is: “dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials,

that for “pollution,” it is nevertheless fairly broad in several respects. First, the list of materials referenced in section 502(6) covers a variety of “wastes,” including the broad category of “biological materials,” as well as several other materials which courts have construed to apply whether or not they are present as waste.²⁷⁰ Second, although the list of materials is not preceded by the word “including,” it may be considered to be nonexclusive of the other types of materials which could constitute “pollutants.”²⁷¹

Third, the definition of “pollutant” appears to cover both point and nonpoint sources. As noted above, the Act defines “pollutants” as materials “discharged into water” without regard to the source of the discharge.²⁷² The Act defines “discharge” as including a “discharge of a pollutant, and a discharge of pollutants.”²⁷³ The Act then defines these latter terms as point source discharges.²⁷⁴ By defining a “discharge” to “include” pollutant discharges from point sources, Congress made it clear that “discharges” were not to be limited to those from point sources. The Ninth Circuit recently held, however, that the term “discharge,” as referenced in section 401 of the Act, does not include the discharge of runoff.²⁷⁵ This decision is inconsistent with the plain text of the provisions cited above.²⁷⁶ Moreover, it is questionable whether the court would adopt a similar interpretation of

radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste.” *Id.*

270. *See, e.g.,* United States v. Pozsgai, 999 F.2d 719, 725 (3rd Cir. 1993) (holding that discharges of dredged spoil, rock, and sand were “pollutants” even when intended as “fill material”).

271. *See* RODGERS, *supra* note 28, § 4.10 (“[T]here is little doubt that the recitation of categories in the definition of ‘pollutant’ is designed to be suggestive not exclusive.”); United States v. Hamel, 551 F.2d 107, 110-13 (6th Cir. 1977) (refusing to read “biological materials” as covering gasoline, but reading the overall definition of “pollutants” as inclusive of that chemical). *But see* Oregon Natural Desert Ass’n v. Dombeck, 151 F.3d 945, 950 (9th Cir. 1998) (treating “water” as a “non-pollutant”); Natural Wildlife Fed. v. Gorsuch, 693 F.2d 156, 171-73 (D.C. Cir. 1982) (noting that the list of materials in section 502(6) appears to be exclusive); *cf. id.* at 174 n.56 (clarifying that the Act does not “necessarily” exclude from the “pollutant” definition unlisted materials).

272. 33 U.S.C. § 1362(6) (1997).

273. *Id.* § 1362(16). There is a confusing circularity in these definitions: “pollutant” is something “discharged,” a term which is defined, in turn, to include “any addition of any pollutant.”

274. *See id.* § 1365(12).

275. *See Dombeck*, 151 F.3d at 950-51.

276. The *Dombeck* court acknowledged that Congress expressly defined the term to “include” point sources of pollution, but indicated that this reference meant only that “discharge” could also apply to point source discharges of “non-pollutants” like water. *Id.* at 950. The court’s decision seemed to stem, more from its threshold conclusion that “[n]onpoint source pollution is not regulated directly by the Act,” *id.*, than from a reasoned analysis of the statute’s definition of “discharge.”

“discharge” as it occurs in the definition of “pollutant” under section 303(d), given its holding in the Alaska TMDLs lawsuit.²⁷⁷ In the *Alaska* case, the EPA argued that the plaintiffs lacked standing with respect to waters polluted by nonpoint sources because, according to the Agency, those claims were not “redressable.”²⁷⁸ The Ninth Circuit found this claim “untenable, because Congress has determined that the relief plaintiffs seek is the appropriate means of achieving desired water quality where other methods, *including nonpoint source controls*, have failed.”²⁷⁹ The court could not have reached this conclusion without first construing section 303(d) to apply to nonpoint sources. Admittedly, the EPA did not question TMDLs’ application to those sources; it questioned only whether such application would do any good.²⁸⁰

While “discharge” is unlikely to be limited to point sources, at least in the context of section 303(d), courts have construed the term to be limited to the *addition* of the listed “pollutants” to waters.²⁸¹ It is unclear, however, whether this limitation includes pollutants “added” to waters through atmospheric transport after being emitted into the air. In one recent case, the Tenth Circuit held that the section 301(a) prohibition of the “discharge of any pollutant” without a permit was inapplicable to air pollution ultimately added to water.²⁸² However, similar to the Ninth Circuit’s recent decision involving section 401, it is unclear whether the Tenth Circuit would have applied the same reasoning in the context of the reference to “pollutant” in section 303(d)(1)(A).

In sum, although its outer limits are unclear, the term “pollutant” warrants TMDL coverage over the addition of a wide variety of substances to water. In all likelihood, this includes those substances

277. See *Alaska Ctr. for the Env’t v. Browner*, 20 F.3d 981 (9th Cir. 1994).

278. See *id.* at 984.

279. *Id.* (emphasis added).

280. The circuit court in the *Dombeck* case did observe that section 303 “does not itself regulate nonpoint source pollution.” 151 F.3d at 950-52. However, the court appeared to be referring to the provisions in section 303(a) regarding the development of water quality standards, rather than to the TMDLs provisions in section 303(d). See *id.*

281. See *National Mining Ass’n v. Army Dep’t*, 46 *Env’t Rep. Cas. (BNA)* 1769 (D.C. Cir. 1998) (“Discharge” does not include the incidental side casting of material during dredging.); *United States v. Wilson*, 45 *Env’t Rep. Cas. (BNA)* 1801 (4th Cir. 1997) (same); see also *PUD No. 1 v. Washington Dept. of Ecology*, 511 U.S. 700, 725 (1994) (dissenting opinion noting the plain meaning of “discharge” as suggesting “a flowing or issuing out,” or “something that is emitted”) (dictionary citation omitted).

282. *Chemical Weapons Working Group, Inc. v. Army Dep’t*, 44 *Env’t Rep. Cas. (BNA)* 1683, 1686-88 (10th Cir. 1997) (rejecting claim that Army required an NPDES permit for the deposition into water of air emissions resulting from the incineration of chemical weapons).

added by nonpoint sources, as long as the substances are “suitable” for TMDL “calculations.”

b. “Suitable” for TMDL “Calculations”

The EPA has declared that all harms which qualify as “pollutants” under section 502 of the Clean Water Act are suitable for TMDL calculation “under proper conditions.”²⁸³ According to the Agency, whether there are “proper technical conditions” is a function of whether there are sufficient analytical methods, modeling techniques, and data to develop a “technically defensible” TMDL in any given situation.²⁸⁴ The EPA’s approach thus provides considerable leeway for states or the EPA to argue that in any given case, a pollutant of concern is not “suitable.” There are several flaws with this open-ended, ad hoc approach. First, the breadth of states’ discretion seems inconsistent with the well established judicial principle, based on the margin of safety requirement in section 303(d)(1)(C), that lack of information should not deter the establishment of TMDLs.²⁸⁵ Given this principle, states should not be permitted to construe “proper technical conditions” as conditions necessary to achieve complete or even substantial scientific certainty.

Second, the EPA’s “proper technical conditions” standard should reflect a comparison of the technical impediments to developing a given TMDL with the flaws inherent in foregoing a TMDL, i.e., in developing effluent limitations and other controls on a source-specific basis. While it may seem more technically sound to establish a pollutant load for a single source in isolation rather than through a TMDL for all sources, the validity of that single-source exercise may be highly questionable if those source-specific limits fail to account for the cumulative effects of all harms. Thus, a TMDL may seem technically weak when viewed in isolation, but it may nevertheless be more valid than an alternative approach which ignores the cumulative impacts of multiple watershed harms. In other words, the “proper technical conditions” standard should be determined not only with respect to the proposed TMDL itself, but also with respect to the consequences of not developing a TMDL at all.

Finally, the ad hoc defining of pollutants as “suitable” for TMDLs calculations seems contrary to congressional intent that the EPA identify up front the pollutants for which TMDLs can be

283. Total Maximum Daily Loads under CWA, 43 Fed. Reg. 60,662, 60,662-66 (1978).

284. *Id.*

285. See *supra* notes 92-93 and accompanying text.

developed. This intent is evident, in part, in the section 303(d)(1)(C) provision quoted above, but primarily in section 304(a)(2), which requires the EPA to publish an “identification of pollutants suitable for maximum daily load measurement correlated with the achievement of water quality objectives.”²⁸⁶ On its face, that provision calls for the EPA to make a generic rather than ad hoc identification. The more loosely states apply the “proper technical conditions” standard which the EPA included in its “identification,” the less of an “identification” the EPA has really made. Problems with collecting and analyzing data are no doubt considerable but, where remediable, they should be addressed in the scheduling of waterbodies for TMDL development, rather than in threshold determinations of whether TMDLs should be prepared for those waters.

The word “calculation” in section 303(d)(1)(C) provides an important clue to Congress’s intent underlying the suitability criterion. “Calculation” suggests that TMDLs must involve a quantitative loading exercise rather than simply a qualitative assessment of problems and solutions, although, as suggested above and discussed in more detail below, the quantification need not reflect scientific certainty. The EPA appears to agree with this interpretation.²⁸⁷ By their very nature, the express categories of materials listed as “pollutants” in section 502(6) of the Act would seem capable of quantification. This criterion makes sense if TMDLs are truly to serve as the “technical backbone” or “blueprint” for a watershed approach. However, the criterion raises the question: Why shouldn’t TMDLs be developed for *all* harms that can be quantified, rather than just for those harms which fall within the Act’s definition of “pollutants”?²⁸⁸

286. 33 U.S.C. § 1314(a)(2) (1997).

287. See 1991 GUIDANCE, *supra* note 118, at 4, 19 (TMDLs should be established for problems that can be “quantified.”); 1992 Grubbs Memorandum, *supra* note 178, at 3 (Narrative water quality standards are relevant targets for TMDL calculations as long as they can be used in a quantitative manner.); Total Maximum Daily Loads under CWA 43 Fed. Reg. 60,662, 60,665 (1978) (TMDLs can be calculated for pollutants with a “specified numerical limit.”); see also FACA REPORT, *supra* note 42, at 25 (“In general, a TMDL is a quantitative, action-oriented analysis of how to attain water quality standards . . .”).

288. A related question is whether the EPA can avoid using a narrative water quality standard as a target for a TMDL, on the ground that the narrative standard lacks a numeric target for calculating the TMDL. The District Court in *Natural Resources Defense Council v. Fox* recently rejected this argument. No. 94 Civ. 8424 (PKL), slip op. at 25-27 (S.D.N.Y. Nov. 12, 1998) (denying EPA’s motion for summary judgment on plaintiffs’ claim that the EPA improperly approved New York’s phosphorous TMDLs, because they were not designed to protect that state’s narrative standard for phosphorous).

c. TMDLs for all Quantifiable Sources of “Pollution”?

Although the EPA has limited TMDLs to quantifiable harms, the Agency’s 1991 TMDLs Guidance did not require that TMDLs be limited to “pollutants” as that term is defined in section 502(6) of the Act. In its Guidance, the Agency indicated its increasing recognition that, “in some instances water quality standards—particularly designated uses and biocriteria—can only be attained if nonchemical factors such as hydrology, channel morphology, and habitat are also addressed.”²⁸⁹ The Agency then stated that TMDLs may address those nonchemical harms “in a manner similar to chemical loads” as long as those harms can be quantified.²⁹⁰

It is unclear whether the Agency still stands by this expansive approach. As mentioned in the preceding part of this Article, the Agency’s 1997 guidance indicated that states should add waters to their 303(d) lists only if they are impaired by “pollutants”; the Agency justified this restrictive listing approach on the ground that TMDLs applied only to “pollutants.”²⁹¹

While the Agency’s 1991 Guidance favors applying TMDLs to any quantifiable “pollution,” and its 1997 Guidance Document seems to limit TMDLs to “pollutants,” the Agency’s TMDL regulations adopt a middle ground between these two positions. Those regulations define the word “load,” in “total maximum daily load,” as “matter or thermal energy that is introduced into a receiving water.”²⁹² By being limited to “matter” or “thermal energy” that is affirmatively “introduced” into a receiving water, a TMDL arguably could not apply to physical changes like stream flow reductions or channelization or other sources of “pollution.” On the other hand, the EPA’s definition of “load” applies to all kinds of “matter,” not just

289. See 1991 GUIDANCE, *supra* note 118, at 4. In fact, rather than being used as surrogates for water quality standards, these nonchemical factors are increasingly likely to be reflected directly as water quality standards through the EPA’s effort to develop whole-ecosystem measures of environmental quality. See Water Quality Standards Regulation, 63 Fed. Reg. 36,742, 36,804 (1998) (EPA request for public comment on the use of biological, wildlife, and physical criteria as water quality standards).

290. *Id.* at 4, 19 (“TMDLs can and should be used . . . to consider the effect of all activities or processes that cause or contribute to the water quality-limited conditions of a waterbody. Activities may relate to thermal changes, flow changes, sedimentation, and other impacts on the aquatic environment.”). In a 1993 guidance, the EPA again noted that “the applicability of the TMDL process to [harms] other than chemical stressors, such as degraded habitat and the resulting loss of healthy, balanced ecosystems, is increasingly being realized.” 1993 Grubbs Memorandum, *supra* note 178, at 2.

291. See Wayland Memorandum, *supra* note 178, at 5-6; CLEAN WATER ACTION PLAN, *supra* note 5, at 79 (TMDLs are “generally used to address violations of chemical standards.”).

292. 40 C.F.R. § 130.2(e) (1996).

those categories expressly listed in the statutory definition of “pollutants.”²⁹³

As a matter of policy, the EPA’s more expansive approach in its 1991 Guidance is preferable to maximize TMDLs’ value in providing technical rigor for watershed management. As a legal matter, however, the EPA’s holistic approach in its 1991 Guidance would seem to be contradicted by the plain language of section 303(d)(1)(C) which, as noted above, provides for the establishment of TMDLs for “pollutants.” Several other related provisions also tie TMDLs to the term “pollutants.”²⁹⁴ Notwithstanding these plain references to “pollutants,” there is a reasonable argument that the Act supports the application of TMDLs on the holistic basis suggested in the Agency’s 1991 Guidance. For one thing, the Agency’s approach is consistent with the Act’s ecosystem-based goal of preserving the “biological integrity” of the Nation’s waters. The EPA’s 1991 Guidance is also consistent with the requirement, in section 303(d)(1)(A), that states rank their 303(d) waters according to severity of “pollution.”²⁹⁵ In stark contrast with the Act’s separate definition for “pollutant” which focuses on the discharge of certain materials, the Act defines “pollution” as essentially any human-caused aquatic or marine ecosystem *effects*.²⁹⁶

Can Congress’s clearly different definitions of the nearly identical words—“pollutants” and “pollution”—be rationalized? The title of the 1972 legislation that is now commonly referred to as the Clean Water Act is the “Federal Water *Pollution* Control Act.”²⁹⁷ In the text, the Act uses “pollutant” in some contexts, “pollution” in

293. Mirroring the language of section 303(d)(1)(C), the EPA’s regulation detailing the process for establishing TMDLs refers only to “pollutants.” *See id.* § 130.7(c).

294. *See* 33 U.S.C. § 1313(d)(2) (1997) (referring to the EPA’s identification of “pollutants” under section 304(a)(2)); *id.* § 1313(e)(3) (referring to the adoption of TMDLs for “pollutants”); *id.* § 1314(a)(2) (states’ “continuing planning processes” must include TMDLs for “pollutants” pursuant to section 303(d) (requiring the EPA to identify “pollutants” suitable for TMDL calculations). In fact, one provision ties TMDLs specifically to point sources of pollutants. Section 303(d)(1)(C) requires that TMDL be developed with a margin of safety which reflects uncertainty regarding “the relationship between effluent limitations and water quality.” *Id.* § 1313(d)(1)(C). Section 502(11) of the Act, in turn, expressly defines the term “effluent limitation” as a limitation on discharges from “point sources.” *Id.* § 1362(11). This reference to “effluent limitations” is odd, not only because of its limited focus on point sources, but also because it is unclear how effluent limitations are even relevant in determining a waterbody’s pollutant loading capacity.

295. *See* 1991 GUIDANCE, *supra* note 118, at 4-12.

296. *See supra* note 31. These quite different definitions are ironic given that the plain meanings of the two words are virtually identical.

297. 33 U.S.C. §§ 1251-1376 (emphasis added).

others, and still other analogous terms in other contexts.²⁹⁸ In at least one context, Congress used the words “pollutants” and “pollution” in virtually the same breath.²⁹⁹ As noted above, section 303(d) itself uses both terms.

Given the facial similarities between the words “pollution” and “pollutant” and the phrases “discharge of a pollutant” and “discharge of pollutants,” it is not surprising that courts have struggled to interpret Congress’s different definitions of those words and phrases and the varying usage of the words and phrases in different parts of the Act.³⁰⁰ However, courts have generally refused to read “pollutant” as expansively as “pollution,” despite the obvious linguistic overlap between the two words.³⁰¹ But at least one of these courts based its distinction, in large part, on its deference to the EPA’s position that Congress intended “pollutants” to be regulated through the NPDES and other programs for point sources, and “pollution” as a whole to be

298. See, e.g., 33 U.S.C. § 1251(a) (1997) (objective to restore and maintain “biological integrity”); *id.* § 1251(a)(1) (zero-discharge goal for “pollutants”); *id.* § 1251(b) (congressional policy regarding states’ roles in preventing, reducing, and eliminating “pollution”); *id.* § 1252(a) (EPA required to develop comprehensive programs for addressing “pollution”); *id.* § 1281(c) (requiring area-wide “wastewater treatment” management plans for areas with “water quality control problems”); *id.* § 1311(a) (prohibiting the “discharge of any pollutant”); *id.* § 1313(d) (TMDLs for “pollutants”); *id.* § 1314(f) (plans to control nonpoint sources of “pollution”); *id.* § 1342(a) (state certifications required for activities needing a federal license or permit which “may result in any discharge into the navigable waters”); *id.* § 1344(a) (permits required for “discharges” of “dredge and fill material”).

299. *Id.* § 1314(f) (directing the EPA to gather information on the “nature and extent of nonpoint sources of pollutants, and [on] processes, procedures, and methods to control pollution” from various sources of “runoff” and other sources arguably lacking the “discrete conveyance” characteristic of point sources).

300. For example, the majority of Supreme Court Justices in *PUD No. 1 v. Washington Dep’t of Ecology* cited the Act’s expansive definition of pollution as support for its holding that a state’s section 401 “certification” of a hydroelectric project can include a requirement to maintain a minimum stream flow. 511 U.S. 700, 713-14 (1994). The dissenters cited the narrow plain meaning of the word “discharge” in the Act’s definition of “pollutant.” *Id.* at 725.

301. See *National Wildlife Fed’n v. Gorsuch*, 693 F.2d 156, 172-73 (D.C. Cir. 1982) (holding that dam-induced “supersaturation,” and changes in oxygen levels and temperature of rivers are not subject to NPDES permitting requirements for “discharges of pollutants,” in part, because those harms are not “pollutants” under Clean Water Act section 502(6) even though they are “pollution” under section 502(19)); *Bettis v. Town of Ontario*, 800 F. Supp. 1113, 1119 (W.D.N.Y. 1992) (stating that water moved from one place to another is not a “pollutant”); see also *United States ex. rel. TVA v. Tennessee Water Quality Control Bd.*, 717 F.2d 992, 998-1000 (6th Cir. 1983) (holding that water leaking through a federal dam was not a point source subject to NPDES permits, under the waiver of sovereign immunity in section 313(a) for the “discharge or runoff of pollutants”). Professor Rodgers criticizes these judicial distinctions, noting that the courts making them have offered “no plausible reason why Congress might wish to embrace the counterintuitive proposition that water can be polluted by humans even though it doesn’t have ‘pollutants’ in it.” RODGERS, *supra* note 28, § 4.10. While Professor Rodgers is right on policy grounds, he wrongly lacks sympathy for the courts’ attempts to give effect to the plainly different statutory definitions of “pollutants” and “pollution.”

addressed through the Clean Water Act's planning provisions in section 208 (for point and nonpoint sources).³⁰² If the EPA's interpretation is the key, then the court's distinctions between "pollutants" and "pollution" may not be warranted in the TMDLs context, given the EPA's historic position that TMDLs are supposed to cover nonpoint as well as point sources.³⁰³ Moreover, it is questionable whether the court should have even relied on the EPA's linkages of "pollutants" with point sources and "pollution" with nonpoint sources, because that dichotomy is inconsistent with the plain language of the Clean Water Act. As noted previously, section 502(6) defines "pollutant" without reference to whether it comes from a point source or a nonpoint source, and the Act uses the term "pollutants" expressly in the context of nonpoint sources, in at least one provision.³⁰⁴

In sum, the Act sends mixed, confusing signals on Congress's intent as to the scope of quantifiable harms that should be covered by TMDLs. Under these circumstances, the EPA's interpretation may carry the day, but the EPA itself has not adopted a consistent interpretation. To enable TMDLs to provide the technical backbone for a truly holistic watershed approach, the Agency should revise its regulations to adopt the approach taken in its 1991 Guidance, that TMDLs can be developed for all kinds of "pollution," as long as they can be quantified.³⁰⁵ States will still need to exercise case-by-case

302. See *National Wildlife Fed'n v. Gorsuch*, 693 F.2d at 156, 172 (D.C. Cir. 1982).

303. See 40 C.F.R. §§ 130.2(h), 130.3(g) (1997) (defining a "TMDL" as including "load allocations" for nonpoint sources); 1991 GUIDANCE, *supra* note 118, at 9.

304. 33 U.S.C. § 1314(f) (1997) (requiring the EPA to "develop guidelines for identifying and evaluating . . . nonpoint sources of pollutants").

305. As with its recommendations on the scope of harms relevant to the 303(d) listing stage, the FACA REPORT presented a range of views with respect to the scope of harms which can be covered by TMDLs. The report stated at the outset that the committee members could not agree on whether TMDLs should be required for "pollution" or only for "pollutants" as those terms are defined in the Clean Water Act. See FACA REPORT, *supra* note 42, at 8-10. However, other than indicating the members' disagreement with respect to nonpoint sources, the remainder of the report reflects the more expansive approach. The committee seemed to agree that TMDLs could cover atmospheric deposition, although it did not agree on the precise method for implementing allocations for that source. See *id.* at 50-52. The committee also stressed that impairments due to modifications of stream flow "must be addressed by the TMDL program to the extent possible." *Id.* at 51. However, the committee did not make it clear whether the TMDL program should "address" this harm by attempting to actually allocate flow volumes among various users. See *id.* at 51-53. The committee also presumed that TMDLs can apply to physical structures (which are "pollutants" if located wholly or partly in waters) and physical "modifications" to aquatic environments (which may only be "pollution"), although it suggested that the allocation rules may need to be relaxed somewhat to the extent these sources reflect "extremely difficult problems." *Id.* at 45-48. Two committee members submitted a minority report arguing that TMDLs should not cover dams and flow modifications. See *id.* app. I (minority report by Nielsen & Burke). Finally, the report lists examples of loadings for

discretion to decide whether the TMDL can address a given harm, but that discretion should be constrained by the principles discussed earlier in this section.

d. What Happens to the Missing Pieces?

Because of the practical constraints on ecosystem management, a truly holistic approach which simultaneously addresses all harms will likely be a rare occurrence, even if it is a worthy ideal. To what extent will these practical constraints prevent the ecosystem approach from serving its theoretical functions of providing an effective framework for pursuing environmental and other social goals? The answer will depend, in large part, on what happens to the “missing pieces,” i.e., the harms that are not addressed. If the choice of “pieces” to ignore is not based on a comprehensive assessment of the total picture, and those pieces are never ultimately addressed, the ecosystem approach will be a meaningless shell. On the other hand, if the choice of “second-order” pieces is made through a rational prioritization process resulting from a threshold comprehensive assessment, and there is a vigorous follow up process for those “second order” pieces, the ecosystem framework is more likely to serve its theoretical functions.

The importance of addressing these “missing pieces” raises difficult questions related to the scope of TMDLs. What is the result if, for legal or practical reasons, the set of harms to be addressed by TMDLs is smaller than the overall set of harms to a given watershed? Ideally, at a minimum, the “missing pieces”—the harms that are not covered by TMDLs—should be addressed through other components of a watershed management plan, rather than be left to fall through the cracks. This principle demonstrates the importance of developing TMDLs, not through an isolated program, but within an overall watershed approach which tracks all harms and accompanying remedial plans (either immediate or delayed), including those resulting from TMDLs.

nonpollutant harms in its “hierarchy approach” to TMDL development. *Id.* app. G-1 (using minimum acceptable percentage of stream-side vegetation cover as a TMDL goal to reduce high stream temperatures that cannot be blamed on thermal discharges and using “surrogate environmental indicators” to establish a “quantified” TMDL where the impairment “is identified but cannot be attributed to a single traditional pollutant”); *see also id.* at 25 (TMDL development should start with the “selection of one or more quantified end-points (i.e., a measurable environmental characteristic that indicates compliance with water quality standards)”; *id.* at 33 (recommending that the EPA use, in appropriate circumstances, “surrogate measures” for developing TMDLs).

The use of such a holistic framework, however, does not completely address the scope of the TMDLs program. Can the TMDLs program treat these additional harms as if they do not exist? For example, if TMDLs are supposed to apply only to “pollutants,” can a state determine the total “pollutant” load and accompanying waste load and load allocations for a given waterbody as if “pollutants” were the only harms to the applicable waterbody? The obvious flaw with this approach is that, if the non-“pollutant” harms contribute to the same water quality standards problem as that caused by the “pollutants,” a total “pollutant” load which ignores the non-“pollutant” harms will fail to be “established at a level necessary to implement the applicable water quality standards,” as required by section 303(d)(1)(C).³⁰⁶ This flaw suggests that, even if TMDLs do not directly cover non-“pollutant” harms by formally allocating “load” reductions to them, the TMDLs must still account for those harms in their allocation of loads to the “pollutant” sources.

Can a TMDL account for non-“pollutant” harms without actually allocating loads to them as if they were “pollutants”?³⁰⁷ TMDLs can essentially take the size of the expected non-“pollutant” loads as a given, and then calculate the allocations to the “pollutant” sources based on the load reductions necessary to insure that the total load from all sources remains within the TMDL.³⁰⁸ In this way, the TMDL will “implement” the applicable water quality standards, as required by section 303(d)(1)(C) (assuming the TMDL itself is implemented), even if nothing is done to remedy the non-“pollutant” harms. This approach is analogous to the EPA’s position that point sources should bear the brunt of load reductions necessary to achieve a given TMDL, if there are insufficient assurances that reductions can be made from

306. 33 U.S.C. § 1313(d)(1)(c).

307. In this discussion I use the term “loads” loosely to refer essentially to a percentage contribution to a water quality problem. However, even in this context, the “loading” concept has a quantitative connotation.

308. One could consider the “given” load from the non-“pollutant” sources indirectly, in determining the “margin of safety” required by section 303(d)(1)(C). 33 U.S.C. § 1313(d)(1)(C) (1998); *see also* Natural Resources Defense Council v. Fox, No. 94 Civ. 8424 (PKL), slip op. at 27-28 (S.D.N.Y. Nov. 12, 1998) (denying EPA’s motion for summary judgment on plaintiff’s claim that the EPA approved TMDLs failed to include adequate justification for their supposed 10% margin of safety). *But see* Houck III, *supra* note 1, at 10,437 (noting that states have claimed that their TMDLs include “margins of safety” simply by using so-called conservative analytical methods, but without actually designating un-used allocations of the total loads to account for possible over-allocations or for new sources). On the other hand, this “given” load is arguably directly relevant to the loading summation exercise which is the foundation for the TMDL.

nonpoint sources.³⁰⁹ Of course, the likely consequence of treating non-“pollutant” loads as a given is that the “pollutant” sources will argue for more controls on non-“pollutants,” just as point sources have argued that more should be done to reduce the loadings from nonpoint sources. Although these are essentially political issues, they are being addressed within the proper watershed framework in the above scenario, the “blueprint” or “technical backbone” provided by TMDLs.

In short, as long as TMDLs are required to “implement” water quality standards, they cannot escape accounting for all harms which are contributing to violations of those standards, even if they do not directly provide for reductions of those harms. A possible exception to this conclusion is where non-“pollutants” are the only harms to a given waterbody. However, even in this scenario, there is a default TMDL of zero for *new* “pollutants,” if no reductions are forthcoming from the non-“pollutant” sources. This restriction on future “pollutant”-generating growth is likely to result in a political give-and-take similar to where both “pollutant” and non-“pollutant” sources already exist.

The discussion in this part is admittedly theoretical and presumes that all the relevant harms—whether “pollutants” or not—can be quantified. One might ask whether this quantitative exercise is even remotely realistic. In all likelihood, quantitative “load” analyses which account for all harms (to the extent known) are often feasible even if only at a “back of the envelope” level of sophistication. Is a “back of the envelope” approach fair, given its potentially significant economic consequences? A partial answer is that this approach is already in place, in a limited TMDL context. The EPA’s regulations allow states to use “best estimates” for calculating nonpoint source load allocations, which can range from “reasonably accurate estimates” to “gross allotments.”³¹⁰ This regulation provides a precedent for quantification of other harms in rough terms.

More importantly, the fairness of rough estimates must be considered in relation to the fairness and costs of the alternative:

309. See 1991 GUIDANCE, *supra* note 118, at 15; 1992 Grubbs Memorandum, *supra* note 178, at 2; Wayland Memorandum, *supra* note 178, at 7. This approach is also analogous to the EPA’s approach, in setting allocations of the Columbia River dioxin TMDL that was challenged in the *Dioxin/Organochlorine v. Clarke* case, of taking as a given the dioxin load from a mill located in the British Columbia portion of the Columbia River basin. 57 F.3d 1517, 1527-28 (9th Cir. 1995). The United States mills did not appear to challenge the EPA’s apparent refusal to pursue reduced dioxin loads from the British Columbia mill through some sort of bilateral agreement with Canada.

310. 40 C.F.R. § 130.2(g) (1997).

making regulatory decisions for only a limited portion of all harms. These decisions, although more scientifically supportable in the context of that limited portion, are unsupportable because of their failure to address the cumulative impacts of all sources. In other words, the question is not whether to use good science or bad science, but whether to take a big picture perspective, accounting for point and nonpoint “pollutant” sources and all other forms of “pollution,” rather than simply continuing to focus only on the point source piece of the puzzle.

B. The Scope of Individual TMDLs

After a state determines the scope of harms that a waterbody’s TMDLs should address, the state must decide how many of those different harms should be addressed in a single TMDL. This is a complex scope issue which can be broken down into four sub-categories: (1) the geographic scope of water; (2) the scope of impaired water quality standards; (3) the scope of pollutants and other harms; and (4) the scope of sources of harms, which should be addressed by a single TMDL. The next part discusses the policy implications of these scope issues and examines how these issues are addressed in the text of the Act, by the EPA, and by the few applicable court decisions.

1. Understanding the Scope Issues in the Context of a Single TMDL

A useful starting point for analyzing issues involving the scope of a single TMDL is the hydrologists’ four-dimensional view of river systems: “(1) longitudinal (upstream-downstream); (2) lateral (floodplain-uplands); (3) vertical (groundwater-surface water); and (4) temporal (all three spatial dimensions change over time).”³¹¹

Because a river’s loading capacity may be a function of all four of these dimensions, they provide a framework for considering the appropriate geographic scope of a TMDL.³¹² Each of the four dimensions presents an array of questions in determining the scope of a single TMDL. For example, in terms of the longitudinal dimension, should the area addressed by a single TMDL cover a discrete longitudinal segment of a river, the entire river, the river and all of its tributaries, or, if the river is itself a tributary of another river, the entire watershed drained by that larger river? In terms of the temporal

311. Adler, *supra* note 3, at 982.

312. *See id.*

dimension, should a single TMDL include low flows as well as high flows?

More fundamentally, should a single TMDL address only the longitudinal or lateral or vertical dimension, without also considering links among those three and the temporal dimension as well? For example, should a TMDL address pollution in a river's water column but not in its bed? Similarly, should a single TMDL ignore water column linkages with groundwater and/or adjacent wetlands?

Similar questions arise in defining the scope of impaired water quality standards which a single TMDL should address. For example, if a designated use is impaired by violations of three different water quality criteria, should a single TMDL address all three criteria? An even more complex question arises when a designated use is impaired by violations of one or more specific criteria *and* by other factors for which there are no existing criteria. In this case, should the designated use, i.e., *all* factors affecting it, define the scope of a *single* TMDL or only one or several of the relevant factors? Likewise, if there is more than one designated use that is impaired, should a single TMDL address all of them together?

The remaining scope issue sub-categories, involving the scope of pollutants and pollutant sources, are similarly complex. For example, if there are several different kinds of pollutants and other nonpolluting activities that cause violations of a single numeric water quality criterion, should a single TMDL address all of those polluting and other harmful activities? Likewise, if there are several different kinds of sources of the offending pollutant, e.g., point and nonpoint sources, should a single TMDL address all of the sources together?

The four categories of scope issues, each viewed from the hydrologists' four dimensions, present a complex array of choices in determining an individual TMDL's scope. Considered together, these scope issues raise a chicken-and-egg problem: the resolution of any one scope issue could determine the resolution of any other. Which issue should be resolved first? For example, should the geographic scope of a TMDL be defined by the geographic extent of the water quality standards, or should the extent of standards addressed by a TMDL be defined by a given geographic unit?

The policy implications of these scope questions are significant and essentially reflect the paradox of the ecosystem approach. The values of ecosystem approaches in promoting effective, efficient, and equitable solutions would be maximized by defining the scope of a single TMDL as broadly as possible. For example, if two pollutants are working synergistically to cause violations of a water quality

standard, a TMDL which addresses the effects of only one of those pollutants would not prevent the violation and would not facilitate an equitable and efficient allocation of pollution control costs among all polluters. On the other hand, a more holistic TMDL is more complex and therefore, more difficult to develop and implement.³¹³

The FACA Report takes a reasonably practical approach to solving this dilemma, at least in the context of determining the geographic scope of a TMDL. The report recommends that a TMDL first “identify” the full geographic range of a water quality problem and of the sources of the problem (which may or may not be equal to the range of the problem).³¹⁴ The report then suggests that, if the resulting geographic area is so large that the TMDL would be unmanageable, the “TMDL process” can be “nested” on more manageable geographic scales.³¹⁵ The committee defines “nesting” in the general context of watershed management, as a process in which the “entire affected watershed is analyzed in an umbrella program, but the program is divided into a series of nested programs at smaller, more manageable scales.”³¹⁶

This “nesting” approach presents the most viable alternative, if the individual, nested TMDLs, determined by reference to the “umbrella” TMDL, are simultaneously coordinated, addressed, and implemented. However, there may be insufficient resources for this comprehensive approach. The EPA’s watershed approach accommodates this constraint somewhat by recognizing the need to set priorities among various problems, i.e., nests, within a given watershed.³¹⁷ Prioritizing reflects practical constraints like scarce government resources and incomplete data. However, the watershed approach provides a useful framework for establishing priorities, by considering all problems at a preliminary planning stage, even though it may not tackle all of those problems at once.³¹⁸

Practical constraints may warrant establishing a TMDL in the short term whose scope is not commensurate with the full scope of the

313. See FACA REPORT, *supra* note 42, at 29 (“A TMDL might be too large if its size and complexity precludes meaningful monitoring, evaluation, and implementation. However, some water quality problems are characterized by large geographic scale, in terms of both the size of the area in which the problems exist and the geographic range of the sources of the problem. (Nutrient enrichment of the Chesapeake Bay and oxygen depletion in the Gulf of Mexico are examples of this phenomenon.)”).

314. See *id.* at 29.

315. *Id.* at 30.

316. *Id.* at 29.

317. See *supra* text at notes 66 and 76.

318. See Adler, *supra* note 3, at 998-1000, 1105.

applicable water quality standards problems. For example, there may be two pollutants harming a watershed's fish species whose extinction is imminent. One pollutant is found to be the primary cause for the fish's decline and there do not appear to be any synergistic effects from the combined pollutants. The state might be able to develop and implement a TMDL for the principal pollutant immediately, but would require a longer time to develop a TMDL which addresses both pollutants, during which time the fish species may become extinct. Under these circumstances, practicality favors developing a TMDL in the short term which addresses only the more offending of the two pollutants.

The need to establish inter-watershed priorities makes priority setting even more complex. Given the inevitably competing demands for government resources among various watersheds within a single state, it may be appropriate to address only part of the problem in one watershed in order to be able to turn quickly to a significant problem in another watershed.³¹⁹

While practical considerations may require determining which parts of the holistic ideal of the watershed process are to be sacrificed initially, those aspects that are set aside should not be ignored altogether. In other words, prioritizing is a valid response to the paradox of the ecosystem approach, generally, and of TMDLs, specifically, only if there is a reasonable assurance that lower priorities do not fall through the cracks.

In short, there are complex, conflicting policies involved in establishing the scope of individual TMDLs. At a basic level, a comprehensive approach seems warranted to fulfill the values of the holistic watershed approach. On the other hand, some flexibility is needed to accommodate practical concerns involved in setting priorities within and among watersheds and in defining watershed planning units. Yet, flexibility should not be used to support attempts to define TMDLs narrowly simply to avoid taking the difficult, but necessary steps for achieving water quality standards.

2. Unclear Direction From Congress and the EPA

Given the problems inherent in defining the scope of individual TMDLs, it is not surprising that both Congress and the EPA have

319. For an over-simplified example, consider a state that has two watersheds both of whose fish are threatened by excessive metals concentrations and, secondarily, by excessive turbidity. Under these circumstances, it may be appropriate for the state to first establish TMDLs only for metals in each watershed and then to establish TMDLs for sediment.

faltered in providing clear direction on this issue. With respect to the lateral, longitudinal, and vertical watershed dimensions, section 303(d) simply refers to the establishment of individual TMDLs for “waters”; the Act does not expressly define that term. On its face, “waters” could be read either narrowly or expansively.³²⁰ Courts have generally construed the term as expansively as allowed by the limits of Congress’ broad legislative authority under the Commerce Clause.³²¹ But this broad general coverage does not by itself mandate broad coverage for individual TMDLs.

Although it does not expressly address the vertical, longitudinal, and horizontal hydrological dimensions, the Act does expressly address the temporal dimension, by providing that a TMDL must reflect “seasonal variations.”³²²

Section 303(d) is also ambiguous as to the scope of water quality standards, pollutants, and pollutant sources to be addressed by a single TMDL. On one hand, section 303(d)(1)(C) appears to support a comprehensive approach by referring to the establishment of a single daily “load” (rather than “loads”) for “those pollutants” identified by the EPA as suitable for TMDL calculations and at a level “necessary to implement the applicable water quality standards.”³²³ Congress’s choice of the singular and plural forms of these three nouns, and the encompassing nature of the word “total” itself, suggest that Congress contemplated the establishment of a single TMDL for all relevant pollutants and water quality standards. This interpretation is supported by the “margin of safety” requirement in section 303(d)(1)(C) for individual TMDLs.³²⁴ By indicating Congress’s intent that lack of information should not hinder the development of

320. *But see* Bazel, *supra* note 127, at 1245-46 n.6 (reading the concept of waterbody “segments” as “explicit” in the statutory term “waters” in section 303(d)).

321. *See, e.g.*, *Riverside Bayview Homes*, 474 U.S. 121 (1985) (holding that the Act covers wetlands linked to surface waters which have an effect on interstate commerce), *United States v. Wilson*, [1997] 28 *Env’t. L. Rep.* (Env’t. L. Inst.) 20,299 (4th Cir. 1997) (holding that the Act does not cover wetlands which lack a surface connection to interstate waters, navigable waters, or waters that affect interstate commerce). Courts have been divided on the extent to which the Act covers pollution in groundwater. *See, e.g.*, *Alleghany Env’t. Action Coalition v. West Elect. Corp.*, 46 *Env’t Rep. Cas.* (BNA) 1126 (W.D. Pa. 1998) (noting the Act does not regulate pollutant discharges to ground water that is hydrologically connected to surface waters). *But see id.* at 1130 (citing cases holding that the Act covers ground water that is hydrologically connected to surface waters).

322. 33 U.S.C. § 1313(d)(1)(C). *But see* *Sierra Club, North Star Chapter v. Browner*, 843 F. Supp. 1304, 1310 (D. Minn. 1993) (holding that load allocations need not include reductions from nonpoint sources that are insignificant contributors during low flow periods when pollution is most harmful).

323. 33 U.S.C. § 1313(d)(1)(C) (1997).

324. *Id.*

TMDLs, this requirement suggests that the scope of individual TMDLs should not be unduly limited by the uncertainties inherent in adopting a broad scope for individual TMDLs.

On the other hand, there are indications that Congress's use of singular and plural noun forms in section 303(d)(1)(C) should not be construed literally. Section 303(d)(1)(C) refers to a state's establishment of a single total maximum daily "load" for *all* of a state's 303(d) waters.³²⁵ Because Congress could hardly have intended that provision to be read literally, i.e., that a state should establish one load for all of its 303(d) waters, one could argue that Congress likewise did not intend that its reference to a single "load" be read literally to cover all applicable water quality standards and pollutants on a given "water." Using this logic, one might argue that a single load need not even address all seasonal variations on a given waterbody.

Putting the confusing language of section 303(d) aside, Congress's intent regarding the scope of individual TMDLs can be gleaned indirectly from Congress's ambitious objectives in adopting the Clean Water Act generally. The scope of individual TMDLs is apparent from Congress's intent to protect the overall biological integrity of the Nation's waters, and from the importance of the water quality-based approach, including TMDLs, for achieving those objectives.³²⁶ These factors suggest that Congress would not have tolerated defining the scope of individual TMDLs in a way that would address unified water quality problems in a piece-meal fashion. This is especially true if the approach delayed addressing those problems or, even worse, ignored altogether components like the combined, synergistic effects of all pollutants and pollutant sources. These inferences suggest that, as a general rule, the scope of individual TMDLs should be as broad as possible.

Like Congress, the EPA has sent mixed, ambiguous signals to the states on the acceptable scope of individual TMDLs.³²⁷ As to the geographic scope of TMDLs, the Agency's regulations refer to the establishment of TMDLs for certain "water quality limited segments."³²⁸ Those regulations do not define the term "segment" expressly, but the word plainly implies that full-length river systems

325. *Id.* § 1313(d)(1)(C). Similarly, section 303(e)(3) requires that states' continuing planning processes include a singular total maximum daily "load" for pollutants "in accordance with" section 303(d). *Id.* § 1313(e)(3).

326. *See supra* Part II.

327. *See* 40 C.F.R. § 130.7 (1996).

328. *Id.* (emphasis added).

can be partitioned for purposes of TMDL development.³²⁹ The EPA partially addressed this issue in a 1985 Federal Register notice which announced the final version of a revised TMDL regulation.³³⁰ Responding to a comment that TMDLs were appropriate for “very short” segments, but not for longer ones, the EPA indicated that the Clean Water Act made it “clear” that TMDLs were appropriate “wherever effluent limitations are necessary to meet water quality standards, *regardless of a segment’s length or its number of dischargers.*”³³¹ This statement suggests that the geographic breadth of a water quality standards problem should not limit the applicability of TMDLs, but it does not necessarily mean that a single TMDL should cover the entire geographic extent of the water quality problem.

In its next sentence, in response to this comment, the Agency stated that, “[t]o the extent practicable, segment boundaries should be established to facilitate developing WLAs/LAs and TMDLs.”³³² While directly addressing the geographic scope issue, this statement provides little guidance as to how states should actually define the scope of individual TMDLs.

As to the scope of harms that should be covered by a single TMDL, the EPA’s 1982 draft TMDLs regulation defined “total maximum daily load” as the total “loadings of pollutants” for a given water.³³³ This definition suggests that a single TMDL should cover all pollutants that may be causing violations of applicable water quality standards. However, the EPA subsequently narrowed this approach. In response to a comment that this proposed definition was unclear as to whether a single TMDL should be applied to more than one pollutant, the Agency stated that it had revised the final TMDL definition

to clarify that a single TMDL covers only one specific pollutant or one property of pollution, for example, acidity, biochemical oxygen demand, radioactivity, or toxicity. Thus, more than one TMDL may be required for

329. *See id.* For that matter, the regulations do not provide expressly that a single TMDL must cover an entire “segment” designated for 303(d) listing purposes. *See id.*

330. *See* Water Quality Planning and Management, 50 Fed. Reg. 1774, 1778 (1985).

331. *Id.* at 1778 (emphasis added). The Agency’s reference to “effluent limitations” is confusing, because TMDLs could lead to control measures other than those traditionally considered effluent limitations, but which are necessary to achieve ambient water quality standards.

332. *Id.*

333. Water Quality Planning and Management, 47 Fed. Reg. 46,668, 46,671 (1982).

a segment where there may be violations of more than one criterion in the applicable Water Quality Standard.³³⁴

The EPA's revised position is problematic for several reasons. First, the Agency did not attempt to justify its decision on either policy or legal grounds. Second, it is partly nonsensical. As quoted above, the response states that a single TMDL should cover only one pollutant or pollutant "property," like BOD or toxicity.³³⁵ The pollutant "properties" to which the Agency refers, however, may themselves be affected by several different kinds of pollutants, so that a single TMDL for one pollutant property may actually have to include loading analyses for several pollutants. Third, besides being internally illogical, the EPA's 1985 comment response is not actually reflected in the Agency's 1985 revised TMDL definition. That revision defines the "load" component of "total maximum daily load" as an "amount of matter or thermal energy" introduced into a receiving water.³³⁶ On their face, those terms could cover multiple pollutants. Thus, they do not limit the TMDL to a single pollutant; nor do they represent single pollutant properties.

The EPA's 1991 TMDLs guidance document sends mixed signals on all of the scope issues discussed above. The document supports a holistic approach by indicating "it is now clear" that EPA and state implementation of section 303(d) "must . . . seek to address problems occurring over large geographic areas."³³⁷ The guidance explains that this approach is necessary to "efficiently and effectively manage" water quality because many "water pollution concerns are areawide phenomena caused by multiple dischargers, multiple pollutants (with potential synergistic and additive effects), or nonpoint sources" and may also be affected by air pollution and "ground water discharge."³³⁸ The guidance also notes that TMDLs are "particularly critical" for waters where the "effect from multiple pollution sources overlap" or cause "combined impacts."³³⁹ Thus, the guidance "recommends" that states develop TMDLs on a "geographical basis (e.g., by watershed)," stresses the value of a "holistic" approach, and notes that a geographic

334. Water Quality Planning and Management, 50 Fed. Reg. 1774, 1776 (1985).

335. *Id.*

336. 40 C.F.R. § 130.2(e) (1997).

337. 1991 GUIDANCE, *supra* note 118, at 9.

338. *Id.* at 14-15.

339. *Id.* at 50. If a TMDL is "critical" where the effects of multiple sources of a single pollutant "overlap" or are "combined," a TMDL is presumably just as important where the effects of multiple pollutants "overlap" or are "combined." *Id.*

approach “supports sound environmental management and efficient use of limited water quality program resources.”³⁴⁰

The EPA’s reference to a wide geographic scope and to the need to account for the effects of multiple pollutants and multiple sources suggests that the Agency believes that an individual TMDL should cover a wide enough geographic scope to encompass the combined, overlapping effects of all problem pollutants and pollutant sources. This approach, however, is inconsistent with the EPA’s 1985 comment response that TMDLs can be limited to a single pollutant.³⁴¹

The EPA’s 1991 Guidance also advises that an “integrated approach” which “considers” all three methods for protecting water quality—chemical-specific, whole effluent toxicity, and biocriteria/bioassessment—is “preferred for the protection of aquatic life.”³⁴² This integrated approach further supports a broad scope for individual TMDLs: the first of these three methods can address water quality conditions that are affected by multiple pollutants; the latter two methods are designed specifically to do so.³⁴³ The EPA can hardly advocate an “integrated” use of these three methods and at the same time stand by its 1985 comment response that individual TMDLs should cover only a single pollutant.

Although the EPA’s 1991 Guidance provides the logic for a comprehensive scope for individual TMDLs, the guidance appears to give states considerable discretion to determine that scope.³⁴⁴ It provides that “geographically targeted waterbod[ies]” could include segments, as well as basins and watersheds as defined by states.³⁴⁵ Rather than requiring that TMDLs’ scopes be as broad as possible, the EPA’s guidance merely outlines the Agency’s “expect[ation]” that

340. *Id.* at 15.

341. See Water Quality Planning and Management, 50 Fed. Reg. 1774, 1776 (1985).

342. 1991 GUIDANCE, *supra* note 118, at 14.

343. The EPA defines the “chemical-specific” approach as one that evaluates pollutant loads in terms of the impact on “physical-chemical water quality conditions (e.g., dissolved oxygen or toxicant concentrations).” *Id.* at 14. Like the EPA’s 1985 reference to pollutant “properties” discussed above, water quality “conditions” can be a function of multiple pollutants. As the word “whole” in “whole effluent toxicity” suggests, that method measures the overall chemical toxicity to aquatic life of an effluent sample which could comprise numerous pollutants; the method was specifically designed to account for the combined or synergistic effects of multiple pollutants. See U.S. Env’tl. Protection Agency, *Office of Water Fact Sheet—Whole Effluent Toxicity* (WET) (Feb. 1997) <<http://www.epa.gov/owowtr1/tmdl/feb97mtg/wetfact.html>>. Similarly, “biocriteria/bioassessments” are methods for measuring the overall health of an aquatic ecosystem in response to “multiple contaminants and physical alterations of habitat.” U.S. Env’tl. Protection Agency, *Office of Water Fact Sheet—Water Quality Standards—Biocriteria* (Feb. 1997) <<http://www.epa.gov/owowwtr1/tmdl/feb97mtg/biofact.html>>.

344. 1991 GUIDANCE, *supra* note 118, at 15-16.

345. *Id.* at 3.

states will “consider” the extent of pollution problems and sources when defining the geographic scope of a TMDL.³⁴⁶ The guidance fails to indicate the appropriate circumstances in which a state can fashion a narrow TMDL that ignores the combined or synergistic effects of multiple pollutants and/or multiple sources which the state has “consider[ed].”³⁴⁷ In short, the EPA’s 1991 Guidance advocated a holistic scope for TMDLs, but gave states sufficient discretion to essentially ignore the Agency’s advice.³⁴⁸

While not officially rejecting the deferential approach in its 1991 Guidance, in 1992 the EPA reaffirmed the value of a “comprehensive watershed . . . process in which all sources and problems are considered cooperatively.”³⁴⁹ The EPA specifically linked TMDLs to this process by stating that “focused attention [on] specific waterbodies *under section 303(d)* will significantly improve the protection . . . of water quality by . . . encouraging all problems in a watershed to be addressed *comprehensively instead of in a piecemeal manner.*”³⁵⁰ It is unclear how this strong pronouncement against a “piecemeal” approach to water quality problems can be squared with the EPA’s apparent approach, in its 1991 Guidance, of allowing states to adopt narrow TMDLs which address problems on a piecemeal basis.

3. The Courts’ Approach

Only one published court decision to date has squarely addressed the appropriate scope of an *individual* TMDL. In *Dioxin/Organochlorine Center v. Clarke*, several environmental groups and pulp and paper mills raised numerous, unsuccessful challenges to a TMDL established by the EPA for dioxin pollution in the U.S. portion of the Columbia River Basin.³⁵¹ The mills were a significant source of that pollution, which

346. *Id.* at 15.

347. *Id.*

348. The recent FACA Report echoes this schizophrenic approach. On the one hand, the Report notes that the TMDL program “[g]enerally . . . uses a parameter-specific approach.” FACA REPORT, *supra* note 42, at 4-5. On the other hand, the Report states that the use of a “broad, watershed approach, considering all water quality problems and their related causes and solution[s], is to be preferred and encouraged.” *Id.* The Report lists, as one of the issues which the committee did not resolve: “How TMDLs should address multiple pollutants and/or stressors.” *Id.* App. E (item #7).

349. Surface Water Toxics Control Program and Water Quality Planning and Management Programs, 57 Fed. Reg. 33,040, 33,040 (1992).

350. *Id.* at 33,041 (emphasis added).

351. 57 F.3d 1517, 1520 (9th Cir. 1995).

was believed to be toxic to Columbia River fish and to the wildlife and humans who consumed the fish.³⁵²

The district court granted the EPA's motion for summary judgment on all of the parties' claims, including a claim made by the environmental plaintiffs that the TMDL failed to address the full scope of the water quality problem because it ignored other pollutants which "act[ed] in a similar fashion" to dioxin.³⁵³ The Ninth Circuit affirmed the district court's unpublished decision, noting that "[n]othing" in the Clean Water Act required that a single TMDL cover all pollutants.³⁵⁴ The court reached this conclusion without specifically analyzing the statutory language and congressional purposes discussed above.

The circuit court referred, instead, to an EPA regulation which the court construed as providing that "TMDLs may be developed on a specific pollutant basis."³⁵⁵ The regulation to which the court referred states specifically that "TMDLs may be established using a pollutant-by-pollutant or biomonitoring approach."³⁵⁶ However, that statement simply does not address whether an individual TMDL must or may be limited to one pollutant when there is more than one pollutant at issue. A single TMDL intended to address multiple pollutants could still do so on a "pollutant-by-pollutant" basis by establishing separate loads for each pollutant, if the separate loads are designed to reflect the cumulative impacts of all pollutants. Of course, the court's reasoning completely ignored the logic of TMDLs and the EPA's insistence, in its 1991 Guidance, that TMDLs are "critical" methods for addressing the combined, overlapping effects of water pollution.³⁵⁷

The Ninth Circuit was also persuaded by the EPA's findings that dioxin was the "most toxic" of the applicable pollutants and that "expeditious" controls on dioxin would "greatly" reduce the risk posed by the other pollutants.³⁵⁸ The court's focus on dioxin as the most toxic of the relevant pollutants ignored whether the combined or

352. *See id.* at 1519.

353. *Id.* at 1524.

354. *Id.*

355. *Id.* (citing 40 C.F.R. § 130.7(c)(1)(ii) (1994)).

356. 40 C.F.R. § 130.7(c)(1)(i) (1994). The court actually cited sub-paragraph (ii) of section 130.7(c)(1), which provides that "TMDLs shall be established for all [problem] pollutants." *Id.* By using the word "all," that provision if anything supports the notion that individual TMDLs should address all problem pollutants. At any rate, it clearly does not sanction limiting an individual TMDL to an individual pollutant.

357. 1991 GUIDANCE, *supra* note 118, at 50. As noted above, the EPA's statement was made in the context of multiple pollution sources but is logically just as applicable to multiple pollutants. *See id.*

358. *Clarke*, 57 F.3d at 1525.

synergistic effects of all pollutants would still have precluded attainment of applicable water quality standards after implementation of the TMDL for dioxin.³⁵⁹ Whether or not the EPA's dioxin limits might "greatly" reduce the risk posed by the other pollutants, or even by *all* pollutants combined (a finding the court did not make), misses the point. Section 303(d)(1)(A) requires the establishment of TMDLs that are sufficient, not simply to "greatly" reduce pollution, but to "implement," i.e. attain, the applicable water quality standards.³⁶⁰ In theory, one might "greatly" reduce a pollutant but still leave enough of it to destroy a given population of fish.

Apparently recognizing the importance of a holistic approach, the court commented that the environmental group plaintiffs were not prevented from "presenting their findings" and petitioning the three Basin States to establish a TMDL that accounted for the combined effects of all pollutants.³⁶¹ However, this comment suggested that the EPA had never determined whether controlling dioxin, alone, would be sufficient to achieve all applicable water quality standards. The court's comment was especially inappropriate, because the "findings," which the court presumed the environmental groups had the burden to present, were essentially a TMDL calculation. The court's approach put the cart before the horse. If there are multiple pollutants, the burden should be on the EPA to show that a TMDL aimed at only one of those pollutants can implement applicable water quality standards without addressing the individual effects of the other pollutants and the effects of all pollutants combined. Citizens should not have to hand the EPA a multi-pollutant TMDL in order to get the Agency to address these cumulative effects. The court's reference to the other pollutants as ones which "act in a similar fashion" to dioxin suggested that the court itself simply ignored the combined or synergistic effects of all pollutants acting together.³⁶²

359. One of those standards expressly prohibited toxic pollution in "combinations" which may harm "aquatic life" or "other designated . . . uses." *Id.* at 1521 n.6.

360. 33 U.S.C. § 1313(d)(1)(c) (1997). The court's approach of viewing pollutants individually is akin to a child who insists that his room has been adequately cleaned, because he has folded and piled up his clothes, which were the messiest of the items scattered around his room. However, there are still toys and books scattered around the room's floor and other surfaces. If the "room quality standard" is a neat clothes pile, the boy is right; if the standard is a neat room overall, the boy's effort is still inadequate, because the clothes pile, together with the scattered books and toys, still collectively render the room a mess.

361. *Clarke*, 57 F.3d at 1525 n.10.

362. *Id.* at 1524. The district court expressly acknowledged that the "additive" and "synergistic" effects of multiple pollutants was a relevant factor. *Dioxin Organochlorine Ctr. v. Rasmussen*, No. C93-33D, 1993 WL 484888, at *6-7 (W.D. Wash. Aug. 10, 1993). But the court upheld the EPA's decision to limit its TMDL to dioxin based on the same EPA regulation cited by

The circuit court also seemed impressed by the EPA's justification that information regarding the toxicity of the other pollutants was not "as available" as information on dioxin.³⁶³ The court's reliance on the *relative* availability of information on dioxin versus other pollutants is inconsistent with the express margin of safety requirement in section 303(d)(1)(C), which Congress imposed to prevent states and the EPA from delaying TMDLs based upon lack of information.³⁶⁴

The Ninth Circuit's hands-off approach should not be overstated, however. At a minimum, the court seemed to place the burden on the EPA to justify adopting a narrow pollutant scope for its TMDL given the known presence of other pollutants. However, the court did not treat that burden as a particularly heavy one.

Another aspect of the Ninth Circuit's decision dealt indirectly with the scope issues discussed above. In their first claim, the environmental plaintiffs argued that the EPA's TMDL was designed to protect aquatic life, but ignored the human health component of the states' water quality standards.³⁶⁵ The court rejected this claim and found that the TMDL did address and adequately protect human health from the carcinogenic effects of dioxin.³⁶⁶ The court's response arguably implied that the dioxin TMDL was required to address water quality standards for both aquatic life and human health. Thus, although the court took a relaxed approach toward the scope of pollutants that needed to be covered, the court impliedly adopted a more rigorous approach toward the scope of water quality standards that need to be addressed, at least, among those standards implicated by dioxin. Of course, the court's assessment of whether the dioxin TMDL was adequate to protect human health was cursory and

the Ninth Circuit and given that dioxin was the "worst" pollutant. *See id.* at *7-8. The district court failed to explain, however, how the synergistic, additive effects of multiple pollutants ranked in the states' overall priorities for the Columbia River Basin or for their waters as a whole. Given the appellate court's suggestion that the plaintiffs could petition the EPA regarding those effects, it appears that the states' priority ranking didn't address the priority of the additive, synergistic effects of all pollutants on the Columbia Basin. If so, the environmentalists' first judicial remedy might have been an APA challenge to the EPA's approval of the states' priority rankings.

363. *Clarke*, 57 F.3d at 1525.

364. *See* 33 U.S.C. § 1313(d)(1)(c) (1997). Professor Houck praised the Ninth Circuit's *Dioxin/Organochlorine* decision for affirming the margin of safety principle. *See* Houck II, *supra* note 28, at 10,399-400. But the court itself failed to apply it in the context of the pollutant scope issue raised by the environmental plaintiffs. *See Clarke*, 57 F.3d at 1521-25.

365. *See Clarke*, 57 F.3d at 1521-23.

366. *See id.*

incomplete, suggesting once again that it would not closely scrutinize the EPA's TMDL.³⁶⁷

The *Dioxin/Organochlorine v. Clarke* case provided yet another twist on the scope of individual TMDLs. One of the pulp mills' claims was that the EPA had improperly allocated the burden of dioxin reductions to the mills, by taking the dioxin loadings from other point and nonpoint sources as given.³⁶⁸ The district court in *Dioxin/Organochlorine v. Rasmussen* accepted the EPA's approach, but noted that "a TMDL should consider all discharges of a pollutant."³⁶⁹ The lower court thus took a broad view of the scope of pollutant sources that must be addressed by a single TMDL. This view seems inconsistent with the Ninth Circuit's narrow view of the scope of pollutants which the TMDL may address, as discussed above.

The appropriate scope of individual TMDLs was addressed indirectly, but in a similarly unsatisfactory manner, by the district court in *Sierra Club, North Star Chapter v. Browner*.³⁷⁰ That case involved a claim by the environmental plaintiffs that the State of Minnesota's lack of progress in establishing TMDLs amounted to a "constructive submission" thereby triggering the EPA's mandatory duty to establish TMDLs.³⁷¹ Although the case was not a direct attack on an EPA-approved TMDL, the scope issue was raised when EPA defended by stating that the State had already adopted forty-three TMDLs.³⁷² The plaintiffs countered that these TMDLs were not "valid" because they failed to "consider" nonpoint sources of pollution on the waters covered by the so-called TMDLs.³⁷³

In response, the court recognized that the EPA regulations required that TMDLs generally address all pollution sources.³⁷⁴ However, the court held that the forty-three specific so-called TMDLs at issue were valid exceptions to this rule.³⁷⁵ The court's explanation of this conclusion is unclear, but it appears to have stemmed from the court's finding that the so-called TMDLs had focused only on low-

367. The court did not address the possible injury to human health from the mutagenic effects of dioxin, even though the district court made it clear that dioxin was not only carcinogenic, but also mutagenic and had an "unusually high degree of reproductive toxicity." *Rasmussen*, 1993 WL 484888, at *1.

368. See *Clarke*, 57 F.3d at 1526-28.

369. *Rasmussen*, 1993 WL 484888, at *4.

370. See 843 F. Supp. 1304, 1313-14 (D. Minn. 1993).

371. *Id.* at 1314.

372. See *id.* at 1313.

373. See *id.*

374. See *id.*

375. See *id.* at 1313-14.

flow conditions, because water quality standards were apparently being exceeded during those conditions.³⁷⁶ The court seemed to believe that the TMDLs had validly omitted nonpoint sources from these low-flow TMDLs, because nonpoint sources had “relatively little impact on water quality” during low flows.³⁷⁷

The court’s decision to sanction only TMDLs which addressed low flow conditions is questionable, given the express requirement in section 303(d)(1)(C) that a TMDL be established at a level necessary to implement applicable water quality standards “with seasonal variations.”³⁷⁸ For this very reason, the district court in *Sierra Club v. Hankinson* rejected the EPA’s claim that a series of waste load allocations for point sources were the “functional equivalent[s]” of TMDLs for low-flow conditions.³⁷⁹

One wonders whether the EPA or Minnesota in *Sierra Club, North Star Chapter* ever attempted to measure pollutant concentrations during high flows or whether they addressed the kinds of pollutants likely to be discharged from nonpoint sources.³⁸⁰ In addition, the EPA’s focus on point sources during low flows may ignore narrative criteria or designated uses in the state’s standards, the attainment of which may be a function of conditions occurring throughout the year.³⁸¹ It is unclear from the court’s opinion whether the EPA and Minnesota even considered this cumulative effect.

Even focusing only on low-flow conditions, the EPA’s assertion that nonpoint sources had “relatively little impact on water quality” during those conditions missed the point. The nonpoint source load may have had “relatively little impact on water quality” by itself, but the EPA should have addressed whether that load was still large enough, in conjunction with the relevant point source load, to cause exceedences of the applicable water quality standards during low

376. *See id.*

377. *Id.*

378. 33 U.S.C. § 1313(d)(1)(C) (1997).

379. 939 F. Supp. 865, 871 n.4 (N.D. Ga. 1996). *See also* Natural Resources Defense Council v. Fox, No. 94 Civ. 8424 (PKL), slip op. at 30-31 (S.D.N.Y. Nov. 12, 1998) (denying EPA’s motion for summary judgment on plaintiff’s claim that the TMDLs at issue failed to account for seasonal variations).

380. *See* Conway, *supra* note 117, at 104-05 (discussing the difficulty of measuring nonpoint source pollutant concentrations); FACA REPORT, *supra* note 42, at 27 (recommending that the EPA “support the development and/or appropriate application of models to assist in TMDL development” for high flow conditions).

381. For example, considering the “aquatic life” designated use, fish may be most stressed when pollutant concentrations are highest during low-flow periods, but the lesser stresses resulting from pollution occurring during high flow periods may still, in *combination* with stresses occurring during low flows, contribute to the decline of a fish population.

flows. The EPA did not appear to consider whether its point source waste load allocations would implement applicable water quality standards given the expected additional pollution load from nonpoint sources.³⁸² The district court's mistaken focus on the "relative" impact of nonpoint and point sources resembled the Ninth Circuit's improper focus, in *Dioxin/Organochlorine Center v. Clarke*, on the *relative* toxicity of and availability of information on dioxin and other pollutants as a basis for allowing the EPA to ignore the cumulative effects of all pollutants.

The preceding criticism of the *Sierra Club, North Star Chapter* and *Dioxin/Organochlorine Center v. Clarke* decisions is not intended to suggest that TMDLs must always cover all pollutants and all pollutant sources. The point is simply that the EPA and the states should have a heavy burden to show a need to forego addressing the cumulative effects of all pollutants and sources in a single TMDL. The cumulative loading calculation necessary for the EPA to justify ignoring the Minnesota nonpoint sources is the very kind of calculation entailed in a TMDL. Thus, the EPA's adoption of TMDLs that only addressed point sources prevented the TMDLs from serving the very function that they were intended to serve. This approach is analogous to the EPA allowing states to preclude listing waters under section 303(d) based upon BMPs for nonpoint sources, even though the EPA maintains that TMDLs are necessary to establish the validity of those control measures.³⁸³ The EPA has once again put the cart before the horse.

The EPA's position in *Sierra Club, North Star Chapter* has disturbing implications for the application of TMDLs to nonpoint source pollution generally. By its very nature, nonpoint pollution "runs off" the land into adjacent waters primarily because of high precipitation.³⁸⁴ It will naturally be less significant during low flow periods than during high flow periods. If the *Sierra Club, North Star Chapter* decision is used to justify developing TMDLs nation-wide which addressed only low flows, nonpoint source pollution could

382. For example, assume that a low-flow TMDL for a given waterbody is 100 daily units of pollution. Point sources currently discharge 110 units and nonpoint sources discharge 10 units during low flow conditions. Allocating 100 units to the point sources collectively while ignoring the 10 unit per day contribution from the nonpoint sources would result in an actual daily load of 110 units, which exceeds the 100 unit TMDL. This exceedence occurs even though the nonpoint sources contribute little pollution during low flow conditions relative to the point sources.

383. See *supra* note 213.

384. E.g., Conway, *supra* note 117, at 105.

effectively be written out of the TMDLs program.³⁸⁵ That outcome would be ironic and unfortunate, given that nonpoint source pollution is well recognized as a significant, if not the largest, source of water pollution in the U.S.³⁸⁶ Limiting TMDLs to low flows would also be inconsistent with the EPA's statements about using TMDLs to address nonpoint source pollution and for providing the technical backbone for a comprehensive watershed approach.³⁸⁷ Another court will soon likely have to address the implications of the *Sierra Club, North Star Chapter* decision, because many states have apparently continued to insist on developing so-called "TMDLs" which do not factor in nonpoint source pollution.³⁸⁸

In sum, the few court decisions to date which have addressed the appropriate scope of individual TMDLs have generally sanctioned a narrow approach, at least where the EPA has justified that approach. However, the courts have not closely scrutinized the EPA's justifications, especially in light of the EPA's guidance and other statements regarding the importance of a holistic, comprehensive approach toward TMDL development.

C. *The Scope of Harms that must be Reduced Through TMDLs and Accompanying Allocations*

Part A above addressed the scope of all harms that must be covered by TMDLs generally. Part B addressed the scope of harms that must be covered by an individual TMDL. After a state answers these scope questions and establishes a TMDL for a given waterbody, it must then decide how to allocate portions of that TMDL among various existing and new sources of the harms which the TMDL addresses. This decision raises still another scope question: must the

385. See Houck III, *supra* note 1, at 10,419-20 ("Nonpoint LAs are . . . central to the success of the TMDL program and, indeed, to the restoration of water quality nationwide."); *id.* at 10,422. ("If nonpoint waters are not included, the [TMDLs] program is wasting everyone's time.")

386. See *supra* note 42 and accompanying text.

387. See, e.g., 1991 GUIDANCE, *supra* note 118, at 9, 19; *supra* notes 118-121 and accompanying text.

388. See Houck III, *supra* note 1, at 10,417 ("A number of pending cases question the substance of what is currently being proffered as TMDLs. . . . The majority of current TMDLs in New York, Louisiana, and several other states—if not nearly all states—are alleged with credible specificity to be point source WLAs, plus nothing."); *id.* at 10,437 (concluding, based on a review of states' TMDLs, that "[i]f at all possible, point sources will be identified as the sole source of even conventional pollution (e.g., solids and oxygen demand) and the sole instrument of cleanup."); see also National Wildlife Fed'n, *Pollution Paralysis—State Inaction Puts Waters at Risk* (Oct. 9, 1997) <<http://www.nwf.org/pubs/reports/paralysis/havestates.html>> (table showing that relatively few states have developed load allocations for nonpoint sources).

state design the allocations so as to require all existing sources to reduce their current loads, or can the state require only a sub-set of those sources to make the necessary reductions to comply with the waterbody's loading capacity?

1. The Big Picture for Allocation Decisions

Section 303(d) provides no express direction on how states should make allocation decisions. As noted previously, the EPA, not Congress, introduced the concept of allocations through its regulatory definition of TMDLs.³⁸⁹ However, Congress impliedly accepted this approach in the 1987 Clean Water Act Amendments, which contain an express reference to "waste load allocations" adopted under section 303(d).³⁹⁰ The requirement in section 303(d)(1)(C), that TMDLs be established at levels necessary to implement applicable water quality standards, contains another implied allocation rule: allocations of a given TMDL may not collectively exceed the TMDL itself, otherwise the TMDL would be unable to implement applicable standards.³⁹¹ That express requirement, read together with the ambitious congressional goals underlying the Act, suggest that allocations must be realistically achievable. For example, an allocation scheme which presumes a 50% reduction of pollution from an abandoned mine tailing for which no one now claims responsibility would frustrate the purpose of section 303(d), just as much as a scheme which allocates more pollution among all sources than the water's loading capacity.

The EPA's regulations require that TMDLs, defined as the sum of all pollutant allocations, not exceed a receiving water's "loading capacity," but do not expressly require that the allocations comprising the TMDL be achievable.³⁹² In fact, the EPA's regulations do not expressly require that states explain and justify their allocation methodology, although the extent that states do so will likely affect the depth of EPA scrutiny of those submissions and of judicial review of the EPA's approval of states' submissions.³⁹³

389. See 40 C.F.R. § 130.2(i) (1997).

390. 1987 Clean Water Amendments, Pub. L. No. 100-4, § 404(b), 101 Stat. 68-69 (Feb. 4, 1987) (adding § 303(d)(4)).

391. See FACA REPORT, *supra* note 42, at 35 ("To be approvable, a TMDL's allocation scheme must be designed to achieve water quality standards."). The "margin of safety" and "seasonal variations" provisions in section 303(d)(1)(C) provide similar constraints on the total of waste load and load allocations. 33 U.S.C. § 1313(d)(1)(C).

392. 40 C.F.R. §§ 130.2(f) & (i), 130.7(c)(1).

393. The Agency's 1991 Guidance provides that the EPA might conduct an in-depth review of only a sample of a state's TMDL submissions if the state has "clearly described its TMDL process" in its section 303(e) continuing planning process. 1991 GUIDANCE, *supra* note

In contrast with its regulations, the EPA's 1991 Guidance at least partially endorses the statutorily implied requirement that allocations must be realistically achievable. The 1991 Guidance provides that allocation schemes which rely on load reductions from nonpoint sources be accompanied by "specific assurances" that those reductions "will in fact occur."³⁹⁴ The Guidance also suggests that such assurances must include a schedule for implementing nonpoint source controls, monitoring, and an assessment of whether the controls have worked.³⁹⁵ The EPA refers to this iterative process as its "phased" TMDLs approach.³⁹⁶

The EPA's guidance, however, is not consistent on this issue. At another point, the guidance states that allocations of nonpoint source pollution reductions should be supported by a "record" showing *either* a "reasonable assurance" that nonpoint source controls will be "implemented and maintained" *or* that nonpoint source reductions are "demonstrated through an effective monitoring program."³⁹⁷ The first of these alternative showings seems incomplete without a demonstration that nonpoint source controls are *designed* to achieve the necessary load reductions.³⁹⁸ In addition, it is unclear why the two sets of showings are phrased disjunctively, rather than conjunctively; the guidance provision quoted in the paragraph above would seem to require the latter approach.³⁹⁹

Despite its lack of clarity, the EPA's "phased approach" is reasonably intended to avoid delays in developing TMDLs due to lack of information, and thus seems consistent with Congress's ambitious objectives. To further those objectives, the phased approach should be included in the EPA's regulations and should be required for all TMDLs, not just those addressing "non-traditional" pollution problems. Just as lack of information can thwart a TMDL for "non-

118, at 32. The guidance does not clarify, however, whether the "TMDL process" description must include a state's generic methodology for allocating portions of its TMDLs. *Cf.* 40 C.F.R. § 130.7(b)(6)(i) (requiring states to provide the EPA with "documentation," including a description of the methodology used, to support 303(d) list submissions).

394. 1991 GUIDANCE, *supra* note 118, at 2.

395. *See id.*

396. *Id.*

397. *Id.* at 24.

398. The EPA's guidance implies this requirement elsewhere, however. *See* 1991 GUIDANCE, *supra* note 118, at 24 (recommending that nonpoint source controls "be based on [load allocations] developed using the TMDL process").

399. *See id.* at 2. The EPA's 1997 guidance just reiterates the "reasonable assurance" requirement in the 1991 Guidance; the newer document also contains additional discussion on how states can assure the achievement of load allocations for waters impaired primarily or solely by nonpoint sources. *See* Perciasepe Memorandum, *supra* note 120, at 5.

traditional” pollution problems, the success of a TMDL for a “traditional” problem, e.g., conventional pollution from point sources only, could be thwarted by a failure to timely implement straightforward waste load allocations for those sources. Thus, a TMDL which allocates point source pollutant reductions should include a schedule for implementing those reductions through the timely issuance or revision of applicable NPDES permits, whether or not there are additional reductions allocated to nonpoint sources.⁴⁰⁰

2. The Scope Issue: Which Polluters must Make the Necessary Cuts?

As described in the preceding section, section 303(d) and the EPA’s regulations give states considerable leeway in deciding, through their allocation decisions, the scope of polluters who must make the necessary pollutant reductions, as long as the allocations are achievable and, collectively, they do not exceed the applicable waterbody’s loading capacity. In its Guidance, the EPA has limited this broad discretion by indicating that point sources alone must make the necessary load reductions, if states cannot provide “reasonable assurances” that nonpoint sources will make additional reductions.⁴⁰¹ The district court and Ninth Circuit Court of Appeal impliedly upheld this approach in *Dioxin/Organochlorine Center v. Rasmussen* and *Dioxin/Organochlorine v. Clarke*, which involved challenges by environmental groups and pulp mills to the EPA’s dioxin TMDL for the Columbia River Basin.⁴⁰² The mills claimed that the EPA had unlawfully required dioxin reductions only from the mills, even though there were other point and nonpoint sources of dioxin in the River Basin.⁴⁰³ The district court believed that the EPA’s focus on the mills was reasonable based on the Agency’s justifications that the mills were the major dioxin source and that the Agency lacked sufficient information to set waste load allocations for other point

400. This position is consistent with that urged by the FACA committee, although the committee members could not agree on whether the implementation plan should be considered part of the TMDL itself. See FACA REPORT, *supra* note 42, at 36-37. The plans should be part of the TMDL, because they are necessary for the TMDL to satisfy the requirement in section 303(d)(1)(C) that TMDLs be sufficient to “implement” applicable water quality standards. See also Houck III, *supra* note 1, at 10,417 (summarizing the debate over whether TMDLs should provide for their own implementation).

401. 1991 GUIDANCE, *supra* note 118, at 15.

402. See No. C93-33D, 1993 WL 484888 (W.D. Wash. Aug. 10, 1993); 57 F.3d 1517 (9th Cir. 1995).

403. See *Rasmussen*, 1993 WL 484888, at *4-5.

sources.⁴⁰⁴ The Ninth Circuit affirmed this decision without specific reference to the issue.⁴⁰⁵

The EPA's rationale has some intrinsic appeal, but is relatively superficial. A truly equitable and efficient allocation of pollution reductions should reflect other factors relating to the various sources' pollution costs relative to their pollution output and profits, and their overall contribution to the welfare of the Basin's natural and human economies.⁴⁰⁶

In sum, there are significant environmental and nonenvironmental policy implications of TMDL allocation decisions. Because of these implications, many future allocation decisions are likely to be contentious and subject to legal challenge from both polluters and environmentalists.⁴⁰⁷ The *Dioxin/Organochlorine* decisions cut a wide swath for the EPA's and states' exercise of discretion in requiring a particular subset of all polluters to make the necessary load reductions. The courts, however, may not be equally as deferential if the lack of "assurance" that load reductions can be achieved results more clearly from a lack of state will to regulate nonpoint or other sources.⁴⁰⁸

D. *Using a Watershed Approach to Decide the Scope of TMDLs*

The TMDLs scope issues discussed in part IV of this Article are complex and will be difficult to resolve, especially, given the ambiguities in the text of section 303(d). With respect to several of the issues, e.g., whether TMDLs apply to waters polluted solely or partly by nonpoint sources, the EPA will simply have to adopt a firm hand. Other scope issues, e.g., the scope of harms or sources or water quality standards which should be covered by a single TMDL, cannot be as readily resolved by federal edict. Practicalities may preclude the adoption of a truly holistic approach on these scope issues; case-specific judgments are needed to determine the scope of individual TMDLs. Nevertheless, the EPA and states should use the watershed approach as a framework for making their difficult scope decisions.

404. See *id.* at *5.

405. See *Clarke*, 57 F.3d at 1528 (finding "no merit" in any of the appellants' "remaining" arguments).

406. See FACA REPORT, *supra* note 42, at 35 (listing factors which states should consider in making allocation decisions).

407. See *id.* at 36 ("Allocation decisions are often contentious.").

408. See Houck III, *supra* note 1, at 10,417 (observing that the states' focus to date on waste load allocations for point sources "results from the tendency of state and federal regulators to finger identifiable point sources, even beleaguered municipal waste treatment systems, rather than tackle the timber industry, fertilizer manufacturers, and the rest of the nonpoint world").

In defining the scope of individual TMDLs, it makes the most sense to focus on particular problems only after analyzing the big picture, so that particular problems can be identified and prioritized by how they relate to the whole, rather than by how urgent they seem in isolation. The watershed approach provides this initial big picture. Using this holistic approach, a state should define the scope of a single TMDL by first identifying all designated uses being impaired and all water quality criteria being violated on a given watershed. Next, the state should determine the geographic extents (from all four hydrological dimensions) of those collective impairments and violations and of all sources of those problems. The resulting geographic area and accompanying sources of harm should then define the scope of the TMDL.⁴⁰⁹ In other words, states should simply use their watershed boundary designations as a starting point for defining the scope of individual TMDLs. Watershed boundaries may be unnecessarily broad in some cases and unreasonably narrow in others, depending on the nature and source of the water quality problems. Using designated watersheds, however, provides a useful starting point for evaluating the “ideal” scope for individual TMDLs.

Just as the watershed approach recognizes the need to consider all problems on a holistic basis, it also recognizes that those problems may need to be solved sequentially, rather than concurrently, based on priorities developed from a holistic perspective.⁴¹⁰ Applying this principle to TMDLs, a state may have a compelling need to develop a TMDL which is narrower in scope than the “ideal” derived from the scoping process described above. That scoping process nevertheless provides a useful starting point from which the EPA can assess the merits of the state’s proposed scope. It will indicate what watershed components the state’s proposed TMDL will ignore and what additional TMDLs will ultimately be necessary to provide a comprehensive cure. Those additional TMDLs would then have to be included in the state’s overall schedule and ranking of 303(d) waters for the establishment of TMDLs.

The watershed approach does not solve either the technical question of what pollutants are quantifiable or the legal question of whether TMDLs apply to “pollutants” or “pollution” as those terms are defined in the Clean Water Act. However, if “pollution” is the proper target, then the four dimensional hydrologic view reflected in

409. Of course, the scoping process is not precise, just as determining watershed boundaries under a watershed approach ultimately involves arbitrary line-drawing. See Adler, *supra* note 3, at 973-80.

410. See Adler, *supra* note 3, at 977-88.

the watershed approach provides a rational framework for evaluating what “pollution” needs to be addressed.

Even if TMDLs are limited by law to “pollutants” rather than to all kinds of ecosystem harms that might be considered “pollution,” TMDLs must still account for the non-“pollutant” harms.⁴¹¹ Rather than take those harms as given, it would seem to be in states’ interests to take necessary steps to reduce the nonpollutant harms simultaneously with their establishment of TMDLs for pollutants.⁴¹² For example, a state might be able to develop a much more equitable approach to protecting an aquatic ecosystem if it allocated pollutant loads in conjunction with allocating reductions in stream flows. Absent flow allocations designed to achieve a minimum stream flow, polluters might bear the entire burden of meeting ambient water quality standards. However, with limits on stream flow reductions, polluters share that burden with others whose activities threaten the environment. A watershed approach provides the comprehensive, yet flexible framework for balancing the costs of achieving ambient standards among various stakeholders. The Clean Water Action Plan makes this point clear.⁴¹³ But the EPA regulations should also reflect it as a required framework for states’ decisions as to which harms are excluded from or included in TMDLs.

A watershed approach could also facilitate a resolution of the allocation issues discussed in Part IV.C above. As noted in that Part, there is a relatively blank legal slate regarding how states and the EPA can allocate TMDL loads. The EPA generally has wide discretion to direct those allocations and has passed this discretion on to the states with few strings. The EPA’s hands-off approach goes too far because it lacks accountability. At a minimum, the Agency should require states to justify particular allocations in terms of efficiency and equity,

411. See *supra* Part IV.A.1.d.

412. See FACA REPORT, *supra* note 42, at 4 (“Generally, the TMDL program uses a parameter specific approach. However, the use of a broad, watershed approach, considering all water quality problems and their related causes and solution[s], is to be preferred and encouraged.”).

413. According to that plan,

[a] Watershed Strategy creates an opportunity to bundle TMDLs, to strike an appropriate balance between controls . . . and to consider other water-related problems in the watershed. . . . By taking a more comprehensive approach to restoring the health of the aquatic system in the watershed, a Watershed Strategy can result in improvements . . . that are mutually reinforcing. . . . Water bodies impaired by polluted runoff in most instances will require a watershed-wide effort to achieve the necessary restoration and clean water goals.

CLEAN WATER ACTION PLAN, *supra* note 5, at 79.

within the overall context of assuring that necessary total load reductions will be achieved. However, the EPA should not, by itself, define relative efficiency and equity objectives; there is a legitimate local interest in defining those objectives. Given this interest, and the often-touted superior ability of locals in developing efficient and equitable solutions,⁴¹⁴ the EPA could create a presumption favoring TMDL allocations which are derived locally. This local allocation process is consistent with the EPA's "partnerships" principle for implementing a watershed approach.⁴¹⁵ Such an approach therefore provides a useful participatory framework for evaluating the adequacy of allocation decisions.

In sum, there is much that TMDLs can do for the watershed approach, as its "technical backbone" or "blueprint." However, the converse is also true; the watershed approach can provide a useful framework for resolving the complex issues regarding the scope of TMDLs.

V. CONCLUSION

The logic of the ecosystem approach is compelling. Individual harms cannot be addressed in an ecological vacuum, i.e., without regard to how they contribute to the cumulative degradation of entire ecosystems and without regard to the social factors which encourage and discourage those harms. Admittedly, the ecosystem approach is difficult and, perhaps impossible to implement in its purest, most holistic form. However, alternative, nonecosystemic approaches are facially flawed.

The case for TMDLs can be made with logic similar to that underlying the ecosystem approach generally: the TMDLs program is "beguilingly simpl[e] to describe . . . [yet] frustratingly difficult to implement."⁴¹⁶ But what is the alternative? A holistic ecosystem approach seems pointless without *any* attempt to quantify targets of ecosystem health and the various sources of harm to that health. The narrative target, "a healthy ecosystem," is not self-implementing. One cannot be assured that a permit for a particular point source is sufficient to protect a watershed which receives pollution from a variety of point and nonpoint sources, and which is affected by other kinds of harms, without having some quantitative sense of the cumulative effects of the particular point source, combined with all

414. See, e.g., Adler, *supra* note 3, at 975-90.

415. See *supra* notes 69-70 and accompanying text.

416. Houck III, *supra* note 1, at 10,437.

other pollution sources and harms. Even with waters polluted solely or primarily by nonpoint sources, one needs some sense of the total pollutant loading from those sources in order to determine whether proposed or existing pollution controls are adequate.

Can these myriad factors truly be quantified? The TMDL exercise is not precise, but is like preparing public or private financial budgets: whenever you can't predict your costs (i.e., loadings) with precision, you just increase your margin of error. Even the federal government's budgets, which are hardly "scientific," nevertheless provide targets and a modicum of accountability when targets are not met. These budgets are often quite controversial, but no one argues that the budgeting exercise itself should be scrapped due to their imprecision.

Although the logic behind TMDLs is compelling, how broadly should it be applied? This scope question is a manifestation of the ecosystem paradox; the broader the scope of the program, the harder it is to implement. Section 303(d) provides little express help in resolving many of the scope issues, although Congress's ambitious objectives combined with the importance of water quality-based controls suggest that the default TMDL should be broad.

The EPA has not sorted out many of the numerous legal and policy issues generated by section 303(d) and has sent mixed and confused signals with respect to those issues which it has addressed directly. The EPA's regulations have provided little direction to states on numerous aspects of the TMDLs process and have thus promoted inconsistent state-by-state approaches. The regulations themselves are either internally inconsistent, flatly inconsistent with the few clear directions in section 303(d), or inconsistent with the EPA's overall views regarding the functions of TMDLs or with the Agency's TMDLs guidance. Among the most prominent issues on which the EPA has expressed inconsistent views are: the appropriateness of TMDLs for waters polluted by nonpoint sources; the degree of factual certainty required for various decisions in the TMDLs process; the kinds of pollution controls which should be based on TMDLs rather than being used to preclude establishing TMDLs; the relationship between TMDLs and other pollution control programs; and the scope of individual TMDLs.

These criticisms are not meant to imply that the EPA should deny states all discretion in determining how to implement the TMDLs process. Some functions, like allocating pollution loads among local sources, would seem to be best performed by state or even more "local" authorities in conjunction with local stakeholders. Many

aspects of prioritizing waters for TMDL development seem to require inherently local judgments, although there are national priorities, like preventing species extinction, which should be reflected in the overall prioritization process. But national leadership is necessary to ensure that state efforts satisfy the overall objectives of the TMDLs process and the Clean Water Act generally. To date, the EPA has exercised this leadership role too sparingly.

The recent FACA Report provides a good basis for the EPA to exert more leadership through its upcoming revision of the TMDL regulations. However, the report is markedly inconclusive on several of the scope issues discussed in this Article, regarding whether the TMDL program should address all “pollution” or only “pollutants” and, even among “pollutants,” whether or the extent to which the program should address nonpoint pollutant sources.

Under the logic of the ecosystem approach, TMDLs should apply to as many different harms as can be quantified and to the entire geographic extent of an overall water quality problem. Does this mean, for example, that there should be a single TMDL, or at least an umbrella TMDL with discrete nested TMDLs, for all sources of nutrient loading along the entire length of the Mississippi River, to remedy the already big and growing hypoxic “dead zone” in the Gulf of Mexico?⁴¹⁷ The idea sounds ridiculous at first but on further reflection, particularly considering the impact of the “dead zone” itself, it becomes more attractive. Compared to the commonly accepted global targets for greenhouse gas emissions, which are akin to a global air pollution TMDL, establishing basin-wide nutrient loadings is a relatively small-scale exercise.

In the short term, at least, the EPA and states will continue to make decisions regarding the scope of TMDLs that are narrower than the holistic ideal. However, the EPA should still require states to address scope issues within the context of a broader watershed approach. That approach provides the context through which states can make rational choices about which harms to address, how to prioritize those harms, and how to ensure that lower priority harms do not fall through the cracks.

417. See FACA REPORT, *supra* note 42, at 26.