

**THE STRUGGLE BETWEEN MAN AND NATURE—
AGRICULTURE, NONPOINT SOURCE POLLUTION, AND
CLEAN WATER: HOW TO IMPLEMENT THE STATE OF
VERMONT’S PHOSPHOROUS TMDL WITHIN THE
LAKE CHAMPLAIN BASIN**

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INTRODUCTION

The importance of water quality and its interrelationship with the health of the land and humans has long been observed. In 1864, George Perkins Marsh in his seminal book *Man and Nature* stated,

But the great, the irreparable, the appalling mischiefs which have already resulted, and threaten to ensue on a still more extensive scale hereafter, from too rapid superficial drainage, are of a properly geographical character, and consist primarily in erosion, displacement, and the transportation of the superficial strata, vegetable and mineral—of the integuments, so to speak, with which nature has clothed the skeleton framework of the globe.¹

In *Man and Nature*, Marsh discusses the direct and indirect effects of the destructive capacity of human agency on aquatic life,² and the beneficial influence of vegetative land cover on decreasing overland and in-stream sediment transportation of “living waters.”³ In observing the transporting power of rivers, he details the downstream deposition of various types of sediments accumulated within a local Vermont milldam and its effects on the stream’s ecology.⁴ To help identify potential solutions to remedy the negative historical results of man-made modifications of nature, Marsh asks

1. GEORGE P. MARSH, *MAN AND NATURE: OR, PHYSICAL GEOGRAPHY AS MODIFIED BY HUMAN ACTION* 200 (David Lowenthal ed., 1967).

2. *Id.* at 99 (“The inhabitants of the waters seem comparatively secure from human pursuit or interference by the inaccessibility of their retreat . . . Human agency has, nevertheless, both directly and incidentally, produced great changes in the population of the sea, the lakes, and the rivers, and if the effects of such revolutions in aquatic life are apparently of small importance in general geography, they are still not wholly inappreciable. The great diminution in the abundance of the larger fish employed for food or pursued for products useful in the arts is familiar, and when we consider how the vegetable and animal life on which they feed must be affected by the reduction of their numbers, it is easy to see that their destruction may involve considerable modifications in many of the material arrangements of nature.” (emphasis added)).

3. *Id.* at 194.

4. *Id.* at 218.

Americans to reevaluate their relationship with the natural environment, seek ways to restore the natural proportions of our Nation's rural landscape (or during his era, the "woodland and plough land"), and "devise means for maintaining the permanence of its relations . . . to the springs and rivulets."⁵ To restore the "disturbed harmonies" of nature, he finds that humans must reconstruct the "damaged fabric which the negligence or the wantonness of former lodgers had rendered untenable."⁶

Significant progress has been made within the fields of ecological science and environmental law over the last century and a half since the first publication of *Man and Nature*. However, Americans still collectively struggle to effectively regulate our land use and other man-made modifications to physical geography for the purpose of improving impaired water quality. As a society, we have enacted relatively strong federal laws, such as the Clean Water Act (CWA) of 1972 and its amendments. However, almost forty years later, we have yet to restore many of the "disturbed harmonies." These include the relations between human usage of land and water resources, and adverse effects of land use activities on the ecological health of many streams, rivers, and lakes. As the sesquicentennial anniversary of the first publication of Marsh's *Man and Nature* approaches, this article evaluates progress made (or not made) in this country, as applicable to Vermont. It also examines our relationship with land and water, specifically in regards to agricultural nonpoint pollution and water quality.

In its declaration of policy for the CWA, as included in 33 U.S.C. § 1251(a), Congress announced its broad and lofty goals of restoration and maintenance of "the chemical, physical, and biological integrity of the Nation's waters."⁷ Notable progress has been made in improving water quality by focusing primarily on the control of point source pollution. However, relatively little attention has been effectively focused on addressing large inputs from nonpoint sources, specifically runoff from privately owned farmland and its cumulative effects on water quality and aquatic health. Few states, including Vermont, have yet to successfully implement all their responsibilities related to section 303(d) of the CWA, as codified in 33 U.S.C. § 1313(d), which requires that "[e]ach State shall identify those waters within its boundaries for which the effluent limitations . . . are not stringent enough to implement any water quality standard applicable to such waters" and "establish for [these] waters" a

5. *Id.* at 280.

6. *Id.* at 35.

7. 33 U.S.C. § 1251(a) (2006).

Total Maximum Daily Load (TMDL) of pollutants,⁸ which includes scientific calculations for nutrient and sediment loading.⁹

The federal government's authority to require states to establish TMDLs has been an issue of heated legal debate under the governing principles of federalism. Courts, however, have held that the CWA unambiguously requires the establishment of TMDLs for waters failing to achieve applicable water quality standards.¹⁰ Further, in a suit brought by a private landowner, the Ninth Circuit in *Pronsolino v. Nastri* held that the U.S. Environmental Protection Agency (EPA) was authorized to determine the TMDL for a river polluted solely by logging runoff and other nonpoint sources, after California failed to timely establish a TMDL for this in-state waterway.¹¹ In *Pronsolino*, the Court also found that the EPA's use of federal authority to determine the Garcia River's TMDL did not violate the balance of federal-state control established by the CWA or intrude upon the state's traditional control of land use, as the statute expressly requires that states decide how to implement TMDLs and monitor effluents in impaired rivers.¹²

This article provides an overview of the CWA and section 303(d), examines case law interpreting the respective roles of the EPA and states in performing and implementing TMDLs for impaired waters, reviews other efforts and potential approaches for restoring impaired waterways, and suggests ways the State of Vermont can reduce pollutant loads identified by scientifically-based TMDL studies. However, as illustrated in political debates regarding approval and implementation of the State's Phosphorus TMDL for Lake Champlain, there are few easy solutions to these problems. Below, Part I discusses nonpoint source pollution control under the CWA as applied within our federalist system of governance. Part II reviews Vermont's Phosphorus TMDL for Lake Champlain (the Lake) approved by the EPA in 2002, evaluates the State's efforts to implement the TMDL, and identifies existing agricultural nonpoint sources which continue to contribute heavily to the Lake's impaired water quality, as well as current State regulations and programs related to agricultural nonpoint source pollution control. Part III evaluates legal mechanisms and systems of governance utilized, established, or contemplated by other states and local

8. *Id.* § 1313(d)(1)(A)–(C).

9. See U.S. ENVTL. PROT. AGENCY, PROTOCOL FOR DEVELOPING SEDIMENT TMDLS (1999), available at http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/upload/1999_12_08_tmdl_sediment_sediment.pdf (discussing methods for developing TMDLs).

10. *Friends of the Earth, Inc. v. EPA*, 446 F.3d 140, 144 (D.C. Cir. 2006).

11. *Pronsolino v. Nastri*, 291 F.3d 1123, 1141 (9th Cir. 2002).

12. *Id.* at 1140.

authorities, which could be adopted or used to further enhance existing State programs to address the continued agricultural nonpoint source (NPS) pollution within the Lake's watershed. These programs include state and local land use planning and zoning measures; watershed-based natural resources planning, management, and regulation; mandatory agricultural best management practices, and whole farm conservation plans; taxation of agricultural inputs and byproducts which contribute to NPS pollution and property tax abatement for well-managed farmlands; and watershed-based pollution trading. Part IV provides final suggestions and remarks on ways that the State of Vermont and its citizens can successfully implement the 2002 Phosphorus TMDL to restore and maintain the Lake's water quality.

I. NONPOINT SOURCE POLLUTION CONTROL UNDER A FEDERALIST SYSTEM

As noted above, Part I discusses NPS pollution control under the U.S. Clean Water Act as applied within our federalist system of governance. Specifically, it outlines key CWA provisions and discusses distinctions between point and NPS pollution control; reviews the 1970s New Federalism policy and the legislative history of the CWA regarding federal deference to states on NPS regulation; provides an overview of federal NPS pollution control initiatives, including sections 208 and 319 of the CWA and section 1455b of the Coast Zone Management Act (CZMA); details the pollution load calculations and planning requirements under section 303 of the CWA and related current EPA regulations and guidance; and examines case law interpreting the application of TMDLs in addressing NPS pollution, as well as the limits on federal authority to implement, or require states to implement, TMDLs. Finally, this section concludes with a discussion of the success (or failure) of cooperative federalism in improving water quality.

A. Clean Water Act: Point Versus Nonpoint Source Pollution Control

In the 1972 Amendments to the Federal Water Pollution Control Act, commonly referred to as the Clean Water Act, Congress set forth a broad declaration of its goals and policy to restore and "maintain the chemical, physical, and biological integrity of the Nation's waters."¹³ Since the Act's

13. Clean Water Act § 101(a), 33 U.S.C. § 1251(a) (2006).

enactment nearly forty years ago, notable progress has been made under its direction to improve water quality nationwide, primarily by focusing on the control of point source chemical pollution. But, relatively little attention has been paid to addressing the inputs from nonpoint sources, including runoff from agricultural lands, and their cumulative effects on the physical and biological integrity of impaired waterbodies.¹⁴ As observed by Professor Oliver Houck, nonpoint sources are “[t]he big enchilada. . . [NPS] pollution has become the dominate water quality problem in the United States, dwarfing all other sources by volume and, in conventional contaminants, by far the leading cause of nonattainment [of water quality standards] for rivers, lakes, and estuaries alike.”¹⁵ He further notes that it is “no secret” that the main reason for this “mushrooming problem is the fact that while other sources have been abated through required controls and their enforcement, no comparable controls . . . appl[y] to agriculture.”¹⁶

While the control of both point and nonpoint sources of pollution is a stated goal of the CWA, it clearly defines “point source” while the term “nonpoint source” is undefined by this statute. As amended in 1987, Congress expressly found in CWA § 101(a)(7) that, in order to achieve its declared objective to restore and maintain the Nation’s waters, “it is the national policy that programs for the control of nonpoint sources of pollution be developed and implemented in an expeditious manner so as to enable the goals of this chapter to be met through the control of *both* point

14. See Robert W. Adler, *The Two Lost Books in the Water Quality Trilogy: The Elusive Objectives of Physical and Biological Integrity*, 33 ENVTL. L. 29, 29 (2003) [hereinafter *The Two Lost Books in the Water Quality Trilogy*] (“While progress has been made in moving toward ‘chemical’ integrity, . . . both the ‘physical’ and ‘biological’ integrity books in the trilogy have remained largely hortatory. Empirical evidence shows measurable gains in reducing chemical pollution, but in the thirty years since the law was passed, the overall health of the nation’s freshwater aquatic ecosystems has declined dramatically. . . . [N]either the federal nor the state agencies charged with implementation of the CWA have taken full advantage of their existing legal authority to address the physical and biological books in the water quality trilogy.”); see also Robert W. Adler, *Integrated Approaches to Water Pollution: Lessons from the Clean Air Act*, 23 HARV. ENVTL. L. REV. 203, 203 (1999) [hereinafter *Integrated Approaches to Water Pollution*] (“Significant water pollution problems remain throughout the United States a quarter-century after enactment of the Nation’s major water pollution-fighting statute, the Clean Water Act. These problems stem in large part from inadequate programs to address cumulative harm to aquatic ecosystems from disparate and diffuse pollution sources. One viable solution would be to adopt enforceable controls on the largest remaining source of water pollution: runoff from farms and other generally unregulated sources (so-called ‘nonpoint source pollution’.”); ROBERT V. PERCIVAL ET AL., ENVIRONMENTAL REGULATION: LAW, SCIENCE, AND POLICY 703 (5th ed. 2006) (describing nonpoint sources as important contributors to water pollution that “have largely escaped federal regulation because of political, administrative, and technical difficulties”).

15. OLIVER A. HOUCK, *THE CLEAN WATER ACT TMDL PROGRAM: LAW, POLICY, AND IMPLEMENTATION* 60 (2d ed. 2002).

16. *Id.* at 60–61.

and nonpoint sources of pollution.”¹⁷ The term point source is precisely defined to include:

[A]ny discernable, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, [CAFO is defined by EPA regulations to include an Animal Feeding Operation which stables or confines as many as or more than the numbers of animals as specified therein; farms with 700 mature dairy cows whether milked or dry or 1,000 non-dairy cattle including heifers are defined as a Large CAFO¹⁸] or vessel or other floating craft, from which pollutants are or may be discharged.¹⁹

The CWA explicitly states that a point source “does not include agricultural stormwater discharges and return flows from irrigated agriculture.”²⁰ Further, by narrowly defining the term “discharge of a pollutant,” as “any addition of any pollutant [with ‘pollutant’ also very specifically defined by the CWA] to navigable waters from *any point source*,”²¹ the CWA does not

17. Clean Water Act § 101(a)(7), 33 U.S.C. § 1251(a)(7) (emphasis added).

18. 40 C.F.R. § 122.23(b)(4) (2009). Under 40 C.F.R. § 122.23(b)(6), a “Medium CAFO” is defined to include “any [Animal Feeding Operation] with the type and number of animals that fall within any of the ranges listed in paragraph (b)(6)(i) of this section and which has been defined or designated as a CAFO.” The type and number of animals includes “200 to 699 mature dairy cows, whether milking or dry,” *id.* § 122.23(b)(6)(i)(A), and “300 to 999 cattle other than mature dairy cows or veal calves. Cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs.” *Id.* § 122.23(b)(6)(i)(C). And further, to be defined as a “Medium CAFO” *either*:

- (A) Pollutants are discharged into waters of the United States through a man-made ditch, flushing system, or other similar man-made device; *or*
- (B) Pollutants are discharged directly into waters of the United States which originate outside of and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation.

Id. § 122.23(b)(6)(ii) (emphasis added). Finally, 40 C.F.R. § 122.23(c) describes how an AFO can be designated as a CAFO, which includes its designation by a State Director and/or Regional Administrator as a significant contributor of pollutants to waters of the United States, after considering relevant factors, which include: size, amount of waste reaching waters, location, means of conveyance, slope, vegetation, rainfall, and other factors affecting the likelihood or frequency of discharge and “other relevant factors.” *Id.* § 122.23(c).

19. Clean Water Act § 502(14), 33 U.S.C. § 1362(14).

20. *Id.*

21. *Id.* § 1362(12) (emphasis added).

require a permit under the national pollutant discharge elimination system (NPDES) for the discharge of pollution from nonpoint sources.²²

However, the CWA does not explicitly define the term NPS. (although one could argue that it is implicitly defined in the negative to include at least agricultural stormwater discharges and irrigation return flows). According to the EPA:

[U]nlike pollution from industrial and sewage treatment plants, [NPS pollution] comes from *many diffuse sources*. NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, [and] wetlands²³

The EPA defines NPS pollutants to include “[e]xcess fertilizers . . . from agricultural lands and residential areas;” “[s]ediment from improperly managed construction sites, crop and forest lands, and eroding streambanks;” “[o]il, grease, and toxic chemicals from urban runoff and energy production;” as well as “[b]acteria and nutrients from livestock, [and] pet wastes.”²⁴ Other identified nonpoint sources include “atmospheric deposition and hydromodification.”²⁵ “The main [NPS] contaminants are sediment, bacteria, nutrients, toxic chemicals and metals.”²⁶ Besides largely unsuccessful federal NPS planning requirements, grant funding conditions,

22. See *id.* §§ 1342(l)(1)–(2), 1362(14) (providing that permits are not required for certain nonpoint source pollutants, such as “return flows from irrigated agriculture” and “stormwater runoff from oil, gas, and mining operations”).

23. *What is Nonpoint Source (NPS) Pollution? Questions and Answers*, U.S. ENVTL. PROTECTION AGENCY, <http://water.epa.gov/polwaste/nps/qa.cfm> (last updated Feb. 19, 2010) (emphasis added); see also *Basic Planning and Frequently Asked Questions*, VT. DEPARTMENT ENVTL. CONSERVATION, http://www.anr.state.vt.us/dec/waterq/planning/htm/pl_faqs.htm (last updated Mar. 2010) (defining NPS pollution as run-off picking up man-made or natural pollutants).

24. *What is Nonpoint Source (NPS) Pollution? Questions and Answers*, *supra* note 23.

25. *Id.*; see PERCIVAL ET AL., *supra* note 14, at 703 (including atmospheric deposition as a nonpoint source pollutant). Note, however, that stormwater runoff from urban and residential areas and construction sites are, under many if not most circumstances, subject to NPDES permitting as point sources. See Clean Water Act § 402(p)(2)(E), 33 U.S.C. § 1342(p)(2)(E) (providing residual designation authority to regulate stormwater discharges that contribute to water quality standard violations or that significant contribute to pollutants “waters of the United States”); see also *Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s)*, U.S. ENVTL. PROTECTION AGENCY, <http://cfpub.epa.gov/npdes/stormwater/munic.cfm> (last updated Apr. 15, 2010, 11:56 AM) (explaining that NPDES permits are required for stormwater runoff); *EPA Construction General Permit*, U.S. ENVTL. PROTECTION AGENCY, <http://cfpub.epa.gov/npdes/stormwater/cgp.cfm> (last updated Apr. 9, 2010, 11:18 AM) (providing an overview on NPDES requirements for construction activities).

26. *Basic Planning and Frequently Asked Questions*, *supra* note 23.

and inclusion of NPS in TMDLs calculations for impaired waterways that do not meet state water quality standards (discussed below), the CWA leaves the regulation and enforcement of NPS pollution controls, and/or implementation of voluntary NPS cleanup initiatives, primarily within the authority and discretion of individual states.

*B. “New Federalism” and Deference to States
for Nonpoint Source Regulation*

The original CWA of 1972 mandated major changes in the United States water pollution control strategy, specifically in terms of enforcement, standards, and planning requirements. The CWA included stronger federal enforcement authority than older water pollution control statutes,²⁷ such as the Water Quality Acts of 1948 and 1965, which included primarily federal funding for state and municipal programs and, with the 1965 Act, state-level water quality standards subject to federal review and approval.²⁸ A complex bill from the start, Senator Edmund S. Muskie (D-Me.) was quoted as saying that during his long tenure in the U.S. Senate, “no bill has consumed so much time, demanded so much attention to detail and required such arduous efforts to reach final agreement”²⁹ Beyond the technical complexity of water pollution control, at the time of the Act’s passage, the Nixon Administration was faced with “the dilemma of integrating the perceived need and loud public demand for quick, strong action to control water pollution with the administration’s oft-expressed desire to return federal powers and revenues to state and local governments.”³⁰ Espousing the doctrine of “New Federalism” (in contrast to the “Cooperative Federalism” promoted by his Democratic predecessors), Nixon offered “[o]ne of the fullest elaborations on the meaning and rationale behind New Federalism . . . in his January 22, 1971 State of the Union Message,” which came on the eve of legislative action on the CWA.³¹ In addressing his goal to strengthen and renew state and local governments, Nixon found that,

The time has now come in America to reverse the flow of
power and resources . . . back from Washington to the

27. HARVEY LIEBER & BRUCE ROSINOFF, *FEDERALISM AND CLEAN WATERS: THE 1972 WATER POLLUTION CONTROL ACT* 7, 9, 11 (1975).

28. HOUCK, *supra* note 15, at 13; *see also* PERCIVAL ET AL., *supra* note 14, at 590 (outlining prior water pollution control statutes).

29. LIEBER & ROSINOFF, *supra* note 27, at 7 (quoting Edmund S. Muskie, Remarks at the Bradley, Woods, and Co. Dinner Seminar (Dec. 12, 1972)).

30. *Id.* at 1.

31. *Id.* at 2.

States . . . The time has come for a new partnership between the Federal Government and the States and localities—a partnership in which we entrust the State and localities with a larger share of the Nation’s responsibilities, and in which we share our Federal revenues with them so that they can meet those responsibilities.³²

In another description of New Federalism included in his 1972 Environmental Message, Nixon stated that the “[p]rimary responsibility rests with State and local government, consumers, industry and private organizations of various kinds—but the Federal Government must provide leadership.”³³ The original CWA was passed on October 19, 1972, only a few weeks prior to the controversial 1972 presidential election. But, while the CWA was enacted at a time when the Nixon administration and many Congressmen were heralding the merits of New Federalism, the CWA actually created expansive areas of federal responsibility in the area of water pollution control.³⁴ However, concerns expressed by stakeholders (including the National Governors’ Conference) that the diversity of water quality problems nationwide were not amenable to inflexible federal standards³⁵ is also reflected in the CWA’s lack of federal direction, as well as broad authority retained by states, over nonpoint sources. The CWA’s failure to successfully “reconcile the requirements for federal standards and local discretion is amply illustrated in the legislative history, initial implementation, and the effects of such legislation upon state water pollution control programs.”³⁶ The political debate between strong federal standards and state discretion over water quality regulation, specifically for NPS pollution, provides one possible explanation for Professor Robert Adler’s observation that “[t]he CWA is schizophrenic in many ways, most notably in its bifurcated technology-based (reducing pollution as much as possible with available technology) and water quality-based (reducing pollution as much as necessary to protect health and the environment) approaches.”³⁷

32. *Id.* (quoting Annual Message to the Congress on the State of the Union, 7 *WKLY. COMPILATION OF PRESIDENTIAL DOCUMENTS* 4, 92 (Jan. 25, 1971)).

33. *Id.* at 5 (quotation omitted).

34. *Id.* at 198–99.

35. *Id.* at 191 (citing Water Pollution Control Legislation—1971: Hearings on H.R. 11,896, H.R. 11,895: Before the Comm. on Public Works, 92d Cong. 520 (1971)).

36. *Id.* at 1.

37. Robert W. Adler, *Addressing Barriers to Watershed Protection*, 25 *ENVTL. L.* 973, 1038 (1995) [hereinafter *Addressing Barriers to Watershed Protection*].

While Congress provided clear authority to the federal government to regulate the discharge of pollutants from point sources, it also explicitly and implicitly gave states primary responsibility for the broader problem of water pollution, including continued authority over NPS control, specifically the regulation of land use, which directly contributes to NPS water pollution.³⁸ Nixon's New Federalism doctrine, discussed above, is echoed in CWA section 101(b), which states that,

It is the policy of the Congress to recognize, preserve, and protect the primary responsibilities and rights of States to prevent, reduce, and eliminate pollution, *to plan the development and use* (including restoration, preservation, and enhancement) *of land and water resources* It is the policy of Congress that the States manage the construction grant program under this chapter and implement the permit programs under sections 1342 [CWA section 402, requiring NPDES permits for point source pollution discharges] and 1344 [section 404, requiring permits for the disposal of dredged or fill material into navigable waters] of this title. It is further the policy of Congress to support and aid research relating to [pollution abatement] and to provide Federal technical services and financial aid to State and interstate agencies and municipalities in connection with the prevention, reduction, and elimination of pollution.³⁹

As noted by Adler, section 101(b) combined with section 101(g) of the CWA (which was added in 1977 and recognizes state authority to allocate water resources), provides “strong indications” that “while Congress designed a strong federal role in programs to reduce or eliminate the discharge of pollutants, including both oversight and direct action, it intended that states would be primarily responsible for the more broadly defined problem of pollution.”⁴⁰ While other provisions of the CWA, specifically sections 102(a) and 104(a), can be interpreted to shed some doubt on this “apparently clean division of authority” between federal and state responsibilities for water pollution control, the EPA to date has not interpreted these provisions expansively.⁴¹ Thus, the prevailing “clear division” interpretation of the Act embraced by the EPA over the last thirty plus years, generally provides the federal government with “direct and

38. 33 U.S.C. § 1251(b) (2006).

39. *Id.* (emphasis added).

40. *The Two Lost Books in the Water Quality Trilogy*, *supra* note 14, at 54.

41. *Id.* at 55.

exclusive authority in certain aspects of point source pollutant control, . . . [and] [i]n other areas of point source control . . . direct regulatory authority absent delegation of that responsibility to qualified states with approved programs.”⁴² However, by contrast, in federal programs directed specifically at nonpoint sources, such as the CWA section 208 “areawide waste treatment management plans” and section 319 water quality management plans (discussed below), primary authority is “ceded more clearly to the states.”⁴³

C. Federal Nonpoint Source Pollution Control Initiatives

Over the last thirty plus years, Congress and the EPA have experimented with the enactment and implementation of a series of federal NPS planning initiatives. The first two, CWA section 208 and CWA section 319 planning, are widely viewed as unsuccessful, for reasons identified and discussed below. While not yet fully tested, other programs which present more potential promise in achieving the CWA’s water quality objectives include NPS pollution control under section 1455b of the CZMA and the recently reinvigorated requirements of section 303(d) of the CWA. Specifically, section 303(d) requires states to identify waters where technology-based effluent limitations are not stringent enough to meet applicable water quality standards and establish TMDLs to meet those standards.⁴⁴

1. Section 208 Planning

Included in the CWA section 208, or as entitled “Areawide Waste Treatment Management,” requires the identification and designation of areas having substantial water quality control problems.⁴⁵ Under section 208(b), States were supposed to develop twenty year plans to address many land-use-based pollution sources and submit these plans to the EPA.⁴⁶ Specifically, section 208 plans were required to identify agricultural

42. *Id.* at 56.

43. *Id.*

44. 33 U.S.C. § 1313(d)(1)(A), (C) (2006).

45. *Id.* § 1288 (emphasis added); *see also* Natural Res. Def. Council v. Costle, 564 F.2d 573, 578, 580 (D.C. Cir. 1977) (“[T]he 1972 CWA in section 208 sets up a comprehensive scheme for the elimination of water pollution in all areas of a State, both urban-industrial areas and agricultural and forest areas. We think it unreasonable to believe that the Congress intended to exempt from this scheme 95% of the State’s areas,” and that “the EPA may of course employ the accepted and traditional means of gaining State compliance by withholding funds under section 208(f), but that method of stimulation would not violate the Tenth Amendment.”).

46. 33 U.S.C. § 1288(b)(2)(A), (F).

nonpoint sources of water pollution and their cumulative effects, as well as manure disposal area runoff and land used for livestock and crop production, and “methods (*including land use requirements*) to control to the extent feasible such sources.”⁴⁷ But, the contents of the plan were largely left to the state’s discretion.⁴⁸ To assist states with the development of these plans, section 208(i) provides states, upon their request, with free technical assistance from the U.S. Fish and Wildlife Service for developing state-based best management practices (BMPs).⁴⁹ Further, section 208(j) authorized the U.S. Department of Agriculture to enter into five- to ten-year agricultural cost-sharing contracts with “owners and operators having control of rural land for the purpose of installing and maintaining measures incorporating [BMPs] to control nonpoint source pollution for improved water quality” in areas which the EPA had approved a plan under section 208(b).⁵⁰

Despite its stated intentions to help states address NPS pollution, and directly and indirectly assist farmers in implementing BMPs to control runoff, the water quality planning process in section 208 “is widely viewed as a failure.”⁵¹ While the EPA approved 209 of the 222 plans submitted by 1982, most approved plans failed to adequately identify NPS pollution regulatory mechanisms (e.g., local or state land use requirements and controls).⁵² Many plans designated state conservation agencies and local Conservation Districts responsible for implementation, but did not utilize state-based land use regulatory powers.⁵³ Never formally repealed, section 208 remains “on the books,” although federal funding for the program ended in 1981.⁵⁴ Key reasons cited for its early failure include: lack of administrative support; absence of a link between planning and implementation; lack of financial assistance or other incentives to link

47. *Id.* § 1288(b)(2)(F) (emphasis added).

48. *Addressing Barriers to Watershed Protection*, *supra* note 37, at 1042 n.413 (citing *Shanty Town Assocs. Ltd. P’ship v. EPA*, 843 F.2d 782, 791 (4th Cir. 1988) (stating that there is “no direct mechanism by which EPA can force the states to adopt adequate nonpoint source pollution control programs [under § 208],” but that Congress intended the EPA to do so through threatened grant withholding)).

49. 33 U.S.C. § 1288(i).

50. *Id.* § 1288(j)(1).

51. *Addressing Barriers to Watershed Protection*, *supra* note 37, at 1043–44; PERCIVAL ET AL., *supra* note 14, at 704.

52. Larry C. Frarey, Ron Jones & Staci J. Pratt, *Conservation Districts as the Foundation for Watershed-Based Programs to Prevent and Abate Polluted Agricultural Runoff*, 18 *HAMLIN L. REV.* 151, 156 (1994).

53. *Id.*

54. *Id.* at 156–57 (identifying examples of implemented state regulatory mechanisms); *Addressing Barriers to Watershed Protection*, *supra* note 37, at 1043.

planning to implementation; a very wide gap between the authorization and appropriations; and finally a “basic resistance of local governments to federal efforts to dictate planning structures and results, however flexibly those programs are designed.”⁵⁵

2. Section 319 Management Plans

Six years after discontinuing funding for section 208 planning, Congress made another attempt to influence state water quality planning to reduce polluted runoff when it added section 319 to the CWA. In its 1987 Amendments, Congress added a declaration to CWA section 101(a)(7) that it is a national policy to quickly develop and implement programs to control both point and NPS pollution.⁵⁶ Under section 319, entitled “nonpoint source management programs,” states were (and still are) required to submit “state assessment reports” to the EPA which “identifies those navigable waters within the State which, without additional action to control nonpoint sources of pollution, cannot reasonably be expected to attain or maintain applicable water quality standards or the [CWA’s] goals and requirements.”⁵⁷

Further, section 319 also requires states to develop “state management plans” which addressed the control of NPS water pollution.⁵⁸ CWA section 319(b)(2)(A)–(E) provide specific requirements for the implementation of state NPS plans, including: identification of BMPs to reduce NPS pollution loading; identification of programs to achieve implementation of BMPs; a schedule with milestones for program implementation; certification by the state’s attorney general that the laws of the state provide adequate authority to implement the NPS management plan; and identification of assistance and funding sources.⁵⁹ Finally, CWA sections 319(b)(3)–(4) require that states “to the maximum extent practicable, involve local public and private agencies” with NPS pollution control expertise, and “develop and implement” their NPS programs on a “watershed-by-watershed basis.”⁶⁰ States with approved assessment reports and plans are eligible for federal financial assistance to implement NPS programs.⁶¹

55. *Addressing Barriers to Watershed Protection*, *supra* note 37, at 1044; PERCIVAL ET AL., *supra* note 14, at 704.

56. 33 U.S.C. § 1251(a)(7) (2007).

57. *Id.* § 1329(a)(1)(A).

58. *Id.* § 1329(b)(1).

59. *Id.* § 1329(b)(2)(A)–(E).

60. *Id.* § 1329(b)(3)–(4).

61. *Id.* § 1329(h)(1) (2006).

The 1987 Amendments' section 319 state assessment and planning requirements generated early enthusiasm by authorizing \$400 million in federal grants for state programs. Like section 208 (the predecessor to section 319), only a portion of these funds were actually appropriated and only about ten percent of this initial authorization was distributed over the next three years.⁶² Most observers find that section 319 has not made significant progress in curbing runoff pollution, although analyses of the reasons for this failure vary.⁶³ Notably, Professor Adler observes "EPA's only leverage under section 319 was to withhold section 319 grant funds (as opposed to EPA's broader mandate under section 303 to adopt federal water quality standards and implementing mechanisms when a state version is lacking)."⁶⁴ In his general critique of the CWA, Professor Victor Flatt notes that for NPS control, including runoff attributed to agriculture, silviculture, mining and construction, the "federal role is essentially one of advice and encouragement."⁶⁵ He further observes that while "technically the law is supposed to identify problems with non-point pollution sources and have them corrected[,] . . . there is no discipline in the CWA that ensures that this clean-up enforcement of [NPS] will or must occur."⁶⁶ In sum, mostly "carrot" (e.g., grant funding) with no real "stick" (e.g., enforcement), section 319 provides limited incentives for states lacking in political will to cleanup impaired waters or control nonpoint sources.

3. Section 1455b Coastal NPS Planning

While not part of the CWA or directly applicable to the State of Vermont (which is not traditionally or definitionally considered a "coastal state"),⁶⁷ 16 U.S.C. § 1455b, a provision of the Coastal Zone Management

62. PERCIVAL ET AL., *supra* note 14, at 704–05.

63. *Id.* at 705; see *Addressing Barriers to Watershed Protection*, *supra* note 37, at 1045 n.427 ("The section 319 program has helped States address nonpoint source pollution. However, it has not been successful because some State plans are inadequate and funding has been lacking." (quoting S. REP. NO. 103-257, at 47 (1994))). Further, Adler personally notes that "Section 319 is only moderately more aggressive than section 208[.]" and while the EPA could have elected to adopt a stricter view through its section 319 plan approval process and require states to adopt regulatory programs to control nonpoint sources, "for political reasons [it] elected not to play hardball.")

64. *Addressing Barriers to Watershed Protection*, *supra* note 37, at 1045 n.427.

65. Victor B. Flatt, *Spare the Rod and Spoil the Child: Why the Clean Water Act Has Never Grown Up*, 55 ALA. L. REV. 595, 598 (2004).

66. *Id.* at 598–99.

67. The term "coastal state" in the CZMA is defined by 16 U.S.C. § 1453(4) to mean "a state of the United States in, or bordering on, . . . one or more of the Great Lakes." 16 U.S.C. § 1453(4) (2006). While Lake Champlain is not considered one of the Great Lakes, it is physically connected to them by the Richelieu River, which drains the Champlain-Richelieu watershed and enters the Saint Lawrence River northeast of Montreal, Canada. See USDA 2007 Census of Ag., WATERSHEDS, Vol. 2,

Act (CZMA) added by Congress in its 1990 amendments requires states with federally approved coastal management programs to develop a Coastal Nonpoint Pollution Control Program subject to approval by the U.S. EPA and National Oceanic and Atmospheric Administration (NOAA).⁶⁸ Professor Robert Percival observes that although “the addition of yet another planning requirement to federal law is not in itself of any great significance, section 1455b . . . requires far more specificity in nonpoint source management planning than ever before.”⁶⁹ Specifically, these requirements include the identification by states of land uses that “individually or cumulatively, may cause or contribute significantly” to the degradation of currently impaired coastal waters and those coastal waters that are “threatened by reasonably foreseeable increases in pollution loadings from new or expanding sources.”⁷⁰

Further, section 1455b requires implementation and “continuing revision” of management measures applicable to identified land uses and critical areas to achieve and maintain applicable water quality standards.⁷¹ Within its Coastal NPS Control Plans, a state must identify how it plans to control NPS within its coastal waters and ensure implementation of management measures through enforceable state policies and mechanisms, such as permit programs, zoning, bad actor laws, enforceable water quality standards, and general environmental laws, as well as economic incentives if they are backed by appropriate regulations.⁷² However, despite its legislative specificity and holistic approach to addressing coastal water

Subject Series, Part 6, 10–12 (May 2009). Further, the federal Lake Champlain Special Designation Act of 1990 § 301, 33 U.S.C. § 1270, as well as the Great Lakes and Lake Champlain Act of 2002, Pub. L. No. 107–303, 116 Stat. 2355, recognize this lake as a water resource of national significance. Finally, along with the Great Lakes and Chesapeake Bay, Lake Champlain is included under the EPA’s “Great Waters Program” created by the 1990 amendments to the Clean Air Act, which recognizes the contribution of air pollution and aerial deposition to water pollution. *See An Introduction to the Issues and Ecosystems*, U.S. ENVTL. PROTECTION AGENCY, (Apr. 1994), <http://www.epa.gov/air/oaqps/gr8water/xbrochure/index.html> (click on “Lake Champlain”) (including Lake Champlain in the “Great Waters Program” and recognizing air pollutants’ contribution to water pollution); *see also The Great Waters Program*, U.S. ENVTL. PROTECTION AGENCY, <http://epa.gov/air/oaqps/gr8water/> (last updated June 12, 2009) (recognizing air pollution as a contributing factor to water pollution).

68. 16 U.S.C. § 1455b(a). This section is also referred to by scholars and the EPA as section 6217 of the 1990 Coastal Zone Act Reauthorization Amendments (CZARA).

69. PERCIVAL ET AL., *supra* note 14, at 705.

70. 16 U.S.C. § 1455b(b)(1) (2007).

71. *Id.* § 1455b(b)(3).

72. *Protecting Coastal Waters from Nonpoint Source Pollution*, U.S. ENVTL. PROTECTION AGENCY, <http://water.epa.gov/polwaste/nps/outreach/point5.cfm> (last updated Apr. 22, 2010); *see Coastal Zone Act Reauthorization Amendments*, U.S. ENVTL. PROTECTION AGENCY, <http://water.epa.gov/polwaste/nps/czara/ch1-1.cfm#National> (last updated Nov. 30, 2009) (identifying methods to abate and control nonpoint pollution).

quality issues, a seasoned critic observed that appropriated funding for this program vastly underestimated the costs of adopting NPS control measures,⁷³ and as with previous federal NPS planning initiatives, a legislative ‘stick’ for addressing non-compliance by states with section 1455b’s nonpoint source planning and implementation requirements is, once again, lacking.⁷⁴

4. Section 303 Pollutant Load Calculations and Planning Requirements

To achieve its statutory goals of restoring and maintaining the chemical, physical, and biological integrity of the Nation’s waters,⁷⁵ the CWA authorizes the EPA to utilize several different approaches based on the severity of specific water quality impairment, including a technology-based approach,⁷⁶ a multi-tiered effluent limitations approach,⁷⁷ and finally if

73. PERCIVAL ET AL., *supra* note 14, at 705 (noting that EPA estimated the cost of adopting NPS control measures as recommended in guidance documents would range from \$390 to \$590 million, but only \$50 million in grant money was made available to states through EPA and less than \$2 million made available from NOAA).

74. While 16 U.S.C. § 1455b(c) requires review, approval, and implementation of state plans developed pursuant to the Coastal Nonpoint Pollution Control Program, penalties included therein for failure for a coastal State to submit an approvable plan included only the withholding of coastal management assistance grants otherwise available under section 306 of the CZMA and withholding of water pollution control assistance grants available under 33 U.S.C. § 1329, or section 319 of the CWA. 16 U.S.C. § 1455b(c) (2006).

75. 33 U.S.C. § 1251(a) (2007).

76. *See* 33 U.S.C. §§ 1311, 1316 (2006) (requiring the EPA to promulgate regulations establishing federal standards of performance requiring best available technology for new point sources identified industry category).

77. *See Id.* §§ 1311, 1312 (imposing multi-tiered effluent limitations on existing sources whose stringency and timing depends on the nature of the pollutant discharged and whether the outfall is directed to a water body or a publicly owned treatment works (POTW) and providing the EPA with discretion to establish effluent limitations in a specific portion of navigable waters where minimum state water quality requirements have not been attained); *see also* PERCIVAL ET AL., *supra* note 14, at 594 (summarizing the structure of the Clean Water Act regarding multi-tiered effluent limitation). Furthermore, 33 U.S.C. § 1311(b)(1)(C) specifically provides that water quality-based effluent limitations are required to “implement *any* applicable water quality standard established pursuant to this chapter.” (emphasis added). Finally, in recent case law binding on Vermont, the Second Circuit in *Waterkeeper Alliance, Inc. v. EPA* found that:

[W]here effluent limitations prove insufficient to attain or maintain certain water quality standards, the Act requires NPDES permits to include additional water quality based effluent limitations. *See* 33 U.S.C. §§ 1311(b)(1)[(A)-(C)], 1312(a). Overall, we hope to make clear that the NPDES permit is critical to the successful implementation of the Act because—by setting forth technology-based effluent limitations and, in certain cases, additional water quality based effluent limitations—the NPDES permit ‘defines, and facilitates compliance with, and enforcement of, a preponderance of a discharger’s obligations under the [Act].’

Waterkeeper Alliance, Inc. v. EPA, 399 F.3d 486, 492 (2d Cir. 2005) (quoting *EPA v. California ex rel. State Water Res. Control Bd.*, 426 U.S. 200, 205 (1976)).

these approaches fail to achieve applicable state water quality standards—the TMDL process. The TMDL process, as outlined in section 303(d) of the CWA, calls for the identification of waters where technology-based performance standards and effluent limitations have failed to achieve applicable water quality standards and, for these impaired waters, the calculation of a TMDLs from both point and nonpoint sources.⁷⁸ Originally “[e]clipsed by [the] more [immediately] action-forcing provisions of the Act, § 303(d)” remained dormant for about twenty years after the passage of the CWA of 1972.⁷⁹ However, this important section was resurrected from its legislative obscurity in the early 1990s, when citizen plaintiffs began to file suits against the EPA on the pace of states’ development and EPA approval of statutorily required TMDLs.⁸⁰ In twenty-seven of the thirty-nine cases related to progress of TMDL development, courts ordered the EPA, or it agreed through consent decrees, to establish TMDLs if states failed to do so within a defined time period.⁸¹ As of March 2009, the EPA had outstanding obligations in sixteen cases and fulfilled its obligations in eleven cases; however, most orders/decrees allow the EPA to forego establishing a TMDL if it can demonstrate that the TMDL is not needed.⁸² In general, where the EPA has continued TMDL obligations, it must “backstop” TMDL development for impaired waters listed under section 303(d) if a state has not completed them by a defined date. Many orders/decrees identify 2010 through 2013 as the backstop, or the EPA’s TMDL development takeover, date.⁸³

Specifically, section 303(d) of the CWA requires states to identify waters for which the effluent limitations required under section 301(b)(1)(A) and (b)(1)(B) of the CWA have not proven strict enough to meet applicable state water quality standards; establish a priority ranking

78. 33 U.S.C. § 1313(d).

79. HOUCK, *supra* note 15, at 3.

80. Following the resolution of *Scott v. City of Hammond*, 741 F.2d 992 (7th Cir. 1984), discussed *infra*, in which the court found that the EPA had a mandatory duty to establish TMDLs when states failed to do so, plaintiffs have filed TMDL lawsuits against the EPA in thirty-five states. *Litigation Status: Summary of Litigation on Pace of TMDL Establishment*, U.S. ENVTL. PROTECTION AGENCY (Mar. 2009), <http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/lawsuit.cfm> [hereinafter *Litigation Status*]; see also HOUCK, *supra* note 15, at 75–76 (discussing lawsuits that resulted from the EPA’s failure to respond to state inaction in TMDL development).

81. *Litigation Status*, *supra* note 80.

82. HOUCK, *supra* note 15, at 76.

83. See *Litigation Status*, *supra* note 80, for the ‘TMDL Litigation by State’ chart for EPA’s outstanding state-specific obligations. This author respectfully observes that the prospect of impending EPA ‘backstop’/TMDL-takeover deadlines may provide the EPA with incentives to find that TMDLs are in fact not required for waters previously identified as impaired or to reduce the level of administrative scrutiny given to state-submitted TMDLs.

that accounts for the severity of continued pollution and designated water uses; and calculate a TMDL for pollutants identified by the EPA under section 304(a)(2).⁸⁴ By terms included in the CWA and its implementing regulations, the TMDL for an impaired waterway must be established “at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality.”⁸⁵ Finally, CWA section 303(e) requires each state have a “continuing planning process” approved by the EPA which results in plans for all navigable in-state waters, including calculating TMDLs for pollutants in impaired waters in accordance with section 303(d).⁸⁶

The EPA’s regulations require states to develop water quality management plans, including those produced in accordance with sections 208 and 303(e), and draw upon water quality assessments to identify priority point and nonpoint water quality problems, including TMDL studies and calculations as required under section 303(d).⁸⁷ These water quality management plans must describe the regulatory and non-regulatory programs, activities, and BMPs selected by states to control NPS pollution where needed to protect or achieve designated water uses for waterways classified as impaired under section 303(d).⁸⁸ However, these regulations allow states to consider economic, institutional, and technical factors in their CWA-required “continuing planning process” when identifying control needs, taking into account pollution stemming from agricultural and silvicultural activities, as well as permitting the modification BMPs necessary to achieve water quality goals.⁸⁹ Finally, the EPA’s regulations require state plans to identify measures necessary to carry out water quality plans, including financing, a time period for plan execution, and an assessment of economic, social, and environmental effects of implementation.⁹⁰

84. 33 U.S.C. § 1313(d)(1)(A)–(C) (2006).

85. *Id.* § 1313(d)(1)(C); *see also* 40 C.F.R. § 130.7 (2009) (including agency regulations for the process states must use in identifying impaired waters requiring wasteload allocation, load allocation, and TMDLs, including the evaluation of waters identified as impaired or threatened in a CWA section 319 nonpoint assessment).

86. 33 U.S.C. § 1313(e)(1)–(3); 40 C.F.R. § 130.5, which requires that states implement processes specified in their “continuing planning process,” as required under CWA section 303(e)(3), and include in these processes for the development TMDLs in accordance with CWA section 303(d) and 40 C.F.R. § 130.7.

87. 40 C.F.R. § 130.6.

88. *Id.* § 130.6(c)(4)(i).

89. *Id.*; 33 U.S.C. § 1313(e)(1)–(3);

90. 40 C.F.R. § 130.6(c)(6).

Unlike other planning-related requirements included in sections 208 and 319 of the CWA, the result of non-compliance for states with section 303(d) requirements is not merely withholding of federal water quality improvement funds. Rather, courts have repeatedly held that the EPA has a statutory duty to establish TMDLs if states fail to complete their impaired waterway inventory, planning, and assessment obligations under section 303 of the CWA;⁹¹ that the EPA can only approve TMDLs which calculate loads on a daily, not seasonal or annual, basis;⁹² and that the EPA cannot issue NPDES permits to regulated point sources discharging into waters listed on a state's 303(d) list without meeting applicable regulatory requirements for bringing these waters into compliance with state water quality standards.⁹³ Finally, as defined by the EPA, a TMDL is “a calculation of the maximum amount of a pollutant that a water body can receive and still safely meet water quality standards,” and an allocation of that amount among the pollutant's sources.⁹⁴ This allocation addresses water pollution from both point and nonpoint sources.⁹⁵ The EPA identifies pollution attributable to point sources (e.g., wastewater treatment plants,

91. See *Scott v. City of Hammond*, 741 F.2d 992, 996–98 (7th Cir. 1984) (finding that “if a state, fails over a long period of time to submit proposed TMDLs, this prolonged failure may amount to the ‘constructive submission’ by that state of no TMDLs” and that “the CWA should be liberally construed to achieve its objectives—in this case to impose a duty on the EPA to establish TMDLs [sic] when the states have defaulted by refusal to act over a long period”); *Sierra Club v. Hankinson*, 939 F. Supp. 865, 868 (N.D. Ga. 1996) (citing *City of Hammond*, 741 F.2d 992, to find that the EPA had a mandatory duty to approve or disapprove of constructive submissions by a state of its Water Quality Limited Segment (WQLS) list and TMDLs as required under the CWA and, upon disapproval, to promulgate its own WQLS list or TMDL determinations for the state); *S.F. Bay Keepers v. Whitman*, 297 F.3d 877, 884, 85 (9th Cir. 2002) (holding that “EPA’s duty under the CWA to establish TMDLs for . . . California has not been triggered either through the constructive submission theory or actual 303(d) submissions that did not list TMDLs,” as there was nothing in the statute that requires the WQLS list and TMDLs to be submitted simultaneously, or that a “submission will be incomplete unless it contains both a WQLS and a corresponding TMDL”).

92. *Friends of the Earth, Inc. v. EPA*, 446 F.3d 140, 144–45 (D.C. Cir. 2006) (holding that the CWA unambiguously requires under the plain language of section 303(d) the calculation of daily loading for waters failing to achieve applicable water quality standards, and thus the EPA cannot approve TMDL submissions which calculate only seasonal or annual loads for these waters).

93. *Friends of Pinto Creek v. EPA*, 504 F.3d 1007, 1009, 1015 (9th Cir. 2007) (holding that the EPA could not issue a NPDES permit for a Carlota Copper Mine’s mining-related discharges into Pinto Creek, which were already in excess of water quality standards for copper and on Arizona’s list of impaired waters under CWA section 303(d), where there were no plans or compliance schedules in place to bring the creek into compliance with applicable state water quality standards, as required by 40 C.F.R. § 122.4 (2009)).

94. *Overview of Impaired Waters and Total Maximum Daily Loads Program*, U.S. ENVTL. PROTECTION AGENCY, <http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/intro.cfm> (last updated Feb. 25, 2010) [hereinafter *Overview of Impaired Waters*].

95. *Id.*

discrete stormwater discharges, and CAFOs) as the Wasteload Allocation,⁹⁶ and remaining pollution attributable to nonpoint sources (e.g., agricultural, silvicultural, and urban runoff), as part of the Load Allocation.⁹⁷ TMDLs must also include a “margin of safety” for the “uncertainty in predicting how well pollutant reductions will result in meeting water quality standards.”⁹⁸ Of the 40,042 waters listed by states as impaired on their collective 303(d) lists, the EPA approved a total of 40,988 TMDLs by the end of its 2009 Fiscal Year.⁹⁹

In summary, a TMDL calculates the maximum amount of a given pollutant that is legally allowed to enter a waterbody (e.g., river, stream, lake, sound, bay) so that it will meet water quality standards for that particular pollutant. Specifically, the TMDL calculation adds the pollution load attributable to the existing Wasteload Allocation and Load Allocation, and adds in a margin of safety to account for uncertainty and variation.¹⁰⁰ While state and federal officials have only recently begun in earnest to implement the congressional mandate of section 303 of the CWA, the TMDL process is an important step in “integrating point and nonpoint source regulations into a watershed-based approach.”¹⁰¹ While the CWA and its implementation over the last thirty plus years has helped to improve the quality of our Nation’s waters, it has focused primarily on addressing point sources and relied mostly on technological standards to abate this

96. *Id.* Point sources include all sources subject to regulation under the NPDES program, as required under 33 U.S.C. § 1341(a) (2006). *Id.* “Point source” is defined in 33 U.S.C. § 1362(14) to mean “any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, [or] concentrated animal feeding operation, . . . from which pollutants are or may be discharged.” 33 U.S.C. § 1362(14) (2006). However, this statutory definition also states that, “[t]his term does not include agricultural stormwater discharges and return flows *from* irrigated agriculture.” *Id.*

97. *Overview of Impaired Waters*, *supra* note 94.

98. *Id.*; JOEL M. GROSS & LYNN DODGE, CLEAN WATER ACT 54 (2005).

99. *National Summary of Impaired Waters and TMDL Information*, U.S. ENVTL. PROTECTION AGENCY, http://iaspub.epa.gov/waters10/attains_nation_cy.control?p_report_type=T (last updated Nov. 13, 2010) (showing charts of “Impaired Waters Listed by State” and “National Cumulative Numbers of TMDLs”). Note that the EPA’s fiscal year starts October 1. *Id.* While the EPA approved about 4,000 TMDLs annually in fiscal years 2005 through 2007, in fiscal year 2008 it approved a record 9,247. *Id.* In fiscal year 2009, EPA approved 4,398 TMDLs, on average with the number approved annually in the early 2000s. *Id.*

100. NAT’L RESEARCH COUNCIL, ASSESSING THE TMDL APPROACH TO WATER QUALITY MANAGEMENT (2001), available at http://www.nap.edu/catalog.php?record_id=10146. See generally LEONARD SHABMAN ET AL., DUKE UNIV., ADAPTIVE IMPLEMENTATION OF WATER QUALITY IMPROVEMENT PLANS: OPPORTUNITIES AND CHALLENGES (2007) (accounting for load uncertainty in TMDL implementation options).

101. GROSS & DODGE, *supra* note 98; Professor David Mears, *Watershed Management* (Apr. 4, 2009) (noting that the TMDL process makes sure the “whole thing [e.g. point and non-point sources] is wrapped together with a bow”).

pollution.¹⁰² Even after addressing key point source discharges, the ecological health of many waters, including the Lake, remains poor.¹⁰³ Therefore it is time to focus on addressing water quality problems stemming from nonpoint sources, such as agricultural runoff. In the states' implementation of TMDLs, new and innovative approaches, legislation, regulations, and community-based action are all necessary to address persistent water quality issues.

D. Addressing Nonpoint Source Pollution Through TMDLs

While many have debated that federal authority requires states to implement TMDLs under governing principles of federalism as discussed above, courts have held that the CWA unambiguously requires the establishment of TMDLs for waters failing to achieve applicable water quality standards;¹⁰⁴ the EPA has a mandatory duty to develop TMDLs if states fail to do so;¹⁰⁵ and the EPA cannot issue a NPDES permit for a point source discharge into waters listed under section 303(d) of the CWA where no plans or schedules to bring waters into compliance with water quality standards are in place, as required by EPA's own regulations.¹⁰⁶ Further, the Ninth Circuit has held that the EPA is authorized to require TMDLs for waters affected solely by nonpoint sources.¹⁰⁷ However, beyond the successful completion of TMDLs as required under section 303(d), which primarily serve as "informational tools,"¹⁰⁸ courts have consistently found that citizen plaintiffs cannot compel the EPA to implement TMDLs, or require states to develop and execute TMDL implementation plans

102. J. William Futrell, *Forward* to OLIVER A. HOUCK, *THE CLEAN WATER ACT TMDL PROGRAM: LAW, POLICY, AND IMPLEMENTATION* 1 (2d ed. 2002); HOUCK, *supra* note 15, at 3.

103. LAKE CHAMPLAIN BASIN PROGRAM, STATE OF THE LAKE AND ECOSYSTEM INDICATORS REPORT 2008, at 4–10 (2008), available at <http://www.lcbp.org/PDFs/SOL2008-web.pdf> [hereinafter LCBP REPORT 2008]; see also U.S. ENVTL. PROT. AGENCY, *PROTECTING WATER QUALITY FROM AGRICULTURAL RUNOFF* (2005) [hereinafter *PROTECTING WATER QUALITY FROM AGRICULTURAL RUNOFF*] (citing U.S. ENVTL. PROT. AGENCY, *NATIONAL WATER QUALITY INVENTORY 2000 REPORT* (2000)) (providing an overview of U.S. government programs that are aimed at protecting water from pollution caused by agricultural runoff).

104. *Friends of the Earth, Inc. v. EPA*, 446 F.3d 140, 144–45 (D.C. Cir. 2006).

105. *S.F. Bay Keepers v. Whitman*, 297 F.3d 877, 880–81 (9th Cir. 2002); *Scott v. City of Hammond*, 741 F.2d 992, 996–98 (7th Cir. 1984); *Sierra Club v. Hankinson*, 939 F. Supp. 865, 868, 871 (N.D. Ga. 1996).

106. *Friends of Pinto Creek v. EPA*, 504 F.3d 1007, 1009–15 (9th Cir. 2007).

107. *Pronsolino v. Nastro*, 291 F.3d 1123, 1135–41 (9th Cir. 2002).

108. *Id.* at 1129 (“TMDLs are primarily informational tools that allow the states to proceed from the identification of waters requiring additional planning to the required plans.” (citing *Alaska Ctr. for the Env't v. Browner*, 20 F.3d 981, 984–85 (9th Cir. 1994))).

addressing Load Allocations attributable to nonpoint sources.¹⁰⁹ The limited application of section 303(d) to waters impaired by nonpoint sources,¹¹⁰ as well as limits on statutory authority under the CWA to require states implementation of approved TMDLs, or even the development of TMDL implementation plans, are discussed below.

1. Application of 303(d) to Nonpoint Sources

Since the first TMDL regulations it promulgated in 1985, the EPA has been committed to the view that TMDL calculations under section 303(d) must account for both point and nonpoint pollution.¹¹¹ In its current regulations, the EPA requires that all states in the identification of impaired waters which require TMDLs must “assemble and evaluate all existing and readily available water quality-related data and information to develop the [303(d)] list,” including those “identified by the State as impaired or threatened in a nonpoint assessment . . . under section 319 . . . or in any updates of the assessment.”¹¹²

As a practical matter, nonpoint sources comprise the majority of water pollution in every state.¹¹³ In Vermont, nonpoint sources account for at least seventy-one percent of the phosphorus entering the Lake.¹¹⁴ Professor Houck aptly notes that “[a]n interpretation of § 303(d) without nonpoint sources would be like an interpretation of Shakespeare without the plays, interesting poetry but not very important.”¹¹⁵ However, the inclusion of nonpoint sources in TMDLs has long served as a *causa belli*—cause for

109. *See* *Sierra Club v. Meiburg*, 296 F.3d 1021 (11th Cir. 2002) (holding that consent decree between parties did not require TMDL implementation); *Amigos Bravos v. Green*, 306 F. Supp. 2d 48, 56–58 (D.D.C. 2004) (holding that TMDL planning is not final agency action that citizen plaintiffs can challenge); *City of Arcadia v. EPA*, 265 F. Supp. 2d 1142, 1144 (N.D. Cal. 2003) (TMDLs set goals for states to achieve but do not require EPA implementation); *Idaho Sportsmen’s Coal. v. Browner*, 951 F. Supp. 962, 966 (W.D. Wash. 1996) (“TMDL development in itself does not reduce pollution TMDLs inform the design and implementation of pollution control measures.”).

110. *But see Friends of Pinto Creek*, 504 F.3d at 1009–15. If the holding of the Ninth Circuit in *Pinto Creek* is carried to its logical extension and the EPA regulations at issue in this recent case remain in force, the EPA itself or states implementing the CWA must deny the issuance of NPDES permits in waters impaired primarily by nonpoint sources if adequate plans or compliance schedules are not in place to bring the impaired waters into compliance with applicable state water quality standards.

111. HOUCK, *supra* note 15, at 198.

112. 40 C.F.R. § 130.7(b)(5) (2009).

113. HOUCK, *supra* note 15, at 198; PROTECTING WATER QUALITY FROM AGRICULTURAL RUNOFF, *supra* note 103.

114. DEP’T OF ENVTL. CONSERVATION, VT. AGENCY OF NATURAL RES. & N.Y. STATE DEP’T OF ENVTL. CONSERVATION, LAKE CHAMPLAIN PHOSPHOROUS TMDL 4 (2002), *available at* http://www.anr.state.vt.us/dec/waterq/lakes/docs/lp_lctmdl-report.pdf [hereinafter LAKE CHAMPLAIN PHOSPHOROUS TMDL].

115. HOUCK, *supra* note 15, at 198.

war—by the agriculture and timber industries, which have unsuccessfully attempted to limit the applicability of TMDLs to only waters impaired by point sources. As Houck observes, the EPA’s inclusion of NPS impairment in its TMDL regulations for over twenty years and the fact that the key inclusion of NPS pollution clearly furthers the clean water restoration goal of the CWA “should allow the Agency’s interpretation to survive judicial review under *Chevron* principles before even the most hostile court.”¹¹⁶

To date, aggrieved parties have lost the legal battle to limit TMDL requirements under section 303(d) to only those waters impaired by point sources. In *Pronsolino v. Nastri*, the Ninth Circuit held that the EPA was authorized to determine a TMDL for the Garcia River (even though it was polluted only by logging runoff and other nonpoint sources) after California failed to establish a TMDL for this impaired instate waterway in a timely manner.¹¹⁷ The Court found that EPA’s interpretation of its TMDL rules, which did not distinguish between point and nonpoint pollution, as applicable to the Garcia River was at least entitled to substantial deference based on their persuasiveness under *Skidmore*.¹¹⁸ Congress had clearly entrusted it with responsibility of approving or disapproving section 303(d) lists submitted by states for TMDL determinations, the agency had specialized expertise in interpreting the Act which the court lacked, and the EPA had consistently interpreted the provisions at issue.¹¹⁹ Furthermore, in *Pronsolino*, the Court found that the EPA’s use of its federal authority to determine the Garcia River TMDL did not violate the balance of federal and state authority as established by the CWA or intrude upon the state’s traditional role in land use controls, as the EPA had left the ultimate decision of if and how to implement the Garcia River TMDL up to California.¹²⁰ The Court noted that the EPA recognized that implementation and monitoring were state responsibilities, and for this reason had expressly not included implementation or monitoring plans within the TMDL it had

116. *Id.* (footnote omitted); *see also* *United States v. Mead*, 533 U.S. 218, 226–27 (2001) (citing *Chevron, U.S.A., Inc. v. Natural Res. Def. Council, Inc.*, 467 U.S. 837 (1984)) (finding that an agency’s statutory interpretation is entitled to deference if “Congress delegated authority to the agency generally to make rules carrying the force of law, and . . . the agency interpretation claiming deference was promulgated in the [reasonable] exercise of that authority”).

117. *Pronsolino v. Nastri*, 291 F.3d 1139, 1141 (9th Cir. 2002).

118. *Id.* at 1134–35 (citing *United States v. Mead Corp.*, 533 U.S. 218, 227–28 (2001)) (“In the end, though, it does not much matter in this case whether we review the EPA’s position through the *Chevron* or *Skidmore/Mead* prism. Under both the more and less rigorous versions of the judicial review standard, the Agency’s position is . . . more than sufficiently supported by the statutory materials.”).

119. *Id.* at 1134.

120. *Id.*

prepared for the Garcia River.¹²¹ The division of federal-state authority identified by the Ninth Circuit in *Pronsolino* echoes Nixon's "New Federalism" doctrine, as discussed above in Part I.B, as well as the legislative goals of section 101(b) of the CWA.

More recently, in *Barnum Timber*, the plaintiff timber company challenged the EPA's approval of California's 2006 section 303(d) list of impaired waters under the CWA, claiming that the EPA's decision to retain Redwood Creek for temperature and sedimentation impairments was arbitrary and capricious.¹²² Barnum Timber owns property along the creek, located near Eureka. In the complaint, Barnum alleged that as a result of the EPA's decision to allow retention of this creek on California's section 303(d) List, Barnum had suffered from additional operational and management costs necessary to satisfy state-imposed land use regulations, including watercourse protection zones and timber harvest restrictions. Barnum also alleged that its property value had decreased as a result of Redwood Creek's TMDL designation.¹²³ Looking to precedent established by *Pronsolino* regarding the division of state and federal authority over TMDLs, the district court found that "EPA's challenged Section 303(d) decision, alone, imposes no restrictions or obligations on plaintiff or its land, but instead merely feeds into further planning steps under the Clean Water Act which may-or may not-lead to regulation of plaintiff's land."¹²⁴ The court found that Barnum failed to establish that its alleged injuries, which arose from state forestry regulations, were caused by or connected to the EPA's 2006 approval of California's listing of Redwood Creek. Thus, the court granted EPA's motion to dismiss on the grounds that plaintiff lacked standing to challenge the EPA's approval.¹²⁵ In December of 2008, the court denied the plaintiff's motion for leave to amend its complaint and entered final judgment for the EPA.¹²⁶ Represented by the Pacific Legal Foundation (PLF), Barnum Timber appealed the district court's decision. According to PLF, appeal briefing and oral argument has been completed and it is awaiting decision before the Ninth Circuit.¹²⁷

121. *Id.*

122. *Barnum Timber Co. v. EPA*, No. C 08-01988 WHA, 2008 WL 4447690 (N.D. Cal. Sept. 29, 2008).

123. *Id.* at *2, *5.

124. *Id.* at *4.

125. *Id.* at *5, *7.

126. *Id.*, at *1.

127. *Land Use Restrictions Should be Based on Defensible Data*, PAC. LEGAL FOUND., <http://community.pacificlegal.org/Page.aspx?pid=491> (last visited Dec. 15, 2010).

However, in *American Wildlands v. Browner*,¹²⁸ the Tenth Circuit held that the EPA's approval was not arbitrary or capricious¹²⁹ and that its interpretation of the CWA implicit in its approval of those standards (e.g., the Act does not grant the EPA authority to regulate nonpoint sources of pollution, and therefore, it is powerless to disapprove state anti-degradation review policies on the basis of how those policies deal with NPS pollution)¹³⁰ was permissible.¹³¹ In *American Wildlands*, the Tenth Circuit agreed with the district court's holding that nothing in the CWA demands that a state adopt a regulatory system for nonpoint sources. The Court further stated that, "In the Act, Congress has chosen not to give the EPA the authority to regulate nonpoint source pollution."¹³² Finally, the Circuit Court found that, "Because the Act nowhere gives the EPA the authority to regulate nonpoint source discharges, the EPA's determination—that Montana's water quality standards exempting nonpoint source discharges from anti-degradation review are consistent with the Act—is a permissible construction of the Act."¹³³ In sum, courts reviewing issues related to the NPS pollution control under the CWA have held that while the EPA can require the calculation of a TMDL for waters impaired solely by nonpoint source runoff,¹³⁴ and landowners subject to state-based land use and management restrictions must establish causation before challenging EPA's approval of a state's section 303(d) list,¹³⁵ the EPA is not required (and likely was not delegated authority) under the CWA to approve or disapprove state water quality regulations or policies directly addressing NPS pollution.¹³⁶

128. *Am. Wildlands v. Browner*, 260 F.3d 1192, 1192 (10th Cir. 2001) (challenging the EPA's approval under the CWA of Montana's water quality standards that provided a statutory exemption from anti-degradation review of nonpoint sources of pollution).

129. *Id.* at 1198–99.

130. *Id.* at 1197.

131. *Id.* at 1199.

132. *Id.* at 1197 (citing *Kennecott Cooper v. EPA*, 612 F.2d 1232, 1243 (10th Cir. 1979) (holding that the EPA lacks authority to regulate nonpoint sources of pollution); *Appalachian Power v. Train*, 545 F.2d 1351, 1373 (4th Cir. 1976) (stating that, "Congress consciously distinguished between point source and nonpoint source discharges, giving EPA authority under the [Clean Water] Act to regulate only the former").

133. *Am. Wildlands*, 260 F.3d at 1192.

134. *See Pronsolino v. Nastri*, 291 F.3d 1123, 1135–41 (9th Cir. 2002) (referencing other courts' discussions whether the EPA can require the calculation of a TMDL for waters impaired solely by nonpoint source runoff).

135. *See Barnum Timber Co. v. EPA*, No. C 08-01988 WHA, 2008 WL 4447690, at *7 (N.D. Cal. Sept. 29, 2008) (finding that plaintiffs did not properly establish causation and therefore did not have standing).

136. *See Am. Wildlands*, 260 F.3d at 1197 (finding that the EPA does not have delegated authority to regulate nonpoint source pollution).

2. Federal Authority to Require TMDL Implementation

While courts have consistently held that the EPA has a mandatory duty under the CWA to develop TMDLs if the states fail to do so,¹³⁷ and the EPA is authorized to require and approve TMDLs for waters affected solely by nonpoint sources,¹³⁸ beyond the successful completion of TMDLs as required under section 303(d) of the CWA, courts to date have held that the EPA cannot be compelled by citizen suits to implement these completed TMDLs or require states to develop and execute implementation plans addressing Load Allocations attributable to nonpoint sources.¹³⁹ Specifically, the Eleventh Circuit in *Sierra Club v. Meiburg* found that the district court had abused its discretion when it modified the terms of a consent decree to require that the EPA develop TMDL implementation plans on behalf of Georgia.¹⁴⁰

The TMDL dispute underlying the court's 2002 decision in *Meiburg* entailed a long history of related litigation dating back to the early 1990s. The Sierra Club had previously sued the EPA in *Sierra Club v. Hankinson* where it asked the district court to require the EPA to establish and implement TMDLs because Georgia had not done so.¹⁴¹ In 1994, the district court in *Hankinson* entered summary judgment for the Sierra Club,¹⁴² and issued an injunction requiring the EPA establish and implement TMDLs for all Georgia's water quality limited segments.¹⁴³ The EPA appealed this decision, but pending appeal, parties agreed to a consent decree that was entered by the district court in 1997.¹⁴⁴ Under this decree, EPA would establish TMDLs if Georgia continued to fail to do so, and all TMDLs were to be completed by 2004.¹⁴⁵ In 2000, dissatisfied with the progress toward

137. See *S.F. Bay Keepers v. Whitman*, 297 F.3d 877, 881 (9th Cir. 2002) (ruling that a state's failure to submit TMDLs will trigger the EPA's nondiscretionary duty to act); *Scott v. City of Hammond*, 741 F.2d 992, 997 (7th Cir. 1984) (stating that if the EPA disapproves a state's TMDL program the EPA must set its own TMDLs); *Sierra Club v. Hankinson*, 939 F. Supp. 865, 868, 871 (N.D. Ga. 1996) (requiring EPA to step in when states fail to fulfill their duties under CWA).

138. *Pronsolino*, 291 F.3d at 1141.

139. See *id.* at 1123 (providing that TMDLs are information tools that do not require implementation or enforcement); *Amigos Bravos v. Green*, 306 F. Supp. 2d 48, 56–58 (D.D.C. 2004) (concluding that "TMDL procedure . . . is not subject to challenge under the APA"); *City of Arcadia v. EPA*, 265 F. Supp. 2d 1142, 1144 (N.D. Cal. 2003) ("A TMDL does not, by itself, prohibit any conduct or require any actions.").

140. *Sierra Club v. Meiburg*, 296 F.3d 1021, 1034 (11th Cir. 2002).

141. *Sierra Club v. Hankinson*, 939 F. Supp. 865, 866 (N.D. Ga. 1996).

142. *Id.* at 872.

143. See *Meiburg*, 296 F.3d at 1027 (reviewing procedural history including *Hankinson*, 939 F. Supp. 865).

144. *Id.*

145. *Id.*

cleaner waters in Georgia and the extent of the EPA's related actions, the Sierra Club requested the district court re-open the 1997 consent decree and compel the EPA to prepare implementation plans for TMDLs.¹⁴⁶ The EPA responded that the 1997 decree did not obligate the Agency to prepare or execute implementation plans for TMDLs.¹⁴⁷ In its review, the district court found that the consent decree did require the EPA to develop implementation plans as well as to ensure that all Georgia-prepared plans were adequate.¹⁴⁸ However, on appeal the Eleventh Circuit in *Meiburg* found that the lower court's interpretation modified the terms of the consent decree, and that this modification was an abuse of discretion.¹⁴⁹

In *Meiburg*, the Eleventh Circuit observed that "The Act generally leaves regulation of non-point source discharges through the implementation of TMDLs to the states," and "Georgia has the primary authority and responsibility for issuing permits and controlling nonpoint source pollution in that state," while the "EPA, for its part, has supervisory authority over various reports and plans which the state is required by the Act to produce."¹⁵⁰ The court found the objective of the consent decree was to establish TMDLs, and that consistent with the CWA, it left "attainment of the Act's ultimate goal of cleaning up the water to the statutory and regulatory scheme which requires compliance by Georgia subject to some oversight by EPA."¹⁵¹ The court further held that in the consent decree, "EPA agreed only to a supervisory role with respect to some of these implementation-related processes, but it did not agree to take over the implementation process."¹⁵² Therefore, the consent decree was "still capable of and is in fact accomplishing what the parties set out to achieve with the decree: the establishment of TMDLs."¹⁵³ And thus, the lower court erred in modifying the decree in the course of interpreting its provisions.

Other recent TMDL-related cases have followed the lead of the Eleventh Circuit in *Meiburg*. In 2003, the U.S. District Court for the Northern District of California in *City of Arcadia v. EPA* (where affected cities challenged the EPA's promulgation of a TMDL for trash and subsequent approval of state's trash TMDLs) stated that, "TMDLs established under Section 303(d)(1) of the CWA function primarily as

146. *Id.* at 1028.

147. *Id.*

148. *Id.*

149. *Meiburg*, 296 F.3d at 1032, 1034.

150. *Id.* at 1025-27.

151. *Id.* at 1034.

152. *Id.*

153. *Id.*

planning devices and are not self-executing.”¹⁵⁴ The court in *City of Arcadia* further found, citing *Meiburg*, that a “TMDL does not, by itself, prohibit any conduct or require any actions. Instead, each TMDL represents a goal that may be implemented by adjusting pollutant discharge requirements in individual NPDES permits or establishing nonpoint source controls.”¹⁵⁵ In 2004, the U.S. District Court for the District of Columbia in *Amigos Bravos v. Green* cited both *Meiburg* and *City of Arcadia* in support of its distinction between EPA’s approval of TMDLs submitted by New Mexico from its alleged arbitrary approval of the state’s TMDL implementation plan included therein.¹⁵⁶ The *Amigos Bravos* court found that EPA’s correspondence regarding New Mexico’s TMDLs in no way approved or disapproved of the state’s implementation plan; thus, there was no reviewable final agency action concerning the plan, and the court lacked jurisdiction under the APA to review plaintiff’s challenge.¹⁵⁷ The court concluded that, “Furthermore, there is no statutory language requiring submission to or approval of a State’s implementation plan by the EPA; rather, the statute only requires that the EPA approve or disapprove a State’s TMDL.”¹⁵⁸ In sum, federal courts to date have found, at best, a very limited role for the EPA, beyond development, review, and approval of TMDLs calculations, in the implementation of TMDLs and regulation of nonpoint source pollution.¹⁵⁹

154. See *City of Arcadia v. EPA*, 265 F. Supp. 2d 1142, 1144 (N.D. Cal. 2003) (“TMDLs are primarily informational tools that allow the states to proceed from the identification of waters requiring additional planning to the required plans.” (citing *Pronsolino v. Nastri*, 291 F.3d 1123, 1129 (9th Cir. 2002))).

155. *Id.* at 1144–45 (citing *Meiburg*, 296 F.3d at 1025; *Idaho Sportsmen’s Coal. v. Browner*, 951 F. Supp. 962, 966 (W.D. Wash. 1996)).

156. See *Amigos Bravos v. Green*, 306 F. Supp. 2d 48, 56–58 (D.D.C. 2004) (discussing *Meiburg*, 296 F.3d 1021, and *City of Arcadia*, 265 F. Supp. 2d 1142, to support the distinction between arbitrary and non-arbitrary approval of state TMDL implementation plans).

157. *Id.* at 58.

158. *Id.* at 57.

159. But see *The Two Lost Books in the Water Quality Trilogy*, *supra* note 14, at 43 n.73 (“In *Pronsolino* the court intimated in dictum that those aspects of TMDLs that cannot be effectuated with point source discharge limitations must be addressed in the comprehensive planning provisions of section 303(e) (citations omitted). I and others have argued, however, that under 303(d), EPA has the authority to implement as well as promulgate TMDLs.” (citing *Integrated Approaches to Water Pollution*, *supra* note 14, at 290 n.504)); Jory Ruggiero, *Toward a Law of the Land: The Clean Water Act as a Federal Mandate for the Implementation of an Ecosystem Approach to Land Management*, 20 PUB. LAND & RESOURCES L. REV. 31, 54 (1999) (“Congress’ intent that TMDLs actually be implemented to improve water quality is clear. Once adequate TMDLs have been drafted, it should be possible to use the law to compel states and the EPA to implement TMDLs in ways that actually bring [Water Quality Limited Segments] into compliance with [Water Quality Standards].”).

3. The Success (or Failure) of New Federalism in Improving Water Quality

Many legal scholars have analyzed the successes and failures of the CWA and the new federalism approach it embraced to achieve its stated goals as well as the role TMDLs have played since the 1990s in prodding forward both federal and state assessments of unregulated nonpoint sources, which are largely responsible for continued water quality impairments.¹⁶⁰ Notably, in his 2003 review of the CWA as it turned thirty, Professor Adler observed that

Of course, the federalism policy of the CWA alone does not explain why large numbers of aquatic ecosystems remain physically and biologically impaired, and appear to be declining further, three decades after the 1972 CWA. It is also necessary to conclude that Congress's experiment of deferring largely to the states to address broader issues of pollution has failed because the states have failed to get the job done absent a stronger federal presence. Indeed, the very contrast between the degree of progress made in controlling discharges from point sources over the past thirty years, compared to the relative lack of success in controlling other forms of pollution, is evidence of the potential merits of a stronger federal-state partnership in the area of water pollution control more generally. If so, it is time for Congress to revisit the allocation of power between EPA and the states with respect to nonpoint source pollution control programs specifically and comprehensive pollution control efforts more generally.¹⁶¹

160. See generally *The Two Lost Books in the Water Quality Trilogy*, *supra* note 14, at 29 (discussing national water quality since enactment of the Clean Water Act); Flatt, *supra* note 65, at 603–04 (examining the deficiencies in the 1972 Clean Water Act); Jefferey M. Gaba, *New Sources, New Growth and the Clean Water Act*, 55 ALA. L. REV. 651, 652–53 (2004) (examining the federal implementation of TMDLs under the Clean Water Act); Jocelyn B. Garovoy, Note, “*A Breathtaking Assertion of Power*”? *Not Quite*. *Prosolino v. Nastri and the Still Limited Role of Federal Regulation of Nonpoint Source Pollution*, 30 ECOLOGY L.Q. 543, 548–50 (2003) (discussing the failure of the federal and state governments to adequately control nonpoint source pollution); Oliver A. Houck, *TMDLs, Are We There Yet?: The Long Road Toward Water Quality-Based Regulation Under the Clean Water Act*, 27 ENVTL. L. REP. 10,391, 10,401 (1997) [hereinafter *TMDLs, Are We There Yet?*] (describing the Clean Water Act as an experiment in cooperative federalism); Oliver A. Houck, *Clean Water Act Developments; 1999–2000*, SE55 A.L.I.-A.B.A. 107, 109 (2000) (noting that “TMDLs and water quality standards are where CWA 2000 is at” and that while TMDLs will be difficult, controversial and take a long time, “for the major and most intractable water pollution sources in this country—agribusiness, timber, grazing, construction, subdivisions and urban sprawl—they remain the only real game in town”).

161. *The Two Lost Books in the Water Quality Trilogy*, *supra* note 14, at 57–58.

In his analysis of the failure of the CWA to achieve the “overriding ecosystem integrity objective of the law” for “most aquatic ecosystems” Adler notes that “One possible explanation for this failure is that Congress simply failed to match its laudable rhetoric with adequate implementation tools and authority.”¹⁶² To achieve the unfulfilled goals of physical and biological integrity, he observes that, “In large part, this serious failure to meet the basic ecosystem integrity goal of the CWA may be attributed to Congress’s assignment to the states of the primary responsibility for controlling pollution from activities other than point source discharges of pollutants.”¹⁶³

On a similar note, in his 2004 article entitled *Spare The Rod and Spoil the Child: Why the Clean Water Act has Never Grown Up*, Professor Flatt observed the Nation’s continued water pollution problems are mostly associated with nonpoint sources, which “tellingly has been one of the biggest failures in the CWA.”¹⁶⁴ Flatt notes that while NPS sources are well understood and “the mechanism for controlling most of such pollution, i.e., land use controls, have long been recognized in the CWA itself,” the federal role here is “essentially one of advice and encouragement.”¹⁶⁵ He finds that “there is no discipline in the CWA that ensures that this clean-up enforcement of non-point sources will or must occur,”¹⁶⁶ and identifies the failure of adequate enforcement as the primary problem with the CWA. Flatt finds that, “This [failure of enforcement] is a problem from the top down and at all levels. Like an unruly child, the CWA needs constant vigilance . . . [and] without enforcement, the true goal of the CWA, . . . clean water, will not occur.”¹⁶⁷ In summary, while viewed as largely successful in controlling point sources of water pollution,¹⁶⁸ the predominance of agriculture, forestry, and urban development as continued sources of water quality impairment¹⁶⁹ underscore the general failure of the

162. *Id.* at 60.

163. *Id.* at 75.

164. Flatt, *supra* note 65, at 597.

165. *Id.* at 597–98.

166. *Id.* at 598–99.

167. *Id.* at 599.

168. See *The Two Lost Books in the Water Quality Trilogy*, *supra* note 14, at 48–49 (discussing the successes of CWA in controlling point sources of water pollution); Flatt, *supra* note 65, at 597–98 (recognizing that continuing pollution is largely associated with nonpoint source control rather than point source control); Oliver A. Houck, *TMDLs: The Resurrection of Water Quality Standards-Based Regulation Under the Clean Water Act*, 27 ENVTL. L. REP. 10,329, 10,329–30 (1997) (recognizing that enforcement of technology-based limits on water quality has produced significant results).

169. See *Basic Information*, U.S. ENVTL. PROTECTION AGENCY, http://www.epa.gov/owow_keep/NPS/whatis.html (last updated Feb. 10, 2010) (giving a basic definition of nonpoint source pollution and noting its prevalence and possible categories); *NPS Categories*, U.S.

CWA and its amendments to effectively address and encourage the control of these NPS pollution through state-based regulations, particularly those related to land use.

II. VERMONT'S LAKE CHAMPLAIN TMDL AND AGRICULTURAL NONPOINT SOURCES

This section provides an overview of Vermont's 2002 Phosphorus TMDL for Lake Champlain; evaluates Vermont's efforts to implement the TMDL; identifies problems presented by instate agricultural nonpoint sources, which contribute significantly to the Lake's water quality impairments; as well as reviews and evaluates Vermont's current regulations and programs related to agricultural NPS control.

A. Background on Lake Champlain's 2002 Phosphorus TMDL

The State of Vermont was required under section 303(d) of the CWA to prepare a TMDL for the Lake because phosphorus concentrations in many segments of the Lake have continued to exceed levels allowed under the Vermont Water Quality Standards since monitoring began in the early 1990s.¹⁷⁰ Approved by the EPA in 2002,¹⁷¹ the Lake Champlain Phosphorus

ENVTL. PROTECTION AGENCY, http://www.epa.gov/owow_keep/NPS/categories.html (last updated Feb. 10, 2010) (listing possible categories of nonpoint source pollution); Flatt, *supra* note 65, at 598 (attributing nonpoint source pollution to agriculture, silviculture, mining, and construction activities); *TMDLs, Are We There Yet?*, *supra* note 160, at 10,399 (“[N]onpoint source pollution has become the dominant water quality problem in the United States, dwarfing all other sources by volume and, in conventional contaminants, by far the leading cause of nonattainment for rivers, lakes, and estuaries alike. It is no secret to any observer of the Clean Water Act that the primary reason for this mushrooming problem is the fact that while other sources have been abated through required controls and their enforcement, no comparable controls or enforcement have been applied to agriculture, silviculture, and the rest of the nonpoint world.”).

170. VT. DEP'T OF ENVTL. CONSERVATION, FACT SHEET: LAKE CHAMPLAIN PHOSPHORUS TMDL (2002), *available at* http://www.anr.state.vt.us/dec//waterq/lakes/docs/lp_lctmdl-factsheet1.pdf.

171. Letter from Linda M. Murphy, Dir., Office of Ecosystem Prot., to Christopher Recchia, Comm'r, Vt. Dep't of Envtl. Conservation (Nov. 4, 2002), *available at* <http://www.epa.gov/region1/eco/tmdl/pdfs/vt/lakechamplain.pdf>. However, note the ongoing legal challenge by the Conservation Law Foundation (CLF) to the EPA's approval of the 2002 TMDL for the Lake, specifically the Agency's alleged failure to fulfill the requirements of the CWA and Administrative Procedure Act in reviewing and approving the TMDL submitted by Vermont's Department of Environmental Conservation. *See* Complaint for Declaratory Judgment and Injunctive Relief at 8–15, *Conservation Law Found. v. EPA*, No. 2:08-CV-238 (D. Vt. filed Oct. 28, 2009) (bringing allegations against the Agency in its review and approval of the TMDL including insufficiently stringent Wasteload Allocations and lack of reasonable assurances, failure to require a Margin of Safety, failure to accurately account for Point Sources, and failure to account for the effects of climate change on existing and assumed future water quality and pollution loading issues). During the spring and summer of 2009, the

TMDL was jointly prepared and submitted to the EPA by the States of Vermont and New York,¹⁷² which along with the Province of Quebec, share this unique, as well as nationally and internationally significant 120-mile long waterbody.¹⁷³ While surface area of Lake Champlain covers 435 square miles, its 8,234 square mile watershed/drainage basin encompasses almost half the land area of Vermont, as well as portions of northeastern New York and southern Quebec.¹⁷⁴ For phosphorus management and assessment purposes, the Lake has been divided into thirteen segments, and total phosphorus concentrations vary widely among these segments. In 2000, the Vermont Department of Environmental Conservation (DEC) identified nine lake segments as “impaired” in its section 303(d) List of Impaired Surface Waters due to phosphorus pollution.¹⁷⁵

Phosphorus enters the Lake from many different point and nonpoint sources located in Vermont, New York and Quebec. The total phosphorus load from all sources was estimated at 647 metric tons per year (mt/yr) during the 1991 hydrologic base year, with point sources then accounting for about twenty-nine percent of the loading, and with the remaining seventy-one percent from nonpoint sources, which includes natural background and ‘cultural’ or human-induced loading.¹⁷⁶ In 1999, a study then estimated that about fifty-six percent of the nonpoint source load into the Lake came from agricultural lands, about thirty-seven percent from urban or developed lands, and about seven percent from forestlands.¹⁷⁷ Of

U.S. District Court for the District of Vermont granted several stipulated motions for extension of time for service filed by CLF based on an agreement between the parties that these extensions would be best to facilitate already-initiated good faith settlement negotiations. Stipulated Motion to Extend Time for Service of the Complaint at 1–2, *Conservation Law Found. v. EPA*, No. 2:08-CV-238 (D. Vt. filed Oct. 14, 2009). In late September 2009, the District Court granted an unopposed motion to intervene as a party defendant filed by the Vermont Agency of Natural Resources (ANR). In its Response to this belated Motion to Intervene, the EPA clarified that it had welcomed the ANR’s participation in ongoing settlement negotiations throughout 2009, but ANR declined. Response of the U.S. EPA to the Unopposed Motion of the Vt. ANR to Intervene as a Party Defendant at 2, *Conservation Law Found. v. EPA*, No. 2:08-CV-238 (D. Vt. filed Sept. 29, 2009). As part of its Order made on October 15, 2009, the Court granted CLF’s motion to extend time to serve ANR with a complaint to January 18, 2010 to facilitate settlement negotiations. Stipulated Motion to Extend Time for Service of the Complaint at 1–2, *Conservation Law Found. v. EPA*, No. 2:08-CV-238 (D. Vt. filed Oct. 14, 2009).

172. LAKE CHAMPLAIN PHOSPHOROUS TMDL, *supra* note 114, at 1.

173. *Lake Champlain*, LAKE CHAMPLAIN PUBLISHING COMPANY, http://www.lakechamplainpub.com/Lake_Champlain.htm (last visited Dec. 15, 2010).

174. LAKE CHAMPLAIN PHOSPHOROUS TMDL, *supra* note 114, at 1. Although important, issues related to interstate and international cooperation and collaboration within the Lake Champlain Basin are not addressed in this article.

175. *Id.* at 2–3.

176. *Id.* at 4.

177. *Id.* However, a recent study estimates different percentages of NPS phosphorus loading among primary land use categories than those included in the 2002 TMDL. AUSTIN TROY ET AL., LAKE

the total load of 647 mt/yr of phosphorus entering the Lake during the 1991 base year from all sources, Vermont's cultural nonpoint sources were estimated to account for about thirty percent of the total phosphorus loading (compared to about eight percent and nine percent respectively from cultural nonpoint sources in New York and Quebec).¹⁷⁸ While the percentage of Vermont's NPS loading from identified land use categories (e.g., forest, developed and agricultural lands) varies among lake segments, in 2000 agricultural lands were estimated to account for over eighty percent of the NPS load in the Northeast Arm, St. Albans Bay, and Missisquoi Bay lake segments.¹⁷⁹ The approved TMDL requires an overall load reduction of 80 mt/yr (twenty-seven percent) from NPS in Vermont from estimated 1991 levels.¹⁸⁰

While not required under the CWA, the 2002 TMDL contains state-specific plans for both Vermont and New York, which include "some specific considerations for implement[ation]."¹⁸¹ Vermont's 2002 implementation plan identifies the VT DEC's ongoing river basin planning process (also called the Vermont Watershed Initiative, discussed at length in Part IV.B) as playing an important role in TMDL implementation and envisions resulting river basin plans to aid "on-the-ground collaborative efforts to restore and protect [water-related] resources" within the State's seven major river watersheds that drain into the Lake.¹⁸² The 2002 implementation plan also identifies the need for a "sustained and enhanced commitment" to existing state and federal cost-share programs which "help farmers comply" with Vermont's Accepted Agricultural Practices (AAPs) and install voluntary BMPs.¹⁸³ Vermont established the Clean and Clear Program in 2003 and a related Center in 2007 to strengthen cooperation between the State's Agency of Natural Resources (ANR, which includes the

CHAMPLAIN BASIN PROGRAM, UPDATING THE LAKE CHAMPLAIN BASIN LAND USE DATA TO IMPROVE PREDICTION OF PHOSPHORUS LOADING 1-2, 27-28, 50 tbl.2-13 (2007). Specifically, a 2007 assessment using 2001 satellite imagery estimated NPS phosphorus loading of about forty-six percent from suburban and urban developed land and about thirty-eight percent from agricultural lands, but included wide variations among sub-watersheds. *Id.* For example, agricultural land use was still found to be the highest contributor of phosphorus (about seventy percent) in the Missisquoi Bay watershed. *Id.* Factors contributing to the increased proportion of the Load Allocation attributable to urban sources included: corrections for previous underestimates of urban land cover; increased urban and suburban development in some areas of the Lake's drainage basin between 1992 and 2001, especially within Chittenden County and around St. Albans; and more years of water quality monitoring and precipitation data. *Id.*

178. LAKE CHAMPLAIN PHOSPHOROUS TMDL, *supra* note 114, at 5.

179. *Id.* at 34.

180. *Id.* at 36.

181. *Id.* at 48.

182. *Id.* at 48-49.

183. *Id.* at 90.

DEC) and Agency of Agriculture, Food, and Markets (AAFV) and help reduce phosphorus loading of the Lake and its extensive drainage basin (or hereinafter “the Basin”).¹⁸⁴

However as of 2008, long-term in-lake monitoring data showed that phosphorus levels were still too high in most parts of the Lake. The Northeast Arm, St. Albans Bay, and Missisquoi Bay lake segments have not met established targets in any of the last five years and phosphorus levels in these impaired segments are either increasing or showing no discernable trends.¹⁸⁵ Furthermore, recent Lake monitoring data shows that primarily Vermont-based NPS loads “greatly exceed TMDL targets.”¹⁸⁶ Factors attributed to Vermont’s high NPS load include the conversion of both agricultural and forest lands to developed land and the “inadequate implementation” of BMPs on farms and within developed areas.¹⁸⁷ While pollution attributed to point sources—identified by the Lake Champlain Basin Program (LCBP, which has funded long-term monitoring of phosphorus and other water quality indicators since 1992) to include “mainly wastewater treatment plants,” and industrial discharges—has been dramatically reduced and is now estimated to contribute less than ten percent of the Lake’s total phosphorus load as of 2008, “runoff from non-point sources [specifically identified by LCBP to include, “runoff from impervious surfaces such as roads, rooftops and other developments, storm drains, fertilized lawns, eroded riverbanks, manure and other farm agricultural runoff”] contributes the remaining 90% of the [Lake’s] total phosphorus load.”¹⁸⁸ In a fairly stern letter from the EPA’s Region 1 office

184. LCBP REPORT 2008, *supra* note 103, at 3; *see also* VT. AGENCY OF NATURAL RES. & VT. AGENCY OF AGRIC., FOOD & MKTS., VERMONT CLEAN AND CLEAR ACTION PLAN ANNUAL REPORT 2008, at 1 (2009) [hereinafter VERMONT CLEAN AND CLEAR ACTION PLAN ANNUAL REPORT 2008] (summarizing the goals and purposes of the Clean and Clear Action Plan).

185. LCBP REPORT 2008, *supra* note 103, at 4; *see also* GREEN MOUNTAIN INST. FOR ENVTL. DEMOCRACY, PERFORMANCE AUDIT OF VERMONT CLEAN AND CLEAR, at v (2008) (finding that “there have been no significant reductions in phosphorus loads to Lake Champlain from the sum of [Clean and Clear] programs although individual programs are responsible for some probable reductions”).

186. LCBP REPORT 2008, *supra* note 103, at 6.

187. *Id.*

188. *Id.* at 7. “The LCBP was created by the federal Lake Champlain Special Designation Act of 1990.” *Id.* at i. The mission of the LCBP is to coordinate the implementation of the Lake’s management plan, and Program partners include the States of New York and Vermont, Province of Quebec, the U.S. EPA and other federal agencies, the New England Interstate Water Pollution Control Commission, and local government leaders, businesses, and citizen groups. *Id.* The Lake Champlain Steering Committee leads the LCBP, and its members include many of the Program’s partners, as well as chairpersons of its technical, cultural heritage and recreation, education, and citizen advisory committees. Primary funding for the LCBP comes from an EPA appropriation made under the CWA. *Id.* However, it is notable that the Lake’s point versus nonpoint source breakdown of ten percent and ninety percent respectively, as reported by the LCBP, is considered “pretty blurry” by some Vermont-based environmental advocate

in 2008 regarding Lake-related water quality issues, the Regional Director of the Office of Ecosystem Protection observed that while “loading from [wastewater treatment] plants, have been reduced, there appears to be not enough progress in reducing the loads from other sources, such as agricultural nonpoint sources and urban stormwater runoff.”¹⁸⁹ Further, the EPA concurred with the DEC assessment, “expressed at [a March 2008] meeting, that restoring Lake Champlain will not be possible without successfully addressing agricultural and urbanized nonpoint sources of phosphorus.”¹⁹⁰ Finally, Region 1 highlighted its continued concern regarding the “lack of progress toward seeing water quality improvements in most lake segments, as well as the large measured tributary loads entering the lake even after almost six years of TMDL implementation.”¹⁹¹

Responding to concerns associated with the continued impairment of the Lake’s water quality by phosphorus, Vermont’s General Assembly passed Act No. 130, entitled “The Cleanup of Lake Champlain and Other State Waters,” which became effective in May 2008.¹⁹² This Act as related

groups. Email from Anthony Iarrapino, Conservation Law Found., to author (Mar. 3, 2010, 15:51 EST) (on file with author). Specifically, Iarrapino aptly observes that these statistics ignore the fact that many discrete stormwater point sources that should be regulated through the NPDES program under sections 402(p)(2)(E) and (p)(6) of the CWA, and implementing regulations included at 40 C.F.R. §§ 122.26(a)(9)(i)(C) and (D), or through the EPA’s MS4 program are incorrectly accounted for as NPS. Anthony Iarrapino, Conservation Law Found., to author, pers. comm. Similarly, Iarrapino observes that this ninety-percent statistic also assumedly counts combined sewer overflows as NPS, even though they are clearly point sources and have long been regulated as such by EPA. He finds that

[the state simply has no reliable method by which to calculate the sizeable [phosphorus] contribution of such sources that are susceptible to NPDES regulation but have not yet been NPDES-regulated because of state and EPA inaction. Montpelier is a classic example. It is not currently in the MS4 program despite the fact that the majority of the City is built in the Winooski River floodplain with nearly all of its impervious surfaces draining to the River without any stormwater treatment. As you drive along [Vt. Rte.] 2, you can see the big pipes protruding from the riverbank. Those are PIPES—hence the pollution they convey is not NPS, but is point source. Because ANR/DEC have no method for monitoring the phosphorus inputs from pipes or ‘discrete conveyances’ like that, they simply count it as NPS. In other words, everything that is not a discharge from the end of a wastewater pipe is considered NPS even if it is definitionally point-source pollution.

Id. For further discussion and pending litigation related to this legal issue, see *In re Montpelier WWTP Discharge Permit*, No. 22-2-08 Vtec (Vt. Envtl. Ct. June 30, 2009) (Durkin, J.), available at <http://www.vermontjudiciary.org/gtc/Environmental/ENVCRT%20Opinions/Montpelier%20WWTF%20Discharge%20Permit%2022-2-08%20Vtec%20Decision%20on%20Cross-MSJ.pdf>; *In re Montpelier WWTP Discharge Permit*, No. 2009-286 (Vt. argued Mar. 17, 2010), and associated filings.

189. Letter from Stephen S. Perkins, Dir., Office of Ecosystem Prot., U.S. EPA Region 1, to Laura Pelosi, Comm’r, Vt. Dep’t Envtl. Conservation (Apr. 30, 2008).

190. *Id.*

191. *Id.*

192. Act 130, VT. STAT. ANN. tit. 10, § 1386 (Supp. 2009).

to the Lake, codified at title 10, section 1386, requires the ANR to amend the implementation plan for the Vermont-specific portion of the Lake TMDL by January 15, 2010.¹⁹³ The Act also requires that the plan include “a comprehensive strategy for implementing the Lake Champlain [TMDL] plan and for the remediation of Lake Champlain.”¹⁹⁴ Specifically, this legislation states that, among other elements, the implementation plan shall “manage discharges to Lake Champlain consistent with the federal Clean Water Act,” “develop a process for identifying critical source areas for [NPS] pollution in each subwatershed [e.g., river basin],” and “develop site-specific plans to reduce both point source and nonpoint source load discharges in critical source areas.”¹⁹⁵ The Act further finds that beginning January 13, 2013, the ANR must update and amend the Lake’s revised TMDL implementation plan after consulting with the AAFM, all interested state environmental and business organizations, the Vermont League of Cities and Towns, the University of Vermont Rubenstein Ecosystem Science Lab, and other interested parties, as well as reporting to the General Assembly and holding at least three public hearings regarding proposed plan amendments.¹⁹⁶ Finally, Act 130 specifies that beginning in February of 2009, the ANR must submit a summary to the General Assembly reporting on activities and progress for all programs supported by the state’s Clean and Clear Program.¹⁹⁷

In December 2009, the state’s Clean and Clear Program released its revised draft of the Lake’s 2002 TMDL implementation plan for a two-week public review and comment period.¹⁹⁸ Based on public input provided by “a broad-based group of stakeholders” during the summer of 2009, the ANR identified thirteen key threats to the Lake’s water quality, including: land conversion (e.g., from existing crop and/or forest lands to developed lands), discharges from farms and agricultural production areas, as well as poorly managed cropland.¹⁹⁹ Further, involved stakeholders, as well as state and federal agency staff, ranked these three threats among the top five

193. *Id.*

194. *Id.*

195. *Id.*; *id.* § 1386(a)(3) (defining “critical source area” as “an area in a watershed with high potential for the release, discharge, or runoff of phosphorus to the waters of the state”).

196. *Id.* § 1386(c).

197. *Id.* § 1386(d).

198. See *Governor’s Clean and Clear Action Plan*, VT. AGENCY OF NAT. RESOURCES, <http://www.anr.state.vt.us/cleanandclear/new.cfm> (last visited Dec. 15, 2010).

199. VT. AGENCY OF NATURAL RES., PUBLIC REVIEW DRAFT OF THE IMPLEMENTATION PLAN FOR THE LAKE CHAMPLAIN PHOSPHORUS TMDL: EXECUTIVE SUMMARY 1–2 (2009) [hereinafter EXECUTIVE SUMMARY], available at <http://www.anr.state.vt.us/cleanandclear/news/exec%20summary-public%20review%20draft.pdf>.

threats to the Lake's water quality.²⁰⁰ In its revised implementation plan, the ANR included strategies to address identified threats to the Lake's water quality, separating them into current actions, next steps (to be taken, budget permitting, between 2010 and 2016), and future measures (that may or may not be necessary, at some future point in time, beyond 2016).²⁰¹ The ANR proposes the implementation of identified strategies using three policy tools, including expanded regulatory requirements, financial incentives and technical assistance.²⁰² However, in the "Next Ten Steps" included within its Executive Summary, as well as the revised Implementation Plan—the ANR primarily focuses on providing financial incentives, as well as increasing technical assistance, to support farmers in their voluntary efforts to decrease agricultural land use and management contributing to NPS pollution.²⁰³ While briefly identifying the need to more clearly link watershed/basin/river corridor plans to land use plans as a current action, the Plan does not set forth a clear vision, goal or objective on how to more effectively integrate agricultural land use and management into the framework of existing or modified statewide or local planning and regulatory efforts aimed to address impaired water quality.²⁰⁴

Finally, with a price tag of \$500-800 million (in 2009 dollars) as the total cost of implementing strategies in the revised Implementation Plan (most of which include providing financial incentives for affected landowners),²⁰⁵ and given the State's well-known budget problems and likely future shortfalls, it remains highly uncertain whether many of the proposed strategies included in the revised 2010 TMDL Implementation Plan will in fact be implemented. Thus, while providing a detailed and seemingly "comprehensive strategy for implementing the Lake Champlain total maximum daily load plan and for the remediation of Lake Champlain,"²⁰⁶ as required of it by the Vermont General Assembly, the revised implementation plan does not go far enough (especially given its

200. *Id.* at 2.

201. See generally VT. AGENCY OF NATURAL RES., REVISED IMPLEMENTATION PLAN: LAKE CHAMPLAIN TMDL (2010), available at <http://www.anr.state.vt.us/cleanandclear/news/TMDL%20impl%20plan%20final%20-%20011510.pdf> [hereinafter REVISED IMPLEMENTATION PLAN: LAKE CHAMPLAIN TMDL] (outlining current and future budget permitting actions to regulate TMDLs in Lake Champlain).

202. EXECUTIVE SUMMARY, *supra* note 199, at 2.

203. *Id.* at 3.

204. REVISED IMPLEMENTATION PLAN: LAKE CHAMPLAIN TMDL, *supra* note 201, at 10.

205. EXECUTIVE SUMMARY, *supra* note 199, at 5; see also REVISED IMPLEMENTATION PLAN: LAKE CHAMPLAIN TMDL, *supra* note 201 (identifying sources to be allocated financial assistance in implementing the Clean & Clear Plan).

206. VT. STAT. ANN. tit. 10, § 1386(a) (1998).

heavy reliance on voluntary financial incentives and cost-share programs that may not be funded), to reduce pollution stemming from unchecked agricultural nonpoint sources that continue to impair water quality. In conclusion, the recently revised Implementation Plan for the Lake Champlain TMDL, as developed by the State of Vermont's Clean and Clear Program and ANR, does not propose to effectively utilize many available planning and regulatory mechanisms. These mechanisms could provide a process for increasing legally binding local/regional land use controls or mandatory state/watershed-based regulations for agricultural land use and management, particularly for the State's smaller farming operations, which are discussed below.

B. Existing State Water Quality Laws and Regulations

Vermont's existing legislation related to water quality is primarily included in Titles 6 and 10 of the Vermont Statutes Annotated (V.S.A.), which respectively encompass laws related to "Agriculture" and "Conservation and Development."²⁰⁷ These statutes delegate authority to promulgate implementing rules to the Secretary of the AAFM,²⁰⁸ and the Secretary of the ANR.²⁰⁹ It also delegates authority to the Vermont Natural Resources Board (NRB) to adopt rules for water quality as necessary to achieve state water classifications.²¹⁰ The General Policy of the rules adopted by the NRB, referred to as the "Vermont Water Quality Standards," is to "achieve the goals of the Vermont Water Quality Policy . . . [included in 10 V.S.A § 1250], as well as the objective of the federal Clean Water Act (33 U.S.C. § 1251 et seq.)"²¹¹

While not defined in the CWA, the Vermont Water Quality Standards define "Nonpoint source waste" to mean "waste that reaches waters in a diffuse manner from any source other than a point source including, but not limited to, overland runoff from construction sites, or as a result of agricultural or silvicultural practices."²¹² Further, title 10, section 1259(a) of the Vermont statutes prohibits the discharge of "any waste [including NPS

207. See e.g., VT. STAT. ANN. tit. 6, §§ 4801–4951 (2009) (regarding agricultural water quality); VT. STAT. ANN. tit. 10, §§ 1250–1386 (regarding water pollution control).

208. VT. STAT. ANN. tit. 6, §§ 4802, 4810(a) (1998).

209. VT. STAT. ANN. tit. 10, § 1251a(a).

210. See VT. STAT. ANN. tit. 10, § 1252(e); see also Vermont Water Quality Standards, chapter 052, CODE OF VT. RULES 12 004 052 (effective Jan. 1, 2008), available at <http://www.michie.com/vermont/lpext.dll?f=templates&fn=main-h.htm&cp=vtadmin> (adopting rules regarding Vermont's Water Quality Standards).

211. CODE OF VT. RULES § 1-02 at 12 004 052.

212. *Id.* § 1-01(B)(32) at 12 004 052.

waste], substance or material into waters of the state” without a permit for that discharge from the ANR Secretary, but provides a statutory exemption to the “proper application of fertilizer to fields and crops.”²¹³ This legislation also provides that the ANR Secretary, to the extent compatible with federal law, “shall delegate to the secretary of agriculture, food and markets the state agricultural non-point source pollution control program planning, implementation and regulation.”²¹⁴

The Vermont General Assembly found the management of stormwater runoff necessary to reduce pollution and the adverse effects of stormwater runoff,²¹⁵ and therefore directed that the ANR Secretary’s stormwater management program “shall include, at a minimum provisions that: (1) Indicate that primary goals of the state program will be to assure compliance with the Vermont water quality standards,”²¹⁶ and is consistent with the State’s 2002 stormwater management manual.²¹⁷ However, related legislation provides a statutory exemption for stormwater “runoff from farms subject to accepted agricultural practices [AAPs]” adopted by the AAFM Secretary, and “runoff from silvicultural activities subject to accepted management practices adopted by the commissioner of forests, parks and recreation.”²¹⁸ Thus, the ANR Secretary has used his/her authority to adopt rules related to the review and issuance of permits for stormwater runoff from impervious surfaces, construction sites and industrial facilities, which are implemented by the DEC’s Water Quality Division.²¹⁹ However, the AAFM is currently charged with promulgating regulations related to controlling NPS runoff from agricultural practices.

Further, the DEC’s Water Quality Division is also responsible for implementing the Vermont’s 2002 Wetland Rules, as adopted by the NRB under authority provided by title 10, section 905(7)–(9) of the Vermont statutes.²²⁰ These Rules protect the first two classes of wetlands (Class One and Class Two) as identified on the Vermont Significant Wetlands Inventory

213. VT. STAT. ANN. tit. 10, § 1259(a) (Supp. 2009).

214. *Id.* § 1259(i).

215. *Id.* § 1264(a).

216. *Id.* § 1264(b)(1).

217. *Id.* § 1264(e)(1).

218. *Id.* §§ 1264(e)(2)(A), (C).

219. See VT. DEP’T ENVTL. CONSERVATION, STORMWATER 101: AN INTRODUCTION TO THE VERMONT STORMWATER PROGRAM 1 (2006), available at http://www.anr.state.vt.us/dec/waterq/stormwater/docs/sw_stormwater_101_9-25-06.pdf (describing state stormwater permit program).

220. See Vermont Wetland Rules, chapter 056, §§ 1.1, 4.2, CODE OF VT. RULES 12 004 056 (2002), available at <http://www.michie.com/vermont/lpext.dll?f=templates&fn=main-h.htm&cp=vtadmin>.

and provide associated buffer zones (100-foot buffers for Class One and 50-foot buffers for Class Two wetlands).²²¹ In general, wetlands help protect surface water quality, including waters ultimately flowing into the Lake, by retaining overland stormwater flows and filtering pollutants from this runoff.²²² However, similar to the State's water quality legislation, the 2010 Wetland Rules provide a regulatory exemption for areas used to grow food or crops in relation to farming activities or in ordinary rotation as of 1990.²²³ Further, many farming activities not exempted and thus subject to the Wetland Rules are permitted as an allowed use in most protected wetlands (if in compliance with the most recent AAPs), as well as many silvicultural activities (if in compliance with Accepted Management Practices as allowed under section 1259).²²⁴

Vermont's AAPs are rules, promulgated by the Secretary of the AAFM under authority granted by title 6, section 4810(a), which adopt base-level management standards to be followed when any individual or corporation conducts any in-state agricultural activities.²²⁵ The AAPs adopt the broad definition of "farming" from title 10, section 6001, which includes the cultivation or other use of land for growing food or fiber, and the raising, feeding or management of livestock.²²⁶ First adopted in 1995, the AAPs were revised by the AAFM in 2006.²²⁷ Updated rules require vegetated buffers and limit manure application within ten feet of identified adjoining surface waters.²²⁸ As observed by the AAFM, "agriculture remains one of the most significant potential sources of nonpoint source pollution. Inadequate animal waste, soil and nutrient management results in nutrient loading to surface[s] . . . [and a] large fraction of [NPS] pollution is a result of cropland erosion."²²⁹ However, the AAFM also finds that Vermont's AAPs "are intended to *reduce, not eliminate*, pollutants associated with [NPS] such as sediments, nutrients and agricultural chemicals that can enter surface water, groundwater and State Significant wetlands that would

221. Vermont Wetland Rules, chapter 056, §§ 4.2, CODE OF VT. RULES 12 004 056 (2010), available at <http://www.michie.com/vermont/lpext.dll?f=templates&fn=main-h.htm&cp=vtadmin>.

222. *Id.* § 5.2

223. *Id.* § 3.1. Note that this exemption expires when the area is no longer used for agricultural purposes.

224. *Id.* §§ 6.01, 6.06.

225. VT. STAT. ANN. tit. 6, § 4810(a) (2009).

226. VT. STAT. ANN. tit. 10, § 6001 (2009).

227. VT. AGENCY OF AGRIC., THE AG-PHOSPHORUS STORY 2007, at 46, 61 (2007), available at <http://www.vermontagriculture.com/ARMES/awq/documents/2007AgWaterQuality.pdf>.

228. See *Accepted Agricultural Practice Regulations*, VT. AGENCY OF AGRIC. (Apr. 24, 2006), www.vermontagriculture.com/ARMES/awq/AAPs.htm (stipulating specific requirements regarding vegetated buffers and limited manure application).

229. *Id.*

degrade water quality.”²³⁰ Implementation of AAPs creates a rebuttable presumption of compliance with Vermont Water Quality Standards and Vermont Wetland Rules.²³¹ However, this presumption can be overcome by water quality data or results from a water quality study “deemed as conclusive by the Secretary of ANR.”²³²

While the State’s AAPs include enforcement procedures for violations, by their own terms AAPs provide broad enforcement discretion to the AAFM, which it has historically used very sparingly. Procedurally, if the AAFM Secretary determines that a person engaged in farming is not managing his or her farm in a manner that is consistent with AAPs, then the Secretary “may” issue a written warning and following an opportunity for a hearing “may” serve a cease and desist order, assess administrative penalties, or commence other appropriate proceedings (including seeking a temporary or permanent injunction).²³³ However, while the AAFM reports that the number of AAFM actions related to AAPs has increased since 2003; over a five-year period the Agency issued five cease and desist orders and assessed fourteen administrative penalties (of which eight were issued in 2008).²³⁴ Further, the introduction to the AAPs describes a mechanism whereby the AAFM can follow through on enforcement activities in cooperation with the ANR. For most AAP violations, the AAFM is supposed to take the lead in ensuring compliance, whereas the ANR exercises its enforcement authority only when there are water quality violations defined as ‘discharges’ to surface waters (e.g., jurisdictional under the CWA, such as from a CAFO). However, statistics “on compliance and enforcement show that the frequency of [AAFM] enforcement actions that result in referral to ANR is small[,]” which underscores the State’s general lack of enforcement against CAFOs (or other farm operations that don’t qualify as CAFOs but have point source discharges).²³⁵

In a somewhat more proactive step, the AAFM recently (in 2007) revised the rules for Large Farm Operations, which detail the individual permitting process required for farms that have more than 700 mature dairy cows (whether milking or dry); 1,000 beef cattle or cow/calf pairs; or

230. *Id.* (emphasis added).

231. *Id.*

232. *Id.*

233. *Id.*

234. VERMONT CLEAN AND CLEAR ACTION PLAN ANNUAL REPORT 2008, *supra* note 184, at 14 fig.1.

235. See GREEN MOUNTAIN INST. FOR ENVTL. DEMOCRACY, *supra* note 185, at 89–90 (providing enforcement statistics as part of the Performance Audit for Vermont Clean and Clear as required by Section 6 of Act 43 of the 2007 session of the Vermont Legislature).

82,000 laying hens (without a liquid manure handling system).²³⁶ In 2008, this permitting process was applied to sixteen dairy producers, one beef producer, and one egg producer.²³⁷ The AAFM also issued a General Permit in 2007 for Medium Farm Operations (MFOs), which include dairy farms with 200-699 mature dairy cows.²³⁸ The General Permit requires the 157 MFOs (ninety percent of which were dairy operations) to operate under an approved Nutrient Management Plan and maintain twenty-five foot vegetated buffers on all fields adjacent to surface waters, as well as prohibits manure application within these buffers.²³⁹ However, to improve regional water quality, the State also needs to more actively monitor and pursue enforcement actions against LFOs which violate conditions of their individually issued permits, as well as against MFOs that may not be in compliance with specific General Permit conditions. Furthermore, to achieve the Lake's TMDL total phosphorus load reduction targets and improve impaired water quality, the State and ANR must assume their federally-delegated responsibilities and administer Vermont's NPDES program in accordance with the CWA and applicable federal regulations. Specifically, the ANR must immediately step up to the plate and require NPDES permits for all Vermont farms that discharge or propose to discharge pollutants and meet the federal definition of a CAFO which is statutorily identified as a point source in 33 U.S.C. § 1362(14), including: all LFOs, which by definition qualify as Large CAFOs under 40 C.F.R. § 122.23(b)(4); MFOs which qualify as Medium CAFOs (based on combined size and discharge requirements under 40 C.F.R. § 122.23(b)(6)); as well as any other designated Animal Feeding Operation (AFO) which is determined by the State Director or Regional EPA Administrator "to be significant contributor of pollutants to waters of the [U.S.]" under requirements and factors enumerated in 40 C.F.R. § 122.23(c).²⁴⁰

236. *Large Farm Operations (LFO) Program*, VT. AGENCY AGRIC. (Dec. 16, 2010), <http://www.vermontagriculture.com/ARMES/awq/LFO.html>; see also VT. AGENCY OF AGRIC., FOOD & MKT., *LARGE FARM OPERATIONS RULES 3* (2007), available at <http://www.vermontagriculture.com/ARMES/awq/documents/LFORules.pdf> [hereinafter *LARGE FARM OPERATIONS RULES*] ("[E]stablish[ing] procedures and standards for the preparation and review of large farm operations permit applications, the issuance of permits for the operation or the expansion of large farms, the construction of new buildings, or the expansion of existing buildings for large farm operations in Vermont, [as well as] procedures and standards for permit amendments, permit compliance, . . . permit enforcement [and] direction on maintaining the facility once permitted.").

237. VERMONT CLEAN AND CLEAR ACTION PLAN ANNUAL REPORT 2008, *supra* note 184, at 19.

238. VT. AGENCY OF AGRIC., FOOD & MKT., *GENERAL PERMIT FOR MEDIUM FARM OPERATIONS 4* (2007), available at http://www.vermontagriculture.com/ARMES/awq/documents/GP_for_MFOs.pdf.

239. *Id.* at 21.

240. See *supra* notes 19 and 20. For details and specifics on the many differences between the AAFM's current regulations for in-state farming operations (e.g., LFOs and MFOs) and the EPA's CAFO

Furthermore, based on violations identified via agency follow-ups on citizen reports and increased compliance monitoring, ANR should actively and aggressively commence CWA enforcement actions against any and all agricultural point source polluters, including CAFOs.

Finally, the AAFM encourages but does not require, the development of Nutrient Management Plans for the just over 900 remaining farms in Vermont identified as Small Farm Operations (SFOs) (farms with less than 200 dairy mature cows).²⁴¹ While SFOs currently have “no programmatic system for inspection other than complaints from the public or staff initiated visits,” the AAFM acknowledges that “[m]ore information is needed” regarding these small but numerous in state farming operations.²⁴² However, while the AAFM finds that small farms receive limited state oversight, SFOs are like other persons/companies who qualify as engaged in “farming” or “agricultural practices” and are thus presumed to comply with AAPs related to water quality and are statutorily exempt from local zoning regulations or other municipal bylaws.²⁴³

Finally, while municipalities are statutorily allowed to define public nuisances,²⁴⁴ agricultural activities, if consistent with applicable laws and regulations (such as Vermont’s AAPs) and established before surrounding non-agricultural activities, are entitled to a rebuttable presumption that their activities are reasonable and do not constitute nuisances.²⁴⁵ In sum, while Vermont’s laws and regulations attempt to address the effects of NPS pollution, existing state legislation and rules provide remarkably broad and generous exemptions for established agricultural and silvicultural operations, especially for SFOs that comprise an overwhelming majority of the State’s current farming operations. Unfortunately, the revised 2010 TMDL Implementation Plan for the Lake developed by ANR through the

regulations, the ANR’s refusal to regulate existing CAFOs in Vermont that clearly qualify for NPDES coverage, as well as documented discharges from CAFOs of various sizes in Vermont and problematic discharge areas, see Vt. Law School, Env’tl. and Natural Resources Law Clinic [filed on behalf of their client, the Conservation Law Foundation], *Petition for Withdrawal of the Natl. Pollutant Discharge Elimination System [NPDES] Delegation from the State of Vt.* 36–49 (filed Aug. 14, 2008 with EPA Administrator Johnson and Region 1 Administrator Varney).

241. See *Land Treatment Planning*, VT. AGENCY OF AGRIC., <http://www.vermontagriculture.com/ARMES/awq/LTP.html> (last visited Dec. 15, 2010) (indicating what a land treatment plan includes and providing links to additional resources).

242. VERMONT CLEAN AND CLEAR ACTION PLAN ANNUAL REPORT 2008, *supra* note 184, at 16.

243. See VT. STAT. ANN. tit. 24, § 4413(d) (2006) (noting that under this provision local zoning or bylaws also cannot regulate accepted agricultural and silvicultural practices).

244. *Id.* § 2291(14).

245. VT. STAT. ANN. tit. 12, § 5753(a) (noting however that § 5753(b) does provide an express clause, effective as of 2004, asserting that it does not limit the authority of state or local health boards to abate nuisances affecting the public health).

State's Clean and Clear Program does not propose to sufficiently narrow many of these exceptions in the near future (e.g., next five years), nor does it more generally provide long-term solutions that will comprehensively address persistent and continued NPS pollution from instate agricultural land use and management.

III. STATE IMPLEMENTATION OF TMDLS: A TOOLBOX OF LEGAL MECHANISMS

As George Perkins Marsh observed almost a century and a half ago,

Woodlands which have passed into private hands will everywhere be managed, in spite of legal restrictions, upon the same economical principles as other possessions, and every proprietor will, as a general rule, fell his woods, unless he believes that it will be for his pecuniary interest to preserve them. Few of the new provinces which the last three centuries have brought under the control of the European race, would tolerate any interference by the law-making power with what they regard as the most sacred of civil rights—the right, namely, of every man to do what he will with his own. . . . The only legal provisions from which anything is to be hoped, are such as shall make it a matter of private advantage to the landholder to spare the trees upon his grounds, and promote the growth of the young wood. Something may be done by exempting standing forests from taxation, and by imposing taxes on wood felled for fuel or for timber, something by premiums or honorary distinctions for judicious management of the woods. It would be difficult to induce governments, general or local, to make the necessary appropriations for such purposes, but there can be no doubt that it would be sound economy²⁴⁶

As discussed above in Part II.B, while the revised Implementation Plan recently developed by Vermont's ANR through the State's Clean and Clear Program provides a detailed and seemingly "comprehensive strategy for implementing the Lake Champlain total maximum daily load [TMDL] plan and for the remediation of Lake Champlain,"²⁴⁷ as required by the Vermont

246. MARSH, *supra* note 1, at 201–02.

247. VT. STAT. ANN. tit. 10, § 1386(a) (2009).

General Assembly, this revised plan does not go far enough in reducing the pollution stemming from agricultural nonpoint sources. This pollution continues to impair the Lake's water quality. Furthermore, with \$500-800 million (in 2009 dollars) as the total estimated cost of implementing strategies outlined in the 2010 TMDL Implementation Plan,²⁴⁸ and given the State of Vermont's recent budget crisis and likely future shortfalls, whether many of the proposed strategies included in this Plan will actually be implemented remains highly uncertain. Finally, the current Implementation Plan does not sufficiently utilize available planning and zoning controls or other regulatory mechanisms which could be used to increase local and state land use controls and/or watershed-based regulations for agricultural land use and management, particularly for smaller farm operations.

Part III evaluates legal mechanisms and governance systems which have been established or are under consideration, that Vermont could use to reduce agricultural NPS pollution which continues to enter the Lake's drainage basin. Specifically, mechanisms outlined and discussed below include: state and local land use planning and zoning; watershed-based natural resources planning, management, and regulation; mandatory best management practices and whole farm conservation plans; taxation of agricultural inputs and byproducts which contribute to NPS pollution and property tax abatement for well-managed farmlands; and watershed-based pollution trading. This section follows in the footsteps of Marsh as set forth in *Man and Nature* almost 150 years ago, and builds on a comprehensive review of scholarship and guidance by seasoned academics and policymakers who have considered at length the ecologically, politically and socially complex issue of how to improve the quality of our Nation's impaired waters.

A. State and Local Land Use Planning and Zoning Controls

One issue that has been repeatedly highlighted as an obstacle to achieving the water quality goals of the Clean Water Act is the lack of federal authority to directly influence local and regional land use planning and zoning, as well as the lack of state-based initiatives to utilize planning and zoning to address NPS pollution. State and local land use planning and zoning is an area of public policy and law that could be used to effectively reduce the vast majority of existing NPS pollution. Planning and zoning powers and related jurisdiction over both state and private lands have

248. See EXECUTIVE SUMMARY, *supra* note 199 (providing that many of these strategies include financial incentives or 'carrots' to encourage the use of voluntary farm-related, cost-share programs).

traditionally been delegated to states within our federalist system of governance, including for non-coastal land use and management that affects the quality of interstate (and international) waters, such as Lake Champlain. However, to date, few states have mustered the requisite social and political will needed to use their broad police powers to address persistent water quality impairments stemming from nonpoint sources.²⁴⁹

As discussed at length in Part II above, the legislative history of the CWA, the text of the CWA, and related judicial case law all strongly support a legal interpretation that the regulation of NPS pollution, specifically land use and management related to agriculture, is primarily reserved to the authority of individual states. In many states, including Vermont, authority to enact local zoning and land use laws is statutorily delegated to local municipalities.²⁵⁰ In Vermont, larger developments are additionally subject to state-level land use review and permitting if they trigger statutory thresholds and are considered “Development” as defined under Act 250.²⁵¹ Therefore, a logical first step in evaluating ways that the State and its governmental subdivisions can implement the Lake’s 2002 Phosphorus TMDL is to assess the applicability of both traditional and innovative planning and zoning techniques for reducing agricultural NPS

249. See *The Two Lost Books in the Water Quality Trilogy*, *supra* note 14, at 54–56 (discussing differences between states’ authority to regulate nonpoint source pollution and federal authority to address point source pollution); Flatt, *supra* note 65, at 598–99 (noting that many states have not fulfilled their responsibility to develop plans for areas having substantial water quality impairments relating to nonpoint source pollution).

250. See VT. STAT. ANN. tit. 24, § 4401 (describing how towns “may” enact zoning and other land use bylaws, but if they do, these local bylaws “shall” be consistent with approved municipal plans). However, as discussed *supra* in Part II.B of this article and specifically at footnote 243 included herein, farming and other agricultural, as well as silvicultural activities, are statutorily exempt from municipal zoning and other local land use controls.

251. “Development” is specially defined under Act 250, as codified in VT. STAT. ANN. tit. 10, § 6001(3)(A)(i)–(viii), and includes the construction of housing projects with ten or more units. Development that is not exempted by other provisions of this Act, such as exemptions included in section 6001(3)(B) related to development located within designated growth centers, are also subject to state-level review and permit approval under VT. STAT. ANN. tit. 10, §§ 6001–6101. However, section 6001(3)(D) specifically states that “the word ‘development’ does not include: (i) [t]he construction of improvements for farming, logging or forestry purposes below the elevation of 2,500 feet.” This includes the vast majority of potentially farmable land in Vermont. For example, the elevation of Burlington, Vermont, which lies on the shores of Lake Champlain, is two-hundred feet above sea level. The Town of Underhill, Vermont, which lies at the western foot of Mt. Mansfield, Vermont’s highest peak, is just over a thousand feet. Further, agricultural activities, or “farming” as defined in section 6001(22) to include the cultivation or other use of land for growing food and fiber as well as raising, feeding, or managing livestock, poultry, or fish, is exempt from Act 250 review under section 6081(s)(1) if it occurs on primary agricultural soils preserved in accordance with section 6093 or it does not conflict with any other conditions imposed by an Act 250 permit.

pollution runoff within Vermont's portion of the Lake Champlain Drainage Basin.

1. Comprehensive Local Planning and Zoning

Authorized by state-level enabling legislation, comprehensive local planning allows residents to democratically create a shared vision for their town's, city's, or county's future growth and development. Designed to identify and articulate community goals and objectives, policies and guidelines included in comprehensive plans (also called master or general plans) serve as templates for future development, as well as for the conservation of key natural resources within a given local government's jurisdiction (defined by town, city or county lines). These plans can provide a basis for ongoing farmland protection strategies by identifying areas where future growth should be encouraged and where agricultural activities (and/or other land uses, such as sensitive natural resources conservation) should be promoted. Plans can also incorporate local agricultural and conservation objectives and recommend local zoning measures, such as cluster zoning, transfer of development rights (TDR), or purchase of agricultural conservation easements (PACE), which are discussed below.²⁵² Finally, through the comprehensive planning process, Vermont's cities and towns can also consider whether other innovative natural resources conservation approaches, such as payment for environmental services (or PES, as outlined below) provided by well-managed agricultural and/or forest lands, are appropriately suited for potential use in their communities.

2. Cluster Zoning

Cluster zoning is a fairly common planning and zoning technique used by many municipalities and counties across the country to promote the design of spatially condensed residential and commercial development and conserve identified land-based resources (such as prime farmland soils,

252. See AM. FARMLAND TRUST, FACT SHEET: THE FARMLAND PROTECTION TOOLBOX (2008), available at http://www.farmlandinfo.org/documents/27761/fp_toolbox_02-2008.pdf (describing a variety of zoning and conservation methods to protect local farmlands) [hereinafter THE FARMLAND PROTECTION TOOLBOX]; see also AM. FARMLAND TRUST & CONN. CONFERENCE OF MUNICIPALITIES, PLANNING FOR AGRICULTURE: A GUIDE FOR CONNECTICUT MUNICIPALITIES (2008), available at http://ctplanningforagriculture.com/guide/AFT_guide_web9-29.pdf (suggesting a variety of zoning, development, and conservation tools to protect local farmlands); Town of Williston, Vt., *Open Space and Working Landscapes Plan*, in TOWN OF WILLISTON COMPREHENSIVE PLAN, at C-31 (2006), available at <http://www.town.williston.vt.us> (providing an example of zoning measures for working landscapes including "funding for the purchase of development rights [and] zoning for a reasonable range of income-generating activities").

wildlife habitat, steep slopes, floodplains, wetlands, riparian corridors and scenic vistas).²⁵³ This zoning can help to mitigate the adverse environmental effects of land conversion (e.g., crop or forest lands to developed land), which is likely to contribute significantly to future water-quality impairment, as developed lands contribute more polluted runoff on average than undeveloped lands.²⁵⁴ While the requirements of specific cluster zoning ordinances vary among communities, these ordinances generally allow for or require development to be spatially grouped together, with the aim of protecting open land and associated natural resources. Clustered developments, sensitive natural resource areas (such as riparian corridors and extended buffers adjacent wetlands), and farmland soil resources, infrequently incorporate active commercial agriculture. However, cluster zoning has been used to successfully create transitional areas between farm and residential land uses.²⁵⁵ In Vermont, as elsewhere around the country, based on local zoning and resources of concern identified on or near the proposed development, clustering may be required by local planning commissions when approving Site Plans, Major Subdivision Plans, or Planned Unit Developments for commercial, industrial or residential uses.²⁵⁶

3. Transfer of Development Rights

Transfer of development rights (TDRs) programs allow landowners to transfer their rights to develop from one parcel of land (based on local

253. See BLACK'S LAW DICTIONARY 1912 (9th ed. 2009) (defining cluster zoning as "[z]oning that favors planned-unit development by allowing a modification in lot size and frontage requirements under the condition that other land in the development be set aside for parks, schools, or other public needs"); see also AM. FARMLAND TRUST & CONN. CONFERENCE OF MUNICIPALITIES, *supra* note 252, at 22 ("Conservation subdivisions—also known as cluster development or open space development—are a commonly used mechanism to reduce the footprint of new residential development [by which h]ousing is concentrated on one part of a site while the remainder of the parcel is protected, typically permanently, as farmland or open space The parcel is allowed the same number of lots as a traditional subdivision, but the lots are smaller").

254. See U.S. ENVTL. PROT. AGENCY, PROTECTING WATER QUALITY FROM URBAN RUNOFF 1 (2003), available at http://www.epa.gov/npdes/pubs/nps_urban-facts_final.pdf (noting that "because of impervious surfaces like pavement and rooftops, a typical city block generates more than 5 times more runoff than a woodland area of the same size").

255. THE FARMLAND PROTECTION TOOLBOX, *supra* note 252, at 2; see also TOWN OF WILLISTON COMPREHENSIVE PLAN, *supra* note 252, for an example of cluster zoning.

256. The author previously worked for the Town of Williston Planning and Zoning Office and currently serves as a Planning Commissioner for the Town of Hartford, Vermont. Also, local development review authority, while generally applicable to municipal and private development, is often limited in scope or is only advisory for proposed state or federal developments under supremacy doctrines.

zoning applicable to that property) to a different parcel of land.²⁵⁷ Effective TDR systems must clearly designate specific ‘sending’ and ‘receiving’ zones. TDRs are complex in that they require a relatively advanced bureaucratic system to track transfers of development rights, the use of easements to restrict development on sending parcels, and sufficient staff to monitor and enforce development restrictions. Further, as TDRs rely on market forces, sufficient demand for local real estate must exist before developers will buy transferable rights to increase their proposed development density above that already permitted by the base zoning within the designated receiving area.²⁵⁸

If sufficient market conditions exist or are likely to exist in the near future, TDRs may be useful to protect key natural resources by shifting development pressure from areas rich in natural resources to areas designated for growth. Steady population growth, the political will to maintain strong zoning ordinances, and the availability of experienced planners who can administer complex regulations are factors that characterize the communities that are the most successful in using TDRs.²⁵⁹ Further, zoning regulations for both sending and receiving zones need to be carefully designed to increase the likelihood of success in achieving the community’s stated development and conservation objectives.²⁶⁰ Thus, although a handful of growing Vermont cities and towns located within the Lake Champlain Basin may currently or at some point in the near future (e.g., over the next five to ten years) develop sufficient market demand to

257. See DAVID L. CALLIES, ROBERT H. FREILICH & THOMAS E. ROBERTS, *LAND USE* 766–67 (4th ed. 2004) (describing the transfer of development rights as a “significant and complex development technique . . . used in historic, environmental, and agricultural preservation”). Specifically, where development is limited due to a zoning ordinance,

[o]wners can recapture resultant losses of value of their land by selling the rights to develop . . . which can be utilized in a receiving area elsewhere in the county [that is] considered appropriate for high density development The transfer of development rights mitigates the economic impact of environmental restrictions while also providing an incentive to developers for protecting the environment.

Id.

258. See J.B. Ruhl, *Agriculture and Ecosystem Services: Strategies for State and Local Governments*, 17 N.Y.U. ENVTL. L.J. 424, 448 (2008) [hereinafter *Agriculture and Ecosystem Services*] (discussing the challenge of generating a supply of and demand for TDRs); see also A. Dan Tarlock, *The Potential Role of Local Governments in Watershed Management*, 20 PACE ENVTL. L. REV. 149, 174 (2002) (noting that TDRs “have long been promoted as a substitute for direct compensation, but it is not clear that they will fulfill their potential because it is often difficult to anchor those units on another tract”).

259. THE FARMLAND PROTECTION TOOLBOX, *supra* note 252, at 7.

260. Marc Mihaly, Director of the Env. Law Center, Vt. Law School, Oct. 5. 2009, pers. comm. (discussing his former professional experience designing a successful TDR system for the City of San Francisco in his capacity as an attorney).

support TDRs,²⁶¹ the application of these local programs is clearly limited in rural areas with low population density and development pressures—which currently comprise the majority of lands within the Lake Champlain Basin.

4. Purchase of Agricultural Conservation Easements

The purchase of agricultural conservation easements (PACE), either by private parties (non-profit land trust organizations) or governmental entities, has become a popular method for encouraging the voluntary conservation of agricultural and other natural resources. Since agricultural easements were first acquired during the late 1970s, the American Farmland Trust (AFT) estimates that landowners have placed about 1.1 million acres of farmland nationwide under conservation easements.²⁶² The Vermont Land Trust (VLT) reports having conserved over 700 farms totaling more than 160,000 acres in Vermont; most of the VLT agricultural conservation projects also received funding from the State of Vermont's Housing and Conservation Board (VHCB), as well as from private foundations.²⁶³ Created in 1977, VLT continues to be one of the most active private non-profit land conservation organizations working in the State, and the vast majority of farmland properties with conservation easements held by VLT are dairy farms.²⁶⁴

PACE agreements are drafted with the purpose of keeping farmland in agricultural use, and all easements must provide some documented public benefit.²⁶⁵ Conservation easements are recorded deed restrictions that limit future development, land use and/or management in accordance with negotiated terms and conditions.²⁶⁶ While the farmer, as grantor, gives up some future development and land use rights, he retains the right to use the land for farming and other activities that do not interfere with the property's agricultural viability and other identified conservation purposes. The grantee (usually a land trust or government agency) is responsible for

261. Including Colchester, Charlotte, Hinesburg, Jericho, Middlebury, Milton, St. Albans, Richmond, Vergennes, and Williston, which still have a relatively abundant amount of undeveloped and/or agricultural lands, but are located in or near growing population centers, primarily surrounding Burlington, Vermont's largest city.

262. *A National View of Agricultural Easement Programs*, AM. FARMLAND TR. <http://www.farmland.org/resources/national-view/default.asp> (last visited Dec. 10, 2010).

263. *About the Vermont Land Trust*, VT. LAND TR., <http://www.vlt.org/about-vlt> (last visited Dec. 15, 2010).

264. *Id.*

265. ELIZABETH BYERS & KARIN MARCHETTI PONTE, *THE CONSERVATION EASEMENT HANDBOOK* 23 (2d ed., rev. 2005).

266. *Id.* at 22.

legally holding, monitoring, and enforcing the terms of this “negative” or restrictive easement.²⁶⁷ Most conservation easements restrict future development in perpetuity, and only gifts of perpetual easements qualify donors for federal income tax and estate tax benefits.²⁶⁸ While most prospective holders will only accept perpetual easements, limited-term easements may also be written for a specific term of years.²⁶⁹ All agricultural easements should at a minimum include the conservation of significant natural resource features, such as wetlands and riparian corridors; other terms can and should relate to acceptable agricultural management practices and standards.

In sum, PACE programs allow farmers to receive cash equity for conserving their land for agricultural and natural resources uses. They also provide an alternative to selling farmland properties for non-agricultural development purposes. Permanent easements often reduce the future market value of the encumbered property, which can help facilitate intergenerational family land transfers or make the farm in question more affordable for other interested non-family farmers. Liquid capital provided by PACE agreements can help farmers enhance the economic and ecological viability of their farm operations and make needed and environmentally sensitive infrastructure improvements.²⁷⁰

5. Payments for Environmental Services

Observing that, “agriculture has long been the Rubik’s Cube of environmental policy,” legal scholars and economists have recently suggested innovative ways to value the “multifunctional capacity of farms to contribute to the environmental and economic wellbeing of the landscape while continuing to serve as our primary source of food and fiber.”²⁷¹ Notable natural capital ‘produced’ by farms managed with environmental stewardship includes the preservation of biological diversity (e.g., diversity of plant, animal and insect species); groundwater recharge; and improvement of both ground and surface water quality. However, most U.S.

267. THE FARMLAND PROTECTION TOOLBOX, *supra* note 252, at 3; *See also* BYERS & PONTE, *supra* note 265, at 22 (describing the easement holder’s responsibilities).

268. BYERS & PONTE, *supra* note 265, at 21.

269. *Id.*; *See generally* Nancy A. McLaughlin, *Rethinking the Perpetual Nature of Conservation Easements*, 29 HARV. ENVTL. L. REV. 421 (2005) (explaining legal issues related to the perpetuity of conservation easements).

270. THE FARMLAND PROTECTION TOOLBOX, *supra* note 252, at 5; BYERS & PONTE, *supra* note 265, at 199 (discussing how agricultural easements can be used to help maintain a “viable, working landscape into the future”).

271. *Agriculture and Ecosystem Services*, *supra* note 258, at 424–25.

agricultural “research and development . . . and policy have traditionally focused on maximizing biomass production and optimizing its use, with far less emphasis on evaluation of environmental, social, and economic performance.”²⁷² In contrast to this traditional approach, the farmland multifunctionality approach emphasizes “the joint production of standard commodities (e.g., food and fiber) and ‘ecological services’ on the premise that ‘major additional gains may result from a ‘working landscape’ approach that improves environmental performance of active farmland by rewarding farmers for delivering environmental benefits, as well as food and biomass.”²⁷³ Payments for ecosystem services can be valued by the avoided cost of technological infrastructure and upgrades (e.g., the avoided costs of municipal water purification upgrades where enhanced ecosystem services provided by farms effectively safeguard local drinking water quality). Monetarily valued in this way, local or state payments can be a demand-driven payment for valuable services rendered, instead of a subsidy or payment for intrinsic ecological benefits, such as wildlife habitat or clean surface and groundwater.²⁷⁴

The Florida Ranchlands Environmental Services Project provides an example of a payment for environmental services program. Started in 2005 by a collaboration of public and private partners, including the World Wildlife Fund, this pilot project allows cattle ranchers in an 850,000-acre area located north of Lake Okeechobee, to sell the enhanced delivery of ecosystem services, specifically water retention, phosphorus load reduction, and wetlands habitat expansion, to government agencies and other willing buyers.²⁷⁵ As observed by Professor J.B. Ruhl, “[u]nderstanding the multifunctional capacity of agricultural lands . . . provides insight into how state and local governments, with federal guidance and support [can] promote alternatives that blend enhanced environmental performance with better development planning.”²⁷⁶ And in general, a successful state or local payment program “must [be] devise[d] [in such] a way for the buyer and seller to know that payment X yields service value Y, and that this [equals] a rational economic move for both parties.”²⁷⁷ Agricultural methods that can

272. *Id.* at 432 (quoting N. Jordan et al., *Sustainable Development of the Agricultural Bio-Economy*, 316 *Sci.* 1570, 1570 (2007)).

273. *Id.* (quoting N. Jordan et al., *Sustainable Development of the Agricultural Bio-Economy*, 316 *Sci.* 1570, 1570 (2007)).

274. *Id.* at 429.

275. *Id.* at 446–47 (citing Sarah Lynch & Leonard Shabman, *The Florida Ranchlands Environmental Services Project: Field Testing a Pay-for-Environmental-Services Program*, *RESOURCES*, Spring 2007 at 17, 17–18).

276. *Id.* at 459.

277. *Id.* at 447.

be used by farm operations to achieve a balanced production profile include: precision farming, contour farming, rotational cropping, no-till farming, organic farming, crop residue usage, riparian buffer cover, filtration strips, and water retention and recharge ponds.²⁷⁸ For active farmland, preservation of an accepted status quo (e.g., the certified use of Vermont's AAPs, discussed *supra* in Sect. II.B), could provide a farmer with a base ecosystem services payment, while sets of more stringent land management and restoration practices could define higher levels of service premiums.²⁷⁹

*B. Watershed-Based Natural Resources Planning,
Management, and Zoning*

The concept that watersheds provide a very logical geographic unit for water resource planning and land use management to regulate the environmental effects of agriculture, specifically water and soils, is not a new idea. Federal and state watershed-based proposals focused on the relationship between land use and water quality date back to the 1930s.²⁸⁰ While several recent studies review the opportunities and constraints of watershed-based natural resources management,²⁸¹ Professor Adler identifies imperatives for why such an approach is necessary for effective water quality protection and restoration in his landmark article, *Addressing Barriers to Watershed Protection*; these imperatives include ecological, institutional, economic, as well as social needs, pressures, and realities.²⁸² Factors that strongly suggest an ecological imperative for watershed-based management include the nature of aquatic ecosystems (e.g., the close interaction between land and water); the continued decline in aquatic species and ecosystem health; and the primary impairment sources (e.g., NPS pollution) that source-specific regulatory programs have not addressed.²⁸³ Institutional factors include political fragmentation of domestic institutions charged with managing and protecting water

278. *Id.* at 432.

279. *Id.* at 455 (identifying a possible tiered system for defining PES premiums).

280. NAT'L RESEARCH COUNCIL, NEW STRATEGIES FOR AMERICA'S WATERSHEDS 13 (1999).

281. *See id.* at 28–31. *See generally* EDELLA SCHLAGER & WILLIAM BLOMQUIST, EMBRACING WATERSHED POLITICS (2008) (discussing the necessity of political considerations when making decisions in watershed management); Lara D. Guercio, *Local and Watershed Land Use Controls: A Turning Point for Agriculture and Water Quality*, 2010 PLAN. & ENVTL. L. at 3, 9 [hereinafter *Local and Watershed Land Use Controls*].

282. *See Addressing Barriers to Watershed Protection, supra* note 37, at 981–1003 (discussing the ecological, institutional, economic, and social imperatives necessary for successful watershed-based protection and restoration).

283. *Id.* at 981.

resources; issue fragmentation, including the artificial legal division of water quality-related issues, such as land and water use; and the gaps in water resource policy program design and implementation, including its continued failure to control NPS pollution.²⁸⁴

Over the last thirty-plus years, Congress and the EPA have experimented with a series of federal NPS planning initiatives, including ‘area-wide planning’ under section 208 of the CWA. The utilization of land use-based regulatory authority by county Conservation Districts engendered broad public interest during the mid-1970s, as efforts progressed to implement the area-wide planning provisions.²⁸⁵ However, for reasons outlined above in Part I.C, notably the lack of state and local land use regulations, section 208 planning was unsuccessful in controlling NPS pollution.²⁸⁶ Among the different watershed-based proposals developed during the 1900s, federal efforts include those by the U.S. Soil Conservation Service (SCS, now the U.S. Natural Resources Conservation Service or NRCS), which were aimed at promoting state enactment of local Conservation Districts during and after the 1930s.²⁸⁷ The general history of Conservation Districts across the United States, existing Districts and state watershed planning initiatives in Vermont, and the potential future enhanced role for watershed-based Conservation Districts in improving and restoring both Vermont’s and Lake Champlain’s water quality are discussed below.

1. The History of Conservation Districts

The use of watersheds as an institutional framework for public policy, planning and localized political decision-making for agriculture, land use

284. *Id.* at 991–95.

285. Frarey, Jones & Pratt, *supra* note 52, at 155–56 (noting that even districts permitted to adopt land use regulations have generally failed to do so).

286. *Id.* at 156–57.

287. See SCHLAGER & BLOMQUIST, *supra* note 281, at 32–34 (discussing river basin development by the Bureau of Reclamation (Bureau) and Army Corps of Engineers (Corps), from 1933 to 1980, as well as the more current and ongoing Watershed Movement from 1980 to 2007); see also *Addressing Barriers to Watershed Protection*, *supra* note 37, at 1003–10 (reviewing Progressive Era, New Deal, and Post-War Watershed Proposals, as well as the Water Resource Planning Act of 1965); MARC REISNER, *CADILLAC DESERT: THE AMERICAN WEST AND ITS DISAPPEARING WATER* 134–36 (Penguin Books, 2d ed. 1993) (1986) (observing that “historic river-basin ‘planning’ was really more of an effort to coordinate the Bureau’s upstream agricultural irrigation projects with the Corps’s downstream river and harbor navigation improvement projects, and that, unlike efforts that began during the 1980s, which are aimed at using watershed-based planning to improve and restore water quality, these historic river-basin ‘planning’ efforts focused primarily on water resources development, and “no one ever spent more than a minute or two thinking about the value of a river in its natural state”).

and related land management dates back to the ‘dirty ‘30s’ and the American ‘Dust Bowl.’²⁸⁸ The U.S. Dept. of Agriculture’s then-new SCS published a model Standard State Soil Conservation Districts Law in 1936 to enable the creation of local ‘soil conservation districts’ as state government subdivisions and promote a localized approach to farm-based soil erosion.²⁸⁹ In exchange for the SCS’s technical service, advice, and federal funding, states were required to enact enabling legislation for conservation districts. States adopted laws, but with significant modification.²⁹⁰

The SCS model law proposed that soil conservation districts organize along watershed boundaries and possess the power to regulate agricultural land uses.²⁹¹ However, many state legislatures eliminated both of these key elements.²⁹² States also rejected the SCS recommendation to provide conservation districts with taxing powers. Instead, as continued in many states to date, state laws direct conservation districts to organize along county lines and few possess (or utilize) land use authority. Today, relying primarily on community education, technical assistance, and cost sharing, conservation district supervisors and staff face the “unenviable task of encouraging voluntary adoption of conservation practices, but without the substantial federal subsidies, without police power authority, and without the organizational logic of the watershed.”²⁹³

288. See Frarey, Jones & Pratt, *supra* note 52, at 153 (explaining how and why watershed use dates back to the 1930s and discussing the USDA and SCS’s response to soil erosion); John H. Davidson, *Conservation Plans in Agriculture*, 31 ENVTL. L. REP. 10,501, 10,501 (2001) [hereinafter *Conservation Plans in Agriculture*] (explaining the connection of the Dust Bowl and new agriculture offices and programs); John H. Davidson, *Conservation Agriculture: An Old New Idea*, 9 NAT. RESOURCES & ENV’T 20, 21 (1995) (noting that a federal and state soil conservation establishment emerged from the environmental disaster known as the Dust Bowl) [hereinafter *Conservation Agriculture: An Old New Idea*]. See generally DONALD WORSTER, *DUST BOWL: THE SOUTHERN PLAINS IN THE 1930S* (2004) (discussing details of the Dust Bowl in depth).

289. *Local and Watershed Land Use Controls*, *supra* note 281, at 10.

290. See Frarey, Jones & Pratt, *supra* note 52, at 153–54, stating that despite “significant opposition” to the establishment of local districts, twenty-two states adopted enabling legislation in 1937, followed by an additional sixteen states by 1940. By 1945, every state permitted the establishment of local districts. *Id.* Spurred by strings attached to federal funding, after 1936, thirty-three states simultaneously provide districts land use regulatory powers. *Id.* By 1975, that number declined to twenty-seven. *Id.*

291. *Local and Watershed Land Use Controls*, *supra* note 281, at 10.

292. *Conservation Plans in Agriculture*, *supra* note 288.

293. Frarey, Jones & Pratt, *supra* note 52, at 154–55 (noting that even districts permitted to adopt land use regulations have generally failed to do so); see also *Conservation Agriculture: An Old New Idea*, *supra* note 288, at 22, 67 (“State legislatures disappointed the SCS by organizing conservation districts along existing county lines and denying them both taxing and police power controls. The result was that the amount of voluntary compliance by private landowners roughly paralleled the amount of federal cost-sharing available.”).

2. Existing Conservation Districts in Vermont

The formation, organization and powers of Vermont's Natural Resources Conservation Districts (NRCs) (formerly Soil Conservation Districts) are set forth in the Soil Conservation Act (SCA) of 1939 and its amendments.²⁹⁴ Specifically, the SCA provides for the establishment of a state-level Natural Resources Conservation (NRC) Council,²⁹⁵ a referendum-based process by which landowners can petition this Council to create local Conservation Districts as subdivisions of the state,²⁹⁶ and the election of District Supervisors.²⁹⁷ The statutory powers of local District Supervisors include the "authority to formulate regulations, as hereinafter provided, governing the use of lands within the district in the interest of conserving soil, controlling soil and stream bank erosion and promoting conservation of natural resources and drainage."²⁹⁸ The SCA allows District Supervisors, subject to a majority vote of approval by District landowners, to enact land use regulations into ordinances;²⁹⁹ the SCA also provides for the amendment or repeal of approved land use regulations and ordinances, as well as termination of the District itself, by landowner petitions or a referendum.³⁰⁰ For the enforcement of approved ordinances, this statute identifies actions that District Supervisors can take in the event of a specific landowner's non-compliance, including referral to a board of adjustment appointed by the NRC Council, and petitioning a superior court to require the landowner's conformity with the District's ordinance.³⁰¹ Finally, the

294. VT. STAT. ANN. tit. 10, §§ 701–740 (2009).

295. *Id.* § 703 (noting members of the NRC Council include the Vermont Extension Service Director, ANR and AAFM Secretaries or their designated representatives, and an elected District supervisor who serves for a term of two years).

296. *See id.* §§ 709–718. Note that the determination of need hearing for a petition submitted by at least twenty-five landowners within a proposed District is based on the state-level Council's finding that there is a need for the district, based on "the interest of the public health, safety, and welfare." *Id.* § 709–711.

297. *Id.* §§ 719–721.

298. *Id.* § 724. For other duties and powers of Conservation District supervisors, see *id.* §§ 722–725.

299. *Id.*

300. *Id.* §§ 728–729. Note that under section 729, any twenty-five landowners can petition Vermont's Natural Resources Conservation Council for the termination of a district's operations and existence. Specific proceedings for the Council to determine whether a district should be terminated are set forth in Ch. 31. *Id.* § 729.

301. *Id.* §§ 731–734. Note that under section 734 if supervisors elect to petition the court, the superior court "shall order such relief as it may deem necessary in the interest of public health, safety and welfare." *Id.* § 734. The Act further requires that any money paid or act performed must protect the landowner's own land, be found "in just proportion to the benefits he will receive and . . . deemed necessary for the public good." *Id.*

SCA provides a specific process for the future division or combination of created Districts.³⁰²

While the SCA delegates to District Supervisors the authority to formulate land use regulations, and subject to a majority approval by affected landowners, enact these regulations into enforceable District Ordinances,³⁰³ current NRCs, including the Winooski NRC (which encompasses Washington County, Chittenden County, and part of Orange County),³⁰⁴ and other county-based NRCs,³⁰⁵ do not utilize their statutorily delegated land use regulatory authority.³⁰⁶ They instead focus on coordinating available technical, financial, and educational resources to meet “the needs of the land user.”³⁰⁷ In Vermont, NRCs function primarily as non-regulatory entities and serve as liaisons between government entities and local landowners.³⁰⁸ Examples of recent activities undertaken by the Winooski NRC include: providing technical assistance on land treatment planning, best management practices, and AAPs; giving Stewardship Awards to farmers who utilize exemplary land conservation practices; and offering incentive payments to farmers who use cover cropping.³⁰⁹

302. *Id.* §§ 736–740.

303. *Id.* §§ 723–724.

304. *Conservation Districts: District Map*, VT. ASS'N CONSERVATION DISTRICT (2010), <http://www.vacd.org/conservation-districts>. The NRC also includes a majority of the Winooski River basin, portions of the Upper Champlain basin, and lower Lamoille River basin. *Id.*

305. Other county-based NRCs include Lamoille County, which includes the upper Lamoille River basin and northern Winooski River basin; Franklin County, which includes portions of the Upper Champlain and Missisquoi basins; Orleans County, which includes the upper Missisquoi basin; and Grand Isle County, which includes portions of the Upper Champlain Basin. *Id.*

306. Statement based on author's review of current Vermont NRC websites, specifically the Winooski NRC and Lamoille County NRC. *Id.*; Telephone Interview with Abbey Willard, former District Supervisor, Winooski Natural Resource Defense Council (Jan. 28, 2010).

307. *Functions of Conservation Districts*, WINOOSKI NAT. RESOURCES CONSERVATION DISTRICT, http://www.vacd.org/winooski/winooski_about.shtml (last updated June 11, 2009); *see also Vermont Conservation Districts*, VT. AGENCY NAT. RESOURCES, <http://www.anr.state.vt.us/cleanandclear/ag-condist.htm> (last visited Dec. 15, 2010) (discussing the role of District-based Agricultural Resources Specialists, a position funded by the State of Vermont and EPA, in offering technical assistance, especially to help farmers meet Vermont's Accepted Agricultural Practices). In Vermont, the main responsibilities of District Supervisors are fundraising, grant writing, and where applicable, staff management. District activities are primarily funded through grants, with an insecure base allocation of funding, which varies annually, from the AAFM. Many Supervisor positions started as part-time and/or seasonal. While several Supervisor positions, including those for the Winooski and Lamoille NRCs, have grown to be full-time, many other District Supervisors still work part-time and generally provide supplemental incomes to dual-income families. Finally, all Supervisors receive relatively low compensation for their work and limited employment benefits. *See generally* Telephone Interview with Abbey Willard, *supra* note 306.

308. Telephone Interview with Abbey Willard, *supra* note 306.

309. WINOOSKI NAT. RESOURCES CONSERVATION DISTRICT, http://www.vacd.org/~winooski/winooski_about_brochure.pdf (last visited Dec. 15, 2010).

Similarly, the mission of the Lamoille County NRCD, established in 1945, is “to aid and educate fellow citizens” about natural resources management and to “be a local voice for conservation, preservation[,] and stewardship of all natural resources.”³¹⁰ In sum, while providing key technical and educational resources to local communities and citizens across Vermont, as well as serving as local liaisons between landowners and different levels of state and federal government, NRDCs do not currently utilize their delegated land use regulatory authority and are primarily organized by county or combinations of counties, instead of by watershed boundaries.

3. Vermont’s Current Watershed Planning Initiative

Over the last decade, Vermont has been persistent and creative in developing its Watershed Planning Initiative. In response to a mandate from the state legislature, the Agency of Natural Resources “renewed” its commitment to river basin planning and water quality restoration efforts in 2000.³¹¹ As required by state and federal water quality laws and regulations,³¹² the ANR, through the Department of Environmental

310. *Our Mission*, LAMOILLE COUNTY NAT. RESOURCES CONSERVATION DISTRICT & NATURE CENTER, <http://www.lcnrcd.com/index.html> (last visited Dec. 15, 2010). The Lamoille County NRCD and Nature Center provide summer camp programs for kids and are involved in several local initiatives, including the Lamoille Watershed Initiative which, “recognizing the need for a group that can lead watershed-wide implementation efforts,” provides coordination between organization who serve the watershed, support local watershed-improvement actions, and raise public awareness “through effective communications, education, and engagement.” *Lamoille Watershed Initiative*, LAMOILLE COUNTY NAT. RESOURCES CONSERVATION DISTRICT & NATURE CENTER, <http://www.lcnrcd.com/Watershedhome.html> (last visited Dec. 15, 2010). Activities performed by the NRCD under this initiative include organizing stream bank plantings and education events, and facilitating the volunteer-based Lamoille Watershed Water Quality Monitoring and Exchange Project via local colleges and schools. *Id.*

311. VT. DEP’T OF ENVTL. CONSERVATION, VERMONT WATERSHED INITIATIVE: GUIDELINES FOR WATERSHED PLANNING 5 (2007), available at http://www.anr.state.vt.us/dec/waterq/planning/docs/pl_planningguidelines.pdf [hereinafter VERMONT WATERSHED INITIATIVE: GUIDELINES FOR WATERSHED PLANNING].

312. 33 U.S.C. § 1313(e)(1) (2006); 40 C.F.R. § 130.6 (2009); VT. STAT. ANN. tit. 10, § 1253(d) (2009) (requiring the ANR Secretary to revise all seventeen sub-basin plans by January 1, 2006, update them every five years thereafter, and prepare an overall management plan to ensure that the water quality standards are met in all state waters). The Natural Resources Board requires basin plans to inventory the existing and potential sources of pollution, establish a strategy to improve or restore waters, ensure full support of designated uses, and serve as a guide, consistent with applicable state and federal law, for how various sources of pollution within each basin will be managed in order to comply with Vermont’s Water Quality Standards. VT. CODE R. 12 004 052 § 1-02D(1)–(6) (effective Jan. 1, 2008), available at <http://www.nrb.state.vt.us/wrp/publications/wqs.pdf>. Plan recommendations “pertaining to the enhancement and maintenance of the quality of waters within the basin,” after being approved by the ANR Secretary are to be given “due consideration” by the Natural Resources Board in subsequent rulemaking. *Id.* § 1-02D(4), (6).

Conservation (DEC), developed (or is developing) Water Quality Management Plans for Vermont's seventeen major river basins.³¹³ These basins drain directly, or indirectly via rivers and creeks, into larger drainage basins such as Lake Champlain.³¹⁴ As identified by the DEC, the Lake Champlain Basin encompasses seven major river basins including: Lamoille River, Missisquoi Bay (which includes the Missisquoi River, Black Creek, Tyler Branch, and Trout River), Upper Lake Champlain (or Northern Lake Direct, which includes the LaPlatte River, Malletts Bay, St. Albans Bay, Rock River, and Pike River), and Winooski River.³¹⁵ Water Quality Management Plans were recently approved by the ANR for the Lamoille River and Northern Lake Direct in 2009. In 2006, an unofficial draft management outline was created to aid ongoing public discussion and continued planning efforts for the Missisquoi River basin. Planning and related public participation is finally underway for the Winooski River, but a Water Quality Management Plan for this river basin has not been completed yet.³¹⁶

The purposes of river basin water quality management plans, as identified by the DEC in its 2007 *Vermont Watershed Initiative Guidelines for Watershed Planning* (Guidelines), are to help communities and the state decide how to “[r]estore the waters most affected by polluted discharges and runoff; p]rotect the waters and adjacent access threatened by pollution . . .; and e]stablish management goals for all waters through

313. As used by the State of Vermont for basin or watershed planning, the term “basin” refers to the seventeen instate major river basins identified by the DEC, the term “watershed” refers to any drainage that may be larger, smaller, or synonymous with these seventeen hydrologic units. *Basin Planning Process*, VT. DEPARTMENT ENVTL. CONSERVATION, http://www.anr.state.vt.us/dec/waterq/planning/htm/pl_basinplan.htm (last updated Mar. 2007).

314. *Specific Basins and Planning Activities*, VT. DEPARTMENT ENVTL. CONSERVATION, http://www.anr.state.vt.us/dec/waterq/planning/htm/pl_basins.htm (last updated Nov. 2009). The statutory deadline of January 1, 2006 for developing all seventeen instate river basin water quality plans has not been met by ANR, and the agency's best estimate for completing all river basin plans at current staffing levels is by 2011. WATER QUALITY DIV., VT. AGENCY OF NATURAL RES., PROGRESS REPORT ON RIVER BASIN WATER QUALITY MANAGEMENT PLANNING DURING 2007, at 5 (2008), available at http://www.anr.state.vt.us/dec/waterq/planning/docs/pl_progress.2007report.pdf [hereinafter PROGRESS REPORT ON RIVER BASIN WATER QUALITY MANAGEMENT PLANNING DURING 2007].

315. *Specific Basins and Planning Activities*, *supra* note 314 (noting that the other three sub-basins within the Lake Champlain Basin, located toward the southern end of the Lake, include: the Lower Lake Champlain (or Southern Lake Direct); Otter, Little Otter, and Lewis Creeks; and the Poultney-Mettowee River). In 2005, a final Water Quality Management Plan was completed for the Poultney-Mettowee, but basin planning for the Lake's other two southern river basins has not been completed to date. PROGRESS REPORT ON RIVER BASIN WATER QUALITY MANAGEMENT PLANNING DURING 2007, *supra* note 314, at 3–4.

316. PROGRESS REPORT ON RIVER BASIN WATER QUALITY MANAGEMENT PLANNING DURING 2007, *supra* note 314, at 3–4.

classification and other designations.”³¹⁷ According to Guidelines, the “keystones” on which water quality management plans “must be based” are: “voluntary action, public involvement, adequate funding . . . , and common sense approaches.”³¹⁸ Further, the Guidelines’ principles also state that these “[p]lans should emphasize voluntary action to solve [all] identified problems.”³¹⁹ Supported by a DEC Watershed Coordinator, Watershed Councils, comprised of interested local volunteer participants, are responsible for guiding and participating in the planning process for each river basin. Besides serving as the DEC’s main contact and lead in river basin planning, Coordinators are responsible for carrying out (directly or indirectly through other parties) the strategies identified in plans, as well as working “with landowners and resource agencies to meet the needs of landowners while determining methods that they are willing to apply to restore waters.”³²⁰

In addition to clearly providing useful information about river basins, Vermont’s basin-specific Water Quality Management Plans seek to engage public participation via commendable watershed-based collaboration and consensus-building efforts; help to identify and prioritize basin-specific water quality problems; and summarize applicable existing state and federal regulatory and non-regulatory programs.³²¹ However, there appears to be no

317. VERMONT WATERSHED INITIATIVE: GUIDELINES FOR WATERSHED PLANNING, *supra* note 311, at 4.

318. *Id.*

319. *Id.* at 6 (emphasis added).

320. *Id.* at 13–15. As of January 2008, there were eight DEC Watershed Coordinators (also known as Basin Planners) located throughout the state. PROGRESS REPORT ON RIVER BASIN WATER QUALITY MANAGEMENT PLANNING DURING 2007, *supra* note 314, at 3.

321. VT. AGENCY OF NATURAL RES., DRAFT WATER QUALITY MANAGEMENT PLANS FOR THE NORTHERN LAKE CHAMPLAIN DIRECT DRAINAGES 10–11 (2009), available at http://www.anr.state.vt.us/dec/waterq/planning/docs/pl_basin5.FinalExecutive%20Summary.pdf.

(recommending collaborative efforts related to agricultural water quality in the *Northern Lake Direct Plan* including “assistance from the agricultural resource agencies and the community” to help the agricultural community with phosphorus and sediment reduction efforts). Specifically, several top strategies identified by the *Northern Lake Direct Plan* for reducing phosphorus include: providing outreach and technical assistance to farmers to help them in “evaluating their own farming practices,” providing the growing equine (or horse) industry with best management practice information, and working with volunteer-based community groups to obtain local and state funding to subsidize nutrient management programs and address eroding river banks. *Id.* at 52. Referenced TMDL strategies for the Lake include cost-share programs for agricultural BMPs, alternative manure management grants, and research and technical assistance for farmers. *Id.* at 68. Finally, the three-quarter-page Implementation Chapter highlights the use of the same collaborative process utilized for basin planning for implementation of recommended strategies. *Id.* at 81; see also VT. AGENCY OF NATURAL RES., LAMOILLE RIVER BASIN WATER QUALITY MANAGEMENT PLAN—DRAFT 3 (2009), available at http://www.anr.state.vt.us/dec/waterq/planning/docs/pl_basin7.finalplan.pdf (highlighting the use of a voluntary, collaborative watershed-based process in plan development and implementation). For

statutory requirement for implementation of recommended Basin Plan strategies except for “due consideration” by the Natural Resources Board in rulemaking related to future amendments of the Vermont Water Quality Standards. The role of Coordinators, as outlined by the ANR in its 2008 Progress Report, is to lead the development of Water Quality Management Plans, serve as a communication link, and “help *educate and persuade* individual landowners and business owners to prevent or abate what is essentially considered to be nonpoint source pollution from their property.”³²² Thus, the Coordinator’s role in plan implementation is one of advice and encouragement. Watershed Coordinators and Watershed Councils cannot implement recommended plan strategies without specific landowner consent, as neither have authority to create, require, or enforce related agricultural land use controls or basin-specific agricultural management strategies.

Furthermore, while consensus-based collaboration and voluntary stakeholder participation may be appropriate in limited circumstances, the effectiveness of watershed-based collaboration for implementing TMDLs and solving persistent water quality issues (such as agricultural NPS pollution) is a relevantly recent development³²³ that has not yet been fully analyzed.³²⁴ Recent experimentation with the use of collaboration to address

prioritized and recommended strategies to reduce agricultural NPS, this Plan also highlights the need for increased education for the equine/horse industry, educational workshops for sheep and goat farmers, development of cover crop and crop rotation demonstration projects, and funding from federal programs to increase the use of erosion reduction techniques to reduce erosion and nutrient runoff from cropland and farmsteads. *Id.* at 64–65. Interestingly, according to the AAFM data, there are only 20 sheep producers and an estimated 30 horse farms, as opposed to 108 dairy and 27 beef farms, in the Lamoille River basin. *Id.* at 42. The number of goat farms is not provided. The one-half-page Implementation Chapter of the *Lamoille Plan* includes securing funding for recommended actions such as agricultural BMPs and working with local, state, and federal agencies to obtain easements on riparian and wetlands areas. *Id.* at 81–82. In sum, strategies emphasize education, research, demonstration, technical assistance, and cost-share funding to promote and encourage voluntary improvements to agricultural land management.

322. PROGRESS REPORT ON RIVER BASIN WATER QUALITY MANAGEMENT PLANNING DURING 2007, *supra* note 314, at 3 (emphasis added).

323. See Paul A. Sabatier et al., *Eras of Water Managed in the U.S.: Implications for Collaborative Watershed Approaches*, in SWIMMING UPSTREAM: COLLABORATIVE APPROACHES TO WATERSHED MANAGEMENT, 41, 43–49 (Paul A. Sabatier et al. eds., 2005) (describing how the use of community-based collaboration to address natural resource management issues in the U.S. largely emerged in the late 1980s and became widespread in the early 1990s).

324. Douglas S. Kenney, *Are Community-Based Watershed Groups Really Effective? Confronting the Thorny Issue of Measuring Success*, in ACROSS THE GREAT DIVIDE: EXPLORATIONS IN COLLABORATIVE CONSERVATION AND THE AMERICAN WEST, 188, 193 (Philip Brick et al. eds., 2001) [hereinafter *Are Community-Based Watershed Groups Really Effective?*].

complex natural resource management issues has its skeptics³²⁵ and is viewed by seasoned academics with “guarded optimism.”³²⁶ Likely obstacles to successful application of watershed-based collaboration within the seven in-state river basins of the Lake Champlain Drainage Basin include strategic, psychological, and institutional barriers.³²⁷ Other procedural and substantive challenges to collaborative decision-making and action include implementation and monitoring issues, stakeholder representation, legitimacy, and measurements of collaborative success.³²⁸ As a mandatory backstop to locally generated water quality management plans, the state through the ANR should be statutorily required to develop and implement its own management plans for Vermont’s river basins, subject to public notice and comment. Additionally, if management plans created through Vermont’s current collaborative basin planning process fail to meet quantitative performance standards (including specific target phosphorus load reductions based on those included in the Lake’s TMDL) by a specific date, they may be subject to citizen suits for agency-related inaction.³²⁹

Any successful voluntary collaboration-based efforts to reduce NPS pollution will be highly context and issue dependent. They will be contingent on the voluntary, good faith participation of stakeholders; support from state environmental and agricultural agencies; the commitment of sufficient time and money; as well as the implementation and monitoring of the resulting river basin-specific agreements.³³⁰ Also, while DEC Coordinators serve as an important link for the ANR to watershed-based efforts to implement river basin plans, professional third-party mediators (e.g., lawyers with alternative dispute resolution practices and other such professionals without political or administrative biases)

325. E. FRANKLIN DUKES & KAREN FIREHOCK, UNIV. OF VA. INST. OF ENV. NEGOTIATION ET AL., *COLLABORATION: A GUIDE FOR ENVIRONMENTAL ADVOCATES* 3–4 (Michael Leahy & Mike Anderson eds. 2001), available at <http://www.virginia.edu/ien/publications.htm> (scroll down to “Collaboration: A Guide for Environmental Advocates (UVA, 2001),” click on “Part I,” “Part II,” and “Part III”); see also DOUGLAS S. KENNEY, NATURAL RES. LAW CTR., UNIV. OF COLO. SCHOOL OF LAW, *ARGUING ABOUT CONSENSUS: EXAMINING THE CASE AGAINST WESTERN WATERSHED INITIATIVES AND OTHER COLLABORATIVE GROUPS ACTIVE IN NATURAL RESOURCE MANAGEMENT* (2000), available at www.colorado.edu/law/centers/nrlc/publications/RR23.pdf.

326. *Are Community-Based Watershed Groups Really Effective?*, *supra* note 324, at 60; see also Mark Lubell et al., *Conclusions and Recommendations*, in *SWIMMING UPSTREAM* 261, 289 (Paul A. Sabatier et al., eds., 2005) (acknowledging that even as general supporters of the collaborative approach, watershed-based collaboration “is not a magic bullet that addresses all situations at all times”).

327. Lara D. Guercio, *Implementing TMDLs: Is Watershed-Based Collaboration the Answer?* (Dec. 17, 2009) (unpublished Environmental Dispute Resolution term paper, Vermont Law School) (on file with author) [hereinafter *Implementing TMDLs: Is Watershed-Based Collaboration the Answer?*].

328. *Id.*

329. The author thanks Prof. David Mears of Vt. Law School for providing this suggestion.

330. *Implementing TMDLs: Is Watershed-Based Collaboration the Answer?*, *supra* note 327.

should facilitate collaborative efforts to implement strategies included in Water Quality Management Plans.³³¹ Prior to any continued investment in collaborative processes for implementing watershed-based strategies, third-party mediators should conduct a standard Conflict Assessment to determine if specific issues are ripe for this method of resolution which is extremely time-consuming and has uncertain regulatory outcomes, or is better suited for continued debate in traditional political and legal forums.³³²

Finally, alternative dispute resolution professionals will likely conclude from their initial Conflict Assessment that under existing state laws and regulations a collaborative process will not achieve a consensus-based agreement or improve water quality. Existing regulations, specifically Vermont's Accepted Agricultural Practices, do not provide sufficient incentives for all necessary stakeholders, particularly those who prefer the status quo, to participate in this voluntary process. However, creditable state initiatives that signal imminent and comprehensive changes to existing state laws and regulations would likely provide motivation for all key parties to engage in collaborative efforts to reduce NPS pollution and implement creative, efficient solutions to improve the water quality of Lake Champlain and its tributaries. In sum, while a watershed-based collaboration approach is definitely not the silver bullet for solving Lake Champlain's persistent water quality problems, given the right circumstances, it does present another tool that can be used in conjunction with existing and future regulatory mechanisms. Finally, if the watershed-based collaborative planning and implementation efforts fail to meet performance standards set by a date certain, the State should retain backstop authority to develop and implement river basin water quality management plans.

331. See Robert H. Mnookin, *Why Negotiations Fail: An Exploration of Barriers to Conflict Resolution*, 8 OHIO ST. J. ON DISP. RESOL. 235, 248–49 (1993) (noting that skilled third-party mediators can help facilitate the efficient resolution of a dispute by assisting parties to overcome specific barriers to collaboration); see also Kimberly A. Wade-Benzoni et al., *Barriers to Resolution in Ideologically Based Negotiations: The Role of Values and Institutions*, 27 ACAD. OF MGMT. REV. 41, 53 (2002) (discussing the importance of recognizing ideological barriers in environmental disputes in order to eliminate bias).

332. LAWRENCE E. SUSSKIND & JEFFREY L. CRUIKSHANK, *BREAKING ROBERT'S RULES* (2006); CONSENSUS BUILDING INST. & PACE UNIV. LAND USE LAW CTR., *CONDUCTING CONFLICT ASSESSMENTS IN THE LAND USE CONTEXT: A MANUAL* (2000), available at <http://web.mit.edu/publicdisputes/practice/pacemanual-ls-111500.pdf>; MONT. CONSENSUS COUNCIL & CONSENSUS BUILDING INST., *A CHECKLIST TO DETERMINE IF CONSENSUS BUILDING IS APPROPRIATE* (2004); DUKES & FIREHOCK, *supra* note 325, at app. C.

4. The Future Role of Watershed-Based Conservation Districts

Vermont and other states over the last seventy-plus years have repeatedly assumed the role of giving advice, encouragement, and technical assistance, in addition to coordinating funding for cost-share programs to support the voluntary implementation of best management practices, with limited success in terms of quantitative reductions for agricultural NPS pollution.³³³ Agricultural history in the United States indicates that without conservation easements or other mandatory restrictions, most voluntary efforts to conserve sensitive natural resource areas quickly subside when economic conditions favor more intensive agricultural land uses.³³⁴ Thus, learning from the limited success of past attempts to reduce NPS pollution, and building on the institutional and statutory framework of Vermont's Conservation Districts and Watershed Planning Initiative, this article strongly recommends that Vermont, as part of Lake Champlain's TMDL implementation, proactively link its fourteen Natural Resource Conservation Districts with the ongoing watershed planning within the seventeen instate river basins. While county lines currently serve to geographically organize most of Vermont's NRCs,³³⁵ state legislation provides a process for amending District boundaries.³³⁶ To effectively implement watershed-based strategies to improve water quality, especially within the Lake Champlain Basin, as well as to provide a local source of related watershed-based land use regulation, current Districts should be modified, to the greatest extent possible, to conform with river basin boundaries.

333. See PROTECTING WATER QUALITY FROM AGRICULTURAL RUNOFF, *supra* note 103 (describing state assistance for NPS pollution); LCBP REPORT 2008, *supra* note 103 (noting that despite the incentives that the State of Vermont has provided to farmers to maintain better management practices, agricultural run-off remains a source of NPS pollution).

334. For example, during and following World War II, many Dust Bowl farmers neglected to maintain or removed vegetative shelterbelts planted by the U.S. Works Projects Administration under the Great Plains Shelterbelt Project to reduce soil erosion and increase soil moisture when agricultural product prices increased and federal crop subsidies were based on output. See R. DOUGLAS HURT, THE DUST BOWL: AN AGRICULTURAL AND SOCIAL HISTORY 136–38 (1981); *Conservation Agriculture: An Old New Idea*, *supra* note 288, at 21–22; WORSTER, *supra* note 288, at 221–24; see also J.B. Ruhl, *Farms, Their Environmental Harms, and Environmental Law*, 27 *ECOLOGY L.Q.* 263, 326 (2000) [hereinafter *Farms, Their Environmental Harms, and Environmental Law*] (“Evidence suggests that farmer participation in [federal] green payment programs [(e.g., Conservation Reserve, Wetlands Reserve, Wildlife Habitat Incentives, and Env. Quality Programs)] is highly sensitive to market commodity prices and does not reflect any newly found farm stewardship ethic. Farmers, like most of us, follow the money.”).

335. See *Conservation Districts: District Map*, *supra* note 304 (illustrating the overlap of county lines with conservation districts in Vermont).

336. VT. STAT. ANN. tit. 10, §§ 736–40 (2009).

Further, through the use of their statutory authority related to land use regulation, Districts within the Basin should be provided with additional funding, staff, and legal support to evaluate and assess opportunities to improve impaired water quality and reduce agricultural NPS pollution. This evaluation should consider an expanded role for Watershed Councils to be incorporated under the institutional framework of watershed-based Districts. Specifically, the State and the Districts should assess if Council membership should be revised to include elected and/or appointed local representatives to serve on quasi-judicial bodies charged with the review and approval of rural land uses (e.g., agricultural and forestry operations) that significantly affect water quality under related District ordinances.³³⁷ They should also reconsider if voter eligibility based on real property ownership is still democratically sufficient, and should reconsider how the fair representation of the interests of all citizens residing within Districts and due process rights for affected landowners can be balanced in amendments to the statute.³³⁸ Generally, statutes that allow all eligible District voters to participate provide the broadest level of public participation. Statutes requiring land ownership to vote, like Vermont's current legislation, may be considered unduly restrictive under today's standards and in light of the impacts of NPS pollution on the State's regional water resources.

Finally, the mission of Districts to provide education and technical assistance to landowners, as well as facilitate conservation projects and inter-governmental relationships, should be supported. Missions should also be consistent with state-level objectives for Districts, which in turn should also be consistent with broader interstate and international water quality goals.³³⁹ Additionally, a more stable source of state-level funding should be earmarked to support the development of an expanded regulatory function for Districts, including for watershed-based agricultural land use and management that impairs in-state, interstate, and international water quality. Alternatively, enabling legislation could be amended to provide Districts with taxing authority. Specifically, these amendments could allow for the independent financing of District operations through "property taxes or special assessments, recreational user fees, water utility fees, and

337. See generally J.B. Ruhl et al., *Proposal for a Model State Watershed Management Act*, 33 ENVTL. L. 929 (2003) (detailing proposed watershed-based management frameworks); see also *Local and Watershed Land Use Controls*, supra note 281, at 11–14 (outlining election processes and duties of elected local representatives).

338. Ruhl et al., supra note 337; see also Frarey, Jones & Pratt, supra note 52, at 159 (describing the history of voting rights based on land ownership).

339. *Local and Watershed Land Use Controls*, supra note 281, at 12.

development-permit fees”³⁴⁰ In sum, the organization, function, and funding of Districts should be expanded as part of Lake Champlain’s TMDL implementation to integrate watershed-based planning and water quality management strategies, as well as provide a source of land use regulatory controls aimed at reducing local agricultural runoff.

*C. Mandatory Best Management Practices and
Whole Farm Conservation Plans*

Another approach for reducing NPS pollution from in-state farming activities is for the state to require Best Management Practices and development of enforceable “whole farm” conservation plans for smaller farms. To date, Vermont, through the AAFM, has developed a three-tiered system for regulating farm operations based on the number of animals raised which include: Small Farm Operations (SFOs), Medium Farm Operations (MFOs), and Large Farm Operations (LFOs).³⁴¹ While SFOs are required to meet the State’s Accepted Agricultural Practices (AAPs), enforcement has been limited because rules provide the AAFM with broad enforcement discretion.³⁴² Further, SFOs are not required to adhere to either “whole farm” or waste-specific nutrient management plans (discussed below). The AAFM took a more proactive step with their 2007 MFO General Permit which requires farms to operate in accordance with an approved Nutrient Management Plan (NMP)³⁴³ and the 2007 LFO Rules which require individual permits for farms that include management standards and field-specific NMPs.³⁴⁴ However, to improve regional water quality this article recommends increased enforcement by the State of MFO General Permit conditions and LFO individual permits. Furthermore, as discussed *supra* in Part III.B, the State and ANR must immediately assume its federally delegated responsibilities under the CWA and require NPDES permits for all Vermont farms that meet the EPA’s regulatory CAFO definition and discharge, or propose to discharge, pollutants. Further, based on identified violations, ANR should actively pursue CWA enforcement action against all point source agricultural polluters, including CAFOs.³⁴⁵

340. *Id.* at 14.

341. *See* Part III.B of this article for an overview of existing state regulations applicable to Vermont farm operations.

342. *Local and Watershed Land Use Controls*, *supra* note 281, at 14.

343. *Id.* at 17.

344. *Id.* at 19.

345. *See supra* notes 18, 19, and 240.

1. Mandatory Best Management Practices

Although the development of NMPs for MFOs and LFOs is definitely a step in the right direction, these plans, and most LFOs management and design standards, include primarily permit-based assurances for proper animal waste management, storage, and disposal under existing laws.³⁴⁶ Vermont's NMPs do not generally require the use of specific BMPs for cropland or pasture management. Rather, they include assurances from farm operators that their farm-specific plans meet or exceed baseline AAPs and that they will provide "adequate storage of manure, litter, and process wastewater;" proper management of dead animals; diversion of clean water "as appropriate" from production areas; and the development of protocols for land application of manure in accordance with approved site-specific NMPs.³⁴⁷ Specific cropland and pasture management BMPs which are not required in NMPs, but identified by the AAFM, include strip-cropping, terracing, pasture management, cropland protection, conservation tillage, diversions, erosion or water control structures, tree planting, conservation cropping, and other BMPs identified by the NRCS.³⁴⁸

While identified BMPs are eligible for state and federal cost-share funding for up to eighty-five percent of an on-farm improvement project (with funding priority given to farms in the Lake Champlain Basin),³⁴⁹ BMPs are primarily based on voluntary implementation which has historically paralleled the amount of federal cost-sharing money available.³⁵⁰ In Vermont, enabling legislation states that the BMP Program was created to provide "state financial assistance to Vermont farmers in support of their *voluntary construction* of on-farm improvements designed to abate non-point source agricultural waste discharges," as well as to

346. See LARGE FARM OPERATIONS RULES, *supra* note 236, at 21–25; VT. AGENCY OF AGRIC., FOOD & MKT., GENERAL PERMIT FOR MEDIUM FARM OPERATIONS 22–23 (2007), available at http://www.vermontagriculture.com/ARMES/awq/documents/GP_for_MFOs.pdf [hereinafter GENERAL PERMIT FOR MEDIUM FARM OPERATIONS].

347. LARGE FARM OPERATIONS RULES, *supra* note 236, at 21–25; GENERAL PERMIT FOR MEDIUM FARM OPERATIONS, *supra* note 346, at 19–21.

348. *Best Management Practices Regulations*, VT. AGENCY AGRIC., FOOD & MARKETS (Jan. 27, 1996), <http://www.vermontagriculture.com/ARMES/BMP.htm#regulations>.

349. *Id.*

350. See, e.g., John H. Davidson, *Thinking About Nonpoint Sources of Water Pollution and South Dakota Agriculture*, 34 S.D. L. REV. 20, 53 (1989) (looking at both early efforts of the SCS to organize effective soil erosion controls and the EPA's more recent efforts to organize effective NPS pollution controls through BMPS through its 1987 NPS Management Program). Davidson also notes that, "Yet while Congress has largely failed to regulated [NPS] pollution, it at least recognizes, as we all must, that when the time comes to deal with this problem, the tools will be BMPs, land use controls and watershed management." *Id.* at 48.

provide “maximum use of federal financial aid for the same purpose.”³⁵¹ BMPs can be required by the AAFM upon petition and after a public hearing to achieve compliance with state water quality standards. Implementation of BMPs on-the-ground is contingent on the farm operator’s receipt of sufficient financial assistance, specifically “a grant of 85 percent of the total cost of a BMP’s design, construction[,] and the auxiliary equipment necessary to operate the system(s).”³⁵² In sum, as traditional state and federal non-rule-based approaches for regulating agricultural NPS pollution via suggested BMPs and voluntary incentives, (such as farm improvement project cost-share programs), have largely failed to reduce agricultural runoff. Therefore, it is time to evaluate the use of mandatory BMPs to address persistent water quality issues.³⁵³ Specifically, Vermont should consider requiring the implementation of specific BMPs for cropland and pasture management in addition to largely waste-specific NMPs.

2. Whole Farm Conservation Plans

Like Conservation Districts, the original concept of agricultural “conservation plans” emerged from the U.S. soil conservation movement during and following the environmental disaster commonly known as the Dust Bowl.³⁵⁴ On the basis of its early scientific research, the U.S. SCS (now the NRCS) developed a catalog of “thoroughly familiar and under-appreciated” cropland erosion control techniques. These techniques included terracing, contour plowing, crop rotation, grass waterways, pasture maintenance, stubble mulch, and field windbreaks; they were “practical and economically efficient” and provided tangible contributions to sustainable agriculture and soil conservations.³⁵⁵ Similar to water quality problems faced by Vermont and other states today, prevailing conditions during the

351. VT. STAT. ANN. tit. 6, § 4821(a) (2009) (emphasis added).

352. *Best Management Practices Regulations*, *supra* note 348.

353. See Douglas R. Williams, *When Voluntary Incentive-Based Controls Fail: Structuring a Regulatory Response to Agricultural Nonpoint Source Water Pollution*, 9 WASH. U. J.L. & POL’Y 21, 22–24 (2002); David Zaring, *Best Practices as Regulatory Regime: The Case of Agricultural Nonpoint Source Pollution*, 34 ENVTL. L. REP. 11,025, 11,025 (2004); David Zaring, *Agriculture, Nonpoint Source Pollution, and Regulatory Control: The Clean Water Act’s Bleak Present and Future*, 20 HARV. ENVTL. L. REV. 515, 515–16 (1996) [hereinafter *Agriculture, Nonpoint Source Pollution, and Regulatory Control*].

354. *Conservation Plans in Agriculture*, *supra* note 288, at 10,501.

355. *Id.*; see also John H. Davidson, *State Soil Erosion Control Laws, Conservation Plans and Nonpoint Pollution*, 1 GREAT PLAINS NAT. RESOURCES J. 421, 422–23 (1996) [hereinafter *State Soil Erosion Control Laws, Conservation Plans and Nonpoint Pollution*] (discussing the use of varied techniques for erosion control).

1930s and 1940s could be traced to the practices of private landowners.³⁵⁶ The on-farm method then developed by the SCS to deal with the variety among different farm operations in terms of size, production methods, crops, soils, terrain, and social practices, were known as the “Whole Farm Conservation Plan.” As used during the 1930s, these plans were based on detailed land capacity classifications that identified the limitations and potential of specific properties used in farming activities, and then developed management programs for different fields and soils. Like today, on-farm improvements were facilitated by substantial federal subsidies (known as field cost-sharing) for improvements included in the Whole Farm Conservation Plan. Implementation of these farm-specific plans also benefited from capital and operating loans to economically marginal farms from the federal Farmers Home Administration (now known as the Farm Service Agency).³⁵⁷

Since the Dust Bowl, the SCS concept, albeit modified, for agricultural conservation plans has found a place in the laws of various states for NPS runoff control.³⁵⁸ In addressing current environmental issues, specifically the “classic situation of controlling runoff from a *large number of widely dispersed* small sources of *nontoxic pollutants*,” John H. Davidson, a professor of law at the University of South Dakota, finds that the original conception of Whole Farm Conservation Plans, as developed under the direction of SCS Chief Hugh H. Bennett, is “an idea that responds most appropriately” to NPS pollution runoff from small and widely dispersed sources.³⁵⁹ Moreover, Davidson observes that “the concept is that a plan, to be successful, must be applied to the entire farm” and that when a plan is restricted to just one part of a farm, “its purpose is largely defeated.”³⁶⁰ He further notes that, “[d]espite one-half century of heavily subsidized volunteerism, pollution from agricultural run-off has worsened steadily”³⁶¹ and “[t]here is little hard evidence (although an abundance of hopeful rhetoric) that a voluntary system will ever come close to solving the problem of [NPS] pollution.”³⁶² As a condition for the receipt of state or

356. *Conservation Plans in Agriculture*, *supra* note 288, at 10,501.

357. *Id.* at 10,502.

358. *See id.* at 10,504; *see also State Soil Erosion Control Laws, Conservation Plans and Nonpoint Pollution*, *supra* note 355, at 424-431 (discussing the South Dakota, Illinois, and Texas statutes addressing NPS runoff control).

359. *Conservation Plans in Agriculture*, *supra* note 288, at 10,505.

360. *Id.* at 10,505-06.

361. *Id.* at 10,507.

362. *State Soil Erosion Control Laws, Conservation Plans and Nonpoint Pollution*, *supra* note 355, at 442 (“Paying half of the cleanup costs of practices not otherwise commending themselves to users is an unlikely way to provoke a raid on the treasury. Altruism, discounted by fifty percent, has yet

federal financial support, farm operators could be required to demonstrate compliance with Whole Farm plans. When used to reduce NPS runoff, Davidson recommends that these conservation plans be closely tied to the quality of receiving waters and be related to specific pollution control objectives included in state water quality standards. Finally, he cautions that while plans can serve as a good approach to deal with runoff from a large number of dispersed sources, they are not designed to respond to intensive, specialized, and industrial agriculture. In sum, the use of Whole Farm Conservation Plans as originally proposed by the SCS, with additional standards related to current state water quality objectives, appears to have strong potential for reducing NPS runoff from Vermont's more than 900 SFOs. Also, as discussed above, the requirement of specific cropland and pasture BMPs, especially for the State's MFOs and LFOs (which totaled 157 and 18 respectively from 2008 AAFM farm survey data),³⁶³ would also enhance regional water quality, specifically in the impaired Lake Champlain Drainage Basin.

*D. Taxation of Agricultural Inputs and Byproducts;
Farm-Related Tax Abatement*

1. Taxation of Agricultural Inputs and Byproducts

Modern agriculture in Vermont, as in many parts of the developed world, contributes positive and negative externalities to society. Production of food supplies, coupled with the preservation of socially valuable open space, scenic vistas, and cultural resources are examples of positive externalities. Environmental damage caused by nutrient pollution and pesticide runoff onto adjacent land and water (which effect fish and wildlife resources), as well as ecological services (e.g., clean water for consumption, domestic and commercial use, as well as recreation) are examples of negative externalities. Another possible policy approach and market-based economic tool to reduce some negative environmental externalities produced by agricultural operations is taxation of, or administrative fees on, agricultural inputs (e.g., fertilizers and pesticides) and byproducts (e.g., manure and other farm residues) which contribute to NPS pollution.³⁶⁴ Dispersed NPS pollution from agricultural operations is

to win its first political campaign." (quoting 2 W. H. RODGERS JR., 2 ENVIRONMENTAL LAW: AIR AND WATER 141 (1986)).

363. VERMONT CLEAN AND CLEAR ACTION PLAN ANNUAL REPORT 2008, *supra* note 184, at 2.

364. DAVID PEARCE & PHOEBE KOUNDOURI, WORLD BANK GROUP, FERTILIZER AND PESTICIDE TAXES FOR CONTROLLING NON-POINT AGRICULTURAL POLLUTION 1 (2003), *available at*

an economic externality because it represents a production cost that farm operators are not required to internalize or financially account for in farming operations.³⁶⁵ Due to these externalities, combined with other factors (such as federal farm subsidies), the market price of agricultural commodities (e.g., milk, beef and feed corn) often does not reflect the full costs associated with their production. Therefore, the typical farmer running their business as an economically rational actor is likely to over-produce, and over-commit resources to their agricultural activities.³⁶⁶ Additionally, they are likely to over-use inexpensive commercial fertilizers (as a form of cheap insurance to increase crop yields),³⁶⁷ and manure (as another source of fertilizer and a method of inexpensive livestock waste disposal) in field-based applications.

Internalization is a classic solution to an economic externality. If currently externalized costs were internalized by individual farm operators agricultural commodities prices may more closely reflect actual environmental and social costs, assuming the market allows farmers to pass on these production costs. But, “only the most saintly of farmers will voluntarily internalize these costs,” which accrue off-farm and off-balance sheet, therefore “internalization will require some form of government inducement.”³⁶⁸ Further, market conditions may not allow farmers to pass on these internalized costs, which could jeopardize the commercial viability of economically fragile farming operations. Thus, for measurable environmental and social progress to be made, the government must provide strong public policy inducements while remaining appropriately sensitive to the economic realities and constraints of farming operations, but not overly protective of socially unacceptable agricultural land use and management practices.³⁶⁹ The current and historic use of mostly incentive-based “carrots” (such as farm subsidies, low interest and non-recourse loans, and voluntary cost-share programs) by federal and state governments has not generated a sufficient interest in on-farm improvements necessary

<http://siteresources.worldbank.org/INTWRD/903845-1112344347411/20424145/31203ARDnoteWRMEIPearceKoundouri.pdf>.

365. George A. Gould, *Agriculture, Nonpoint Source Pollution, and Federal Law*, 23 U.C. DAVIS L. REV. 461, 487 (1989); *see also* *Agriculture, Nonpoint Source Pollution, and Regulatory Control*, *supra* note 353, at 532–35 (describing an incentive-based pollution tax model to reduce NPS pollution); PEARCE & KOUNDOURI, *supra* note 364, at 3; Chang Woon Nam et al., *Taxation of Fertilizers, Pesticides and Energy Use for Agricultural Production in Selected EU Countries*, 17 EUR. ENV'T 267 (2007) (discussing how taxes may be used to reduce NSPS pollution).

366. Gould, *supra* 365, at 487.

367. PEARCE & KOUNDOURI, *supra* note 364, at 2.

368. Gould, *supra* note 365.

369. *See id.* at 489 (describing strong inducements required for farmers to reduce pollution).

to reduce the now well-documented environmental externalities of agricultural production, specifically NPS pollution. It is clearly time for regulatory-based measures or ‘sticks’ (including local land use or watershed-based land management controls, mandatory BMPs, farm conservation plans, and the taxation of agricultural inputs and byproducts) to be considered and at least several strategies should be implemented by the State of Vermont in the near future.

Increased taxes (depending on assessment levels), while often viewed as socially and politically unpopular among more conservative U.S. citizens and politicians,³⁷⁰ may encourage individual reductions in pollution-generating activities; create a more generalized signaling effect by raising social awareness of the environmental costs related to these activities; and provide funding for research and development of new agricultural technologies and environmental restoration programs.³⁷¹ However, many forms of farm-generated pollution would be very hard to accurately tax, especially those related to livestock and dairy production, due to the practical and administrative difficulty associated with measuring diffuse and varied nonpoint sources. Furthermore, the fairly extensive experiences with fertilizer and pesticide taxes by individual countries in Europe suggest that while environmental taxes can play some role in the reduction of fertilizer and pesticide use by farm operators, their price elasticity estimates are low, and researchers note that this suggests “comparatively little effect in terms of quantity reduction, unless [taxes] are set at very high rates (relative to price).”³⁷² However, the same researchers in their 2003 review for the World Bank observe “revenue recycling may have been more effective, with revenues [from taxes] redirected to research and information.”³⁷³ Specifically, the Danish experience suggests that recycling revenues directly back into agriculture severely reduces the policy effectiveness of the tax and using revenues to further research or encourage changes in farming practices appears to make more sense.³⁷⁴ Finally, damage from pesticides and fertilizers is often cumulative and as a result

370. For example, see publicized citizen group responses to, current related commentaries on, and coverage of the 2009 ‘Town Hall meetings’ debates over the Obama administration’s ‘public option’ proposal for healthcare reform.

371. *Farms, Their Environmental Harms, and Environmental Law*, *supra* note 334, at 339; PEARCE & KOUNDOURI, *supra* note 364, at 2, 4.

372. PEARCE & KOUNDOURI, *supra* note 364, at 2; *see also* Nam et al., *supra* note 365, at 270 (“[T]he dilemma inherent in fertilizer taxation is that the use of fertilizers is so essential that tax rates would have to be very high to modulate consumption. This could result in a major reduction in farm income.”).

373. PEARCE & KOUNDOURI, *supra* note 364, at 2.

374. *Id.* at 2–3.

“current damage is partly a function of their past releases.”³⁷⁵ However, researchers find that if revenues can be hypothecated they can be used for environmental cleanup programs, “so that revenue-raising taxes [on fertilizers or pesticides] nonetheless have an externality reducing function.”³⁷⁶

While administratively complex and costly, NPS runoff and related water quality pollution, from both commercial fertilizer inputs and farm-generated manure byproducts, can be linked to annual land application levels. Self-reporting of field application levels can be required as part of farm-specific NMPs,³⁷⁷ which have been discussed above. Nutrient release inventories, if tied to related taxes or fees, could reduce farm operators’ use of commercial or manure fertilizers in field-based applications and/or provide revenues to mitigate the cumulative effects of off-farm externalities.³⁷⁸ If established as generally outlined by Prof. Ford Runge, farms using fertilizers in excess of an acceptable application level would be subject to a progressively higher tax rate based on the quantity of their overall nutrient application, while farms using commercial or manure-based fertilizers below this application threshold would be rewarded with decreased taxes, no taxes, or even subsidies.³⁷⁹ To simplify this already

375. *Id.* at 3.

376. *Id.*

377. The trustworthiness of self-reported fertilizer and/or manure application data by individual farm operators is, of course, suspect. However, to reduce inaccuracies and/or fraudulent reporting, the State could also create stiff administrative fines and criminal/civil liability for such behavior, as well as conduct randomized application audits.

378. *Farms, Their Environmental Harms, and Environmental Law*, *supra* note 334, at 339.

379. *Id.* (citing C. Ford Runge, *Environmental Protection from Farm to Market*, in *THINKING ECOLOGICALLY: THE NEXT GENERATION OF ENVIRONMENTAL POLICY*, 200, 213–14 (Marian R. Chertow & Daniel C. Esty eds., 1997)). The author acknowledges that the use of a tax-based strategy by any state, including Vermont, to reduce NPS pollution may be socially and politically suspect. However, this strategy would likely not be legally preempted by the Supremacy Clause of the U.S. Constitution or struck down as unconstitutional under the Due Process or Commerce Clauses. See *Nutrient Management and Fertilizers*, U.S. ENVTL. PROTECTION AGENCY, <http://www.epa.gov/oecaagct/tfer.html> (last updated Oct. 7, 2009) (pointing out that fertilizers made from domestic and sewer sludge (e.g., biofuels) used in agriculture are specifically regulated under the CWA). Fertilizers made from industrial waste materials are regulated under the Resource Conservation and Recovery Act of 1976 as well as applicable toxic substance-related legislation. Agricultural producers can return manure and crop residues to the soil as fertilizers on their property unless prohibited by state or local laws. 42 U.S.C. § 6901 (2006). While the Federal Environmental Pesticide Control Act (FEPCA) of 1972 (which amended and essentially rewrote the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) of 1947), in its current form “mandates that EPA regulate the use and sale of pesticides to protect human health and preserve the environment.” *Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), Overview*, U.S. ENVTL. PROTECTION AGENCY, <http://www.epa.gov/agriculture/lfra.html> (last updated Apr. 21, 2010). No existing federal statute directly relates to use and sale of non-toxic, non-industrial waste and non-sewage sludge based soil fertilizers. See generally U.S. ENVTL. PROT. AGENCY, MAJOR EXISTING EPA LAWS AND PROGRAMS THAT COULD AFFECT AGRICULTURAL PRODUCERS (2007), available at

administratively complex nutrient tax scheme, if used in Vermont, this article recommends that nutrient inputs applied below farm-specific management plan levels, similar to Denmark's nutrient tax system discussed below, should not be subject to a tax penalty.³⁸⁰ While inputs below threshold application levels may still contribute to NPS pollution, their contribution should theoretically be small enough that they do not warrant the imposition of administratively costly and complex cost-internalization measures. Building on Runge's "negative tax" proposal, the French Ministry of the Environment recommended a similarly structured tax on fertilizers and pesticides.³⁸¹ As of 2007, France did not have a specific tax on fertilizers, but had established a pesticides tax based on seven categories of noxiousness.³⁸² However, other European countries, such as Denmark and the Netherlands, have developed detailed "mineral accounts" for individual farms.³⁸³ These accounts record the soil application of nitrogen from commercial fertilizers and farm-generated animal manure, the net uptake of nitrogen by crops, and the net excess balance which is

<http://www.epa.gov/agriculture/agmatrix.pdf> (discussing statutes that specifically disallow hazardous waste but allow disposal of non-hazardous waste). Thus, state regulation in this area/field is likely not inconsistent and thus preempted by federal legislation, and it is also unlikely that a reviewing court find such a tax-based regulation implicitly preempted by a federal intent to 'occupy this field.' Further, if NPS pollution-based taxes, as described herein, were challenged as unconstitutional under the Due Process Clause (applicable to state governments through the Fourteenth Amendment), a reviewing court would likely find the tax-based regulation on fertilizer use and application rationally related to a legitimate state interest (e.g., the improvement of regional water quality and reduction of persistent, diffuse NPS pollution). Finally, state taxation would not likely be found to violate the Commerce Clause under the 'dormant commerce clause' doctrine. *See* *Nw. States Portland Cement Co., v. Minnesota*, 358 U.S. 450, 452 (1959) (holding that the "net income from the interstate operations of a foreign corporation may be subjected to state taxation provided that the levy is not discriminatory and is properly apportioned to local activities within the taxing state forming sufficient nexus to support the same, and that imposition of such tax did not violate the Commerce Clause or the Due Process Clause of the federal Constitution;" and finding that restrictions placed by the U.S. Constitution on the states in the exercise of their taxing powers are extremely limited); *H.P. Hood & Sons, Inc. v. DuMond*, 336 U.S. 525 (1949) (finding that states have broad powers to protect inhabitants against perils to health or safety, even by use of measures which bear adversely upon interstate commerce, but that a state may not promote its own economic advantages by curtailment or burdening of interstate commerce). Finally, the author notes that she and the named defendant in this case, former New York State Commissioner of Agriculture and Markets, C. Chester DuMond, may be distantly related, as her paternal relatives and DuMond ancestors for many generations are/were involved in farming and agricultural-related activities in New York.

380. *Farms, Their Environmental Harms, and Environmental Law*, *supra* note 334.

381. *Id.* at 339. The author, despite strong French ancestry and pride inherited from both sides of her family tree, acknowledges that some conservative U.S. citizens and politicians (e.g., staunch Republicans who eat Freedom Fries) may not find French models of social governance or legislation overly persuasive.

382. Nam et al., *supra* note 365, at 270 tbl.

383. PEARCE & KOUNDOURI, *supra* note 364, at 4.

effectively the nitrate runoff from the farm. Thus, to some extent, “the underlying problem of NPS pollution—namely the difficulty of allocating ambient pollution to sources—is overcome.”³⁸⁴ As of 2007, the Danish assessed penalties where fertilizers exceeded individual farm-specific quotas. While no tax on fertilizers by the Netherlands was reported as of 2007, during the 1990s the Dutch had also previously applied a tax penalty for fertilizer use above established fertilizer reduction goals.³⁸⁵

An alternative to a comprehensive (but administratively complex and costly) nutrient loss tax is a state level point-of-sale tax on all in-state commercial fertilizers. Results from an economic study that modeled input/output behavior of Danish pig farms compared the cost effectiveness of a “Pigouvian” tax (also spelled Pigovian, this is a tax levied on a non-market activity that generates negative externalities and is intended to correct market outcomes) on nitrogen loss to other tax schemes. This comparison to other tax schemes focused on nitrogen use suggests that a simpler tax on all nitrogen inputs generates only a marginal increase in abatement costs.³⁸⁶ Further, researchers found their results imply that even a limited administrative cost advantage may make an input tax preferable to implementing complex Pigouvian incentives via a nitrogen loss tax. As of 2007, the Swedish government applied its standard national tax rate on the

384. *Id.*

385. See Nam et al., *supra* note 365, at 270–71 tbl. (reporting no taxes on fertilizers). However, during the late 1980s and through the 1990s, the Dutch developed and implemented a three-phased tax program to address nitrate runoff from excessive livestock manure. See U.S. OFFICE OF TECH. ASSESSMENT, AGRICULTURE, TRADE, AND ENVIRONMENT: ACHIEVING COMPLEMENTARY POLICIES 185 (1995). The first phase of the Dutch program (1987–1990) aimed at stabilizing the problem by setting standards for the maximum amount of manure that could be applied per hectare; the second phase (1991–1994) gradually tightened maximum application standards; and the final phase (1995–2000) further tightened standards to balance application of fertilizer and manure against what the environment is estimated to be capable of absorbing. *Id.* Dutch farmers were initially allowed to meet fertilizer reduction goals in any way they wanted to; but, if they did not meet these goals by a certain date, they were subject to a tax on input use. An estimated 90% of Dutch farmers were able to comply with these regulations. *Id.* In 1988, the Netherlands also established a tax on livestock feed manufacturers, with the revenue from the tax going toward financing education and research on manure disposal. *Id.* In the early 2000s, the Netherlands also used a “payment-by-result” policy instrument which did not specify how reductions in fertilizer and pesticide use should be achieved, but gave Dutch farmers increasingly higher financial rewards for decreasing their levels of pesticide and nutrient use, depending on the specific crop under consideration and based on farm-specific nutrient management plans. See Katrin Oltmer & Floor Brouwer, *The Netherlands: From Compensation to Legal Constraints*, in GOVERNANCE OF WATER-RELATED CONFLICTS IN AGRICULTURE: NEW DIRECTIONS IN AGRI-ENVIRONMENTAL AND WATER POLICIES IN THE EU 133, 144 (Floor Brouwer, Ingo Heinz & Thomas Zabel, eds., 2003).

386. Jan Christensen & Lars Garn Hansen, *Abatement Costs of Alternative Tax Systems to Regulate Agricultural Nitrogen Loss*, 7 ENVTL. ECON. & POL’Y STUD. 53 (2005).

use of nitrogen on a per kilogram basis.³⁸⁷ Austria had previously imposed a sales tax on fertilizers, but abolished this tax in 1997 to increase the competitiveness of its agricultural sector in the European Union, combined with the policy failure of taxes to reduce fertilizer usage (due to the relatively low tax rate imposed).³⁸⁸ Some U.S. states, including Vermont, impose a tonnage fee on commercial fertilizer sales,³⁸⁹ although due to

387. Nam et al., *supra* note 365, at 271, 274. Further, Pearce and Koundouri reported that in Sweden, it is estimated that the tax reduced demand for fertilizers in 1991 to 1992 by fifteen to twenty percent and also reduced financially optimal dosages by about ten percent. PEARCE & KOUNDOURI, *supra* note 364, at 4. Indirect effects of the use of recycled revenues to fund research were more significant, but ended in 1994 when the nutrient charge became an official tax. *Id.* The receipt of taxes on pesticides and fertilizers flowed into the general budget and not directly to agricultural research—however, in Sweden, environmental control measures and support programs are financed through the country's general budget. Nam et al., *supra* note 365, at 274.

388. Nam et al., *supra* note 365, at 274. However, Pearce & Koundouri, *supra* note 364, at 4, note that, in the case of Austria's fertilizer tax, "the levy is thought to have had a significant 'signaling' effect through raising awareness that fertilizers are environmentally damaging."

389. See VT. STAT. ANN. tit. 6, §§ 361–379 (2010). Specifically, section 364(e) requires that all fertilizer and lime registration and tonnage fees be deposited into a special fund that is restricted to implementing and administering laws "relating to feeds and seeds" (as most recently amended in 2005); section 366(a) requires that an annual inspection fee "at the rate of twenty-five [25] cents per ton" be paid annually to the AAFM Secretary for all fertilizers distributed to non-registered in-state consumers; section 367(4) allows for the development of "any reasonable means necessary to monitor and promulgate rules for the use of fertilizers and agricultural limes on Vermont soils where monitoring indicates environmental or health problems." *Id.* §§ 364(e), 366(a), 367(4); see also Janet E. Milne, *Exploring the Potential Role of State Taxation in Reducing the Flow of Nutrients from Nonpoint Sources into the Waters of New England and New York*, in ENVIRONMENTAL TAXES: EXPLORING THE OPTIONS, at App. D (1996) (Env'tl. Law Ctr., Vt. Law School & Amos Tuck School of Bus., Dartmouth Coll. Workshop, Discussion paper) (on file with author) [hereinafter *Exploring the Potential Role of State Taxation in Reducing the Flow of Nutrients from Nonpoint Sources into the Waters of New England and New York*] (summarizing that, as of 1996, New England states and New York imposed fertilizer tonnage fees ranging from \$.10/ton to \$.25/ton). More aggressively, Iowa under its 1987 Groundwater Protection Act imposes a "groundwater protection fee" of a \$.75 per ton tax on nitrogen-based fertilizer (as well as an annual "inspection fee" of up to \$.20/ton on all commercial fertilizers sold or distributed in-state). IOWA CODE, § 200.8(1)(a)(4)(2010). Further, under section 200.4, Iowa requires a license of any person who manufactures, sells or distributes fertilizer or soil conditioners. Under section 200.9, all fertilizer and inspection fees collected are to be deposited in the state's agricultural management account of the groundwater protection fund, and may be assigned by Iowa's Secretary of Agriculture to the state's agricultural experiment station for research and other work projects. In 1993, thirty-five percent of this tax went to the Leopold Center for Sustainable Agriculture at Iowa State University to promote economic and environmentally sustainable agriculture. David Morris, *Green Taxes*, INSTITUTE FOR LOCAL SELF-RELIANCE (1994), <http://www.ilsr.org/ecotax/greentax.html>. Wisconsin also requires an annual license and fee for the in-state manufacture or distribution of fertilizers. WIS. STAT. §§ 94.64(3), (3r). Wisconsin has established an escalating fee schedule for in-state fertilizer tonnage fees and surcharges (which started with a basic fee of \$.23/ton of commercial fertilizer sold or distributed in 1999–2001 and increased to a \$.30/ton for fertilizer sold or distributed after 2001; plus an additional \$.10/ton "research fee," a \$.10/ton "groundwater fee," and finally an "agricultural chemical cleanup surcharge" of \$.44/ton on all fertilizer sold or distributed in-state after June 2007, "unless the department establishes a different surcharge. . . ." WIS. STAT. § 94.64(4)(a)(1)–(5) (2010). Finally, section 94.64(8m)(a)–(b) requires that "research fees" be forwarded to the University of Wisconsin system "for

relatively low fee levels, the Pigouvian effect of this fee on actually reducing fertilizer use is limited. However, at least several states, including Iowa, Florida, and Wisconsin, direct or allow the use of these fertilizer-related fees for in-state research on soil and nutrient management.³⁹⁰ Like these states, Vermont could specifically earmark all or a portion of its collected fertilizer fees to agricultural and related environmental research by the University of Vermont and other Vermont-based academic institutions. In addition, or alternatively, Vermont could increase its current statute-based fee of \$.25/ton, like Iowa has done, to help mitigate the off-farm effects on cumulative nutrient use on in-state water resources, including Lake Champlain. However, point-of-sale taxes and fees on in-state use or distribution of commercial fertilizers would not (unlike a comprehensive nutrient-loss tax) address nutrient runoff associated with farm-generated manure and other agricultural byproducts which are very common to dairy farming.³⁹¹ One potential adverse effect on a commercial fertilizer tax is that it “penalizes arable farming, whose farmers contribute [relatively] little to pollution, while favouring livestock farmers with surplus manure.”³⁹² Thus, if a fertilizer tax or fee was used in Vermont, it should be coupled with other specific tax incentives and penalties to encourage environmentally-sensitive dairy farm manure management and improved methods for manure storage, livestock waste disposal,³⁹³ and/or

research on soil management, soil fertility, plant nutrient problems and for research on surface water and groundwater problems which may be related to fertilizer usage.” *Id.* § 94.64(8m)(a)–(b); *see also* KATHERINE A. SHEEHAN, MANAGING FERTILIZER FOR LAWN USE: GUIDANCE FOR LOCAL GOVERNMENT IN WATERSHEDS WHERE NUTRIENT LOADING IS AN ISSUE 11–12 (2007) (discussing Wisconsin and Florida’s fertilizer tax statutes, which use revenues to support related research). Finally, the State of Nebraska imposed an aggressive fee of \$4.00/ton on the gross tonnage of all commercial fertilizer sales, use, or “other in-state consumption” through December 31, 1996 and a \$1.00 fee/ton between January 1, 1997 to December 31, 2001. NEB. REV. STAT. § 77-4401 (repealed 2001).

390. As previously noted above, Vermont more generally requires that all fertilizer registration and tonnage fees be deposited into a special fund that is restricted to implementing and administering laws “relating to feeds and seeds.” VT. STAT. ANN. tit. 6, § 364(e) (2010).

391. *See* Nam et al., *supra* note 365. As noted by Nam et al. herein, in EU countries, including Denmark and Sweden, the profit tax burden on arable farming (e.g., crop production) from the taxation of fertilizers in these countries is generally above the level of other model agricultural sector entities studied (milk, pig, and poultry). *Id.* at 279 fig.2. Nam et al. observe that “[t]he counterpart of arable farming is *dairy farming*,” which “is subject to the lowest tax burden of all examined sectors.” *Id.* at 278. Nam et al. conclude that a serious drawback of input use taxes and regulations is that “for the case of non-point source pollution, it is hardly feasible to charge a farm a tax on the basis of its pollution.” *Id.* at 280. As they observe, “[a]n adverse effect of fertilizer tax is that this also penalizes arable farming, whose farmers contribute little to pollution, while favouring livestock farmers with surplus manure.” *Id.* at 281.

392. *Id.*

393. *See Exploring the Potential Role of State Taxation in Reducing the Flow of Nutrients from Nonpoint Sources into the Waters of New England and New York*, *supra* note 389, at 2, 29–35 (providing

reuse as an alternative source of in-state electricity production. As proposed by Prof. Janet Milne, related tax incentives could include: tax credits or accelerated depreciation for improved manure storage facilities, including waste diversion systems; tax credits for soil testing, costs of certified crop [or nutrient] management plans, and precision fertilizer applicators; and property tax exemptions for buffer zones along bodies of water [and wetlands], which play a key role in reducing nutrient runoff by filtering it before it reaches environmentally-sensitive surface waters.

2. Farm-Related Tax Abatement

Other popular tax-related tools used by states to support agricultural land use include property tax abatement, or “differential property tax assessment” (also called current use assessment),³⁹⁴ and/or circuit breaker tax relief credits. Differential property tax assessment laws, which have been passed in all states except Michigan, allow eligible and interested landowners the option to enroll in current use programs.³⁹⁵ These laws direct local governments to assess agricultural lands at their current use or agricultural value as opposed to the standard assessment of the property at its full fair market value, which is generally higher. Differential assessments can help promote the economic viability of farms by reducing farmers’ property tax burden.³⁹⁶ Alternatively, states like Michigan have created circuit breaker tax programs that offer tax credits to offset farmers’ property taxes. In Wisconsin and New York, farmers may receive state income tax credits based on the amount of their real property tax bill and income. In Iowa, farmers can receive school tax credits from local governments when taxes exceed a statutory threshold. Under Iowa’s tax credit program, as well as some current use programs, local governments are later reimbursed for credits or lost local property tax revenues from a statewide fund. However, unlike differential assessment programs, property tax credit programs base tax relief credits on farmers’ income.³⁹⁷

Vermont’s Agricultural and Managed Forest Land Use Value Program (commonly known as the “Current Use Program”) was created in 1978 and offers landowners use value property taxation based on the productive value

and summarizing a detailed proposal of state tax incentives that could encourage farmers to implement improved nutrient management practices aimed at reducing farm-based nutrient runoff).

394. See *Agriculture and Ecosystem Services*, *supra* note 258, at 437 (noting that evidence shows that these measures do not deter conversion of land at the urban fringe, where development returns frequently more than offset the higher tax rates).

395. THE FARMLAND PROTECTION TOOLBOX, *supra* note 252, at 6.

396. *Id.*

397. THE FARMLAND PROTECTION TOOLBOX, *supra* note 252.

of their land.³⁹⁸ In 2000, the current use value of the land enrolled in the program statewide averaged about twenty percentage of its full fair market value.³⁹⁹ The program allows abatement of farmers' assessed property taxes. Vermont's Current Use Program also includes a Land Use Change Tax as a disincentive to farmland development; this tax is about twenty percent of the fair market value of a property, or, in the event of a subdivision and sale of a portion of the enrolled property, a pro rata share of the fair market value of the entire property.⁴⁰⁰ In 2008, landowners enrolled over 15,000 properties in the program, totaling over two million acres or about one-third of Vermont's total land area.⁴⁰¹ As evidenced by high enrollment numbers, Vermont's Current Use Program has proven very popular among landowners and should definitely be continued. However, in addition to maintaining properties in agricultural or forestry uses, as a condition of continued enrollment, participating landowners should be required to annually certify their use of AAPs, mandatory BMPs, and Whole Farm Conservation Plans, as discussed above.⁴⁰² Finally, enrolled properties should be subject to State auditing for compliance with applicable agricultural land management requirements.⁴⁰³

398. *Current Use Program*, VT. AGENCY OF AGRIC., FOOD & MARKETS (2005), <http://www.vermontagriculture.com/agdev/currentuse.htm>. The program was later expanded to include "conservation land owned by qualifying nonprofit organizations and the exemption from all property taxes of eligible farm buildings." *Property Valuation and Review*, VT. DEPARTMENT OF TAXES, <http://www.state.vt.us/tax/pvrcurrentuse.shtml> (last visited Dec. 10, 2009).

399. *Current Use Program*, *supra* note 398.

400. *Id.*

401. *Id.*

402. See Janet Milne, *Watersheds: Runoff from the Tax Code*, 34 VT. L. REV. 883, 891 (2010) (discussing Vermont's Current Use Program and its current lack of leverage to improve agricultural practices). Professor Milne notes that this program's lack of specific agricultural practice requirements for current use qualification in Vermont "represents a missed opportunity, while the [federal] tax deduction [under section 180 of the U.S. Tax Code] for fertilizer is environmentally negative." *Id.*; see also *Exploring the Potential Role of State Taxation in Reducing the Flow of Nutrients from Nonpoint Sources into the Waters of New England and New York*, *supra* note 389, at 31 (noting that "states could amend the current use property tax programs to require that farmers must follow specified [BMPs]," and that cross-compliance could help "ensure that existing tax subsidies . . . are not supporting activities that are environmentally detrimental").

403. See VT. STAT. ANN. tit. 32, § 3752(5) (2006) (requiring forestland enrolled in the Current Use Program to be managed in accordance with an approved forest or conservation management plan or "minimum acceptable standards for forest management"). If forestland is not managed as statutorily required, it is subject to the Land Use Change Tax. *Id.* However, Vermont's Current Use Program does not currently include a similar provision for the management of agricultural lands in accordance with AAPs or other applicable agricultural stewardship standards.

E. Watershed-Based Pollution Trading

One final approach examined by this article which may be applicable to improve water quality and reduce overall NPS phosphorus loading attributed to agricultural activities within the Lake Champlain Basin is watershed-based pollution trading (or “water quality trading”). This market-based approach has been supported and promoted by the EPA throughout the 2000s,⁴⁰⁴ reviewed extensively by legal scholars and economists over the last twenty years,⁴⁰⁵ and is currently being used and considered for use in impaired watersheds around the country to improve persistent water quality issues, including impairments related to nutrients (e.g., phosphorus and nitrogen) and sediment.⁴⁰⁶ While the concept of pollution trading itself has raised strong criticism from influential nonprofit organizations,⁴⁰⁷ and

404. See *Final Water Quality Trading Policy*, U.S. ENVTL. PROTECTION AGENCY (Jan. 13, 2003), <http://www.epa.gov/owow/watershed/trading/finalpolicy2003.html> (outlining the Water Trading Policy as an EPA-approved approach to improving water quality).

405. See, e.g., Dennis M. King & Peter J. Kuch, *Will Nutrient Credit Trading Ever Work? An Assessment of Supply and Demand Problems and Institutional Obstacles*, 33 ENVTL. L. REP. 10,352, 10,358 (2003) (reviewing the market-based approach of nutrient credit trading).

406. See generally HANNA L. BREITZ ET AL., WATER QUALITY TRADING AND OFFSET INITIATIVES IN THE U.S.: A COMPREHENSIVE SURVEY (2004) (surveying market-based approaches); U.S. ENVTL. PROT. AGENCY, WATER QUALITY TRADING TOOLKIT FOR PERMIT WRITERS, at app. A (2007) [hereinafter TOOLKIT FOR PERMIT WRITERS], available at http://www.epa.gov/npdes/pubs/wqtradingtoolkit_app_a_case_studies.pdf (including existing U.S. water quality trading programs). Federal legislation was introduced in the fall of 2009 for a multistate cap and trade nutrient trading program to be established for Chesapeake Bay. WORLD RES. INST., HOW NUTRIENT TRADING CAN HELP RESTORE THE CHESAPEAKE BAY (2009), available at http://pdf.wri.org/factsheets/factsheet_nutrient_trading_chesapeake_bay.pdf; Chesapeake Clean Water and Ecosystem Restoration Act of 2009, H.R. 3852, 111th Cong. (2009); Chesapeake Clean Water and Ecosystem Restoration Act of 2009, S. 1816, 111th Cong. (2009). Note that the U.S. EPA has developed a TMDL or multistate “pollution diet” for the 64,000 sq. mile Chesapeake Bay watershed, which is the “largest [TMDL] ever developed” and the implementation stage is now underway. U.S. ENVTL. PROT. AGENCY, FACT SHEET: CHESAPEAKE BAY TOTAL MAXIMUM DAILY LOAD (TMDL), http://www.epa.gov/reg3wapd/pdf/pdf_chesbay/BayTMDLFactSheet8_6.pdf, *Bay TMDL Frequently Asked Questions*, ENVTL. PROTECTION AGENCY, <http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/FrequentlyAskedQuestions.html#gi12> (click on “Final TMDL & Next Steps”) (last visited Apr. 9, 2011).

407. Specifically, some groups say trading violates fundamental polluter-pays principles and creates right to pollute. See Kirk W. Junker, *Ethical Emissions Trading & The Law*, 13 U. BALT. J. ENVTL. L. 149 (2006) (questioning whether an implicit right to pollute has been created through emissions trading); see also King & Kuch, *supra* note 405, at 10,362 (“Another factor limiting demand for nutrient offset credits is the sentiment among many powerful environmental groups that nutrient regulations should require nutrient discharge reductions by point sources and not allow them to ‘buy their way out of their responsibilities.’”); GROSS & DODGE, *supra* note 98, at 60 (“While many have applauded EPA’s trading policy for providing adding flexibility and lower costs to meeting water-quality standards, some, including certain environmental groups, have criticized the policy because it allows trades between dischargers to different water bodies in the same watershed.”).

its use faces significant market, institutional, political, and social barriers,⁴⁰⁸ it has been employed in several different contexts to protect environmental quality.⁴⁰⁹ If used to improve the quality of waters listed under section 303(d) of the CWA, watershed units [e.g., Vermont's river basins or larger drainage basins such as Lake Champlain] provide a logical framework for trading,⁴¹⁰ as well as yet another possible option for the State to integrate largely unregulated farming activities into its TMDL implementation program.⁴¹¹

The biggest success stories for pollution trading come from federal programs enacted under the Clean Air Act. By most accounts, the EPA sulfur dioxide (SO₂) trading program was successful in terms of its administration, compliance, and pollution reduction.⁴¹² However, while today's persistent water quality issues share some features with air quality issues solved by trading,⁴¹³ they also present complex differences, as well as unique administrative and compliance challenges.⁴¹⁴ Due to its questionable application in Vermont, proposing a specific trading scheme for phosphorus

408. See King & Kuch, *supra* note 405 (considering market and institutional barriers); Ann Powers, *The Current Controversy Regarding TMDLs: Pollutant Trading*, 4 VT. J. ENVTL. L. 2 (2003) [hereinafter *The Current Controversy Regarding TMDLs*] (considering social and political barriers); Ann Powers, *Reducing Nitrogen Pollution on Long Island Sound: Is There a Place for Pollutant Trading?*, 23 COLUM. J. ENVTL. L. 137 (1998) [hereinafter *Reducing Nitrogen Pollution on Long Island Sound*] (considering market barriers).

409. Including air quality, wetlands mitigation, and trading of water quantity allocations in states that utilize prior appropriation water allocation systems. For discussion of federal air quality trading, see *Reducing Nitrogen Pollution on Long Island Sound*, *supra* note 408, at 153–63; *The Current Controversy Regarding TMDLs*, *supra* note 408, at 36; and *Farms, Their Environmental Harms, and Environmental Law*, *supra* note 334, at 344–45.

410. *Final Water Quality Trading Policy*, *supra* note 404 (stating that for Trading Areas, “[a]ll water quality trading should occur within a watershed or a defined area for which a TMDL has been approved”).

411. *Farms, Their Environmental Harms, and Environmental Law*, *supra* note 334, at 345–46.

412. *Id.* at 344–345 (outlining that under this program, coal-burning electric plants can trade sulfur dioxide pollution units as part of a national policy to reduce industry emissions and thus, a market incentive was created with a declining ceiling on total industry emissions with annual allotments of pollution units based on historic usage with facilities that achieved emissions lower than their allotment could sell additional emissions units); see also *Reducing Nitrogen Pollution on Long Island Sound*, *supra* note 408 (discussing the sulfur dioxide trading program); *The Current Controversy Regarding TMDLs*, *supra* note 408 (discussing the control provisions in the sulfur dioxide trading program).

413. *Farms, Their Environmental Harms, and Environmental Law*, *supra* note 334, at 344–345. *But see* King & Kuch, *supra* note 405, at 10,355 (“The characteristics of successful air emission credit trading programs provide a few useful insights for designing successful nutrient credit trading programs. However, the similarities between the two types of trading systems are superficial, and very easy to overemphasize.”).

414. See King & Kuch, *supra* note 405 (“[P]oint/nonpoint source nutrient trading what is being exchanged is not directly comparable and often too costly to measure directly Trade regulators in nutrient credit markets must use fairly complex ‘scoring’ criteria to convert nutrient-related gains and losses from different land use changes”).

within the Lake Champlain Basin is not within the scope of this article. However, this section presents the trading approach as one option for addressing phosphorus loading, provides a brief overview of water quality trading schemes deemed consistent with federal policy, reviews the framework of two active trading programs developed for the Long Island Sound and California's Grassland drainage basins, identifies factors that make these programs likely inapplicable to the Lake Champlain Basin, and briefly discusses options for future research on a river-basin-specific pilot program and/or permit-specific offset agreements.

The EPA's Water Quality Trading Policy of 2003 endorses the development and implementation of water quality trading programs for nutrients (such as total phosphorus and total nitrogen), sediment, and other pollutants by states, tribes and interstate agencies.⁴¹⁵ The Agency's stated purpose for establishing this policy was to capitalize on market-based approaches to achieve improved water quality that would not otherwise be reached through traditional approaches.⁴¹⁶ The fundamentals of water quality trading, as well as the nuts and bolts for establishing different trading schemes (including point/nonpoint source trading and NPS credit exchanges), are well detailed in EPA guidance, specifically its 2007 *Water Quality Trading Toolkit for Permit Writers*.⁴¹⁷ Notably, suggested state or interstate trading does not apply to technology-based standards. But, for effluent-based limits, the EPA's 2003 Policy allows for one source (e.g., a point source) to meet its regulatory obligations by using pollution reductions created by another source (e.g., point source or nonpoint source) that has lower pollution control costs.⁴¹⁸ Consistent with the EPA's focus on using a watershed-based approach to meet the goals of the CWA,⁴¹⁹ the policy requires that trading occur within a watershed or defined area for which a TMDL has been developed.⁴²⁰ Ultimately, what can be traded are "pollution reduction credits" or pollution reductions greater than that required by regulation or established under an approved TMDL.⁴²¹

415. See *Final Water Quality Trading Policy*, *supra* note 404 (stating that the purpose of the policy is to encourage development and implementation of water quality trading programs); see also GROSS & DODGE, *supra* note 98, at 58–59 (detailing the policy and mechanisms of the EPA Final Water Quality Trading Policy).

416. *Id.*

417. See TOOLKIT FOR PERMIT WRITERS, *supra* note 406 (providing background and eligibility information for water quality trading).

418. *Final Water Quality Trading Policy*, *supra* note 404.

419. GROSS & DODGE, *supra* note 98, at 59.

420. *Final Water Quality Trading Policy*, *supra* note 404.

421. GROSS & DODGE, *supra* note 98, at 60.

An often-cited example of a successful water quality trading scheme is the Nitrogen Credit Exchange Program (NCEP), administered by the Connecticut Department of Environmental Protection (CT DEP), for the Long Island Sound watershed. The NCEP began formal operations in 2002,⁴²² and by 2004, sixty-three nitrogen credit trades had taken place.⁴²³ This program utilizes nitrogen loading data and reduction targets based on a 1990 base load in the Sound's TMDL, which was jointly prepared by the Connecticut DEP and New York DEP and was approved by the EPA in 2001.⁴²⁴ The Connecticut legislature then approved a General Permit for Nitrogen Discharges into the Long Island Sound, including the NCEP, which became effective as of January 2002.⁴²⁵ This General Permit limits nitrogen loading from Connecticut's seventy-nine municipal sewage treatment plants and allows plants discharging less than their allocation to sell credits to plants discharging more than their allocation.⁴²⁶ Primarily run as a point-point trading program, the NCEP could allow trading with nonpoint sources.⁴²⁷ However, "Because point sources dominate the nitrogen load to the Sound and since accurate, affordable, and enforceable methods for controlling nonpoint sources are currently lacking, the program does not rely on nonpoint source reductions."⁴²⁸

Both the Lake Champlain and Long Island Sound TMDLs deal with nutrients and include geographic areas where the bulk of the watershed and pollution sources are within one state.⁴²⁹ However, that's about where their similarities end. The Sound's watershed is about twice the size of Champlain's and "includes some of the most heavily urbanized areas in the country, with a population of almost 8.5 million people."⁴³⁰ (In contrast, Lake Champlain Basin's population is about 571,000, with about six-eight

422. *Final Water Quality Trading Policy*, *supra* note 404, at 2–11; *see also The Current Controversy Regarding TMDLs*, *supra* note 408, at 19–37 (discussing the Long Island Sound project).

423. James S. Shortle & Richard D. Horan, *Water Quality Trading*, 14 PENN ST. ENVTL. L. REV. 231 (2006) (citing to water quality trading data compiled by BREETZ ET AL., *supra* note 406).

424. BREETZ ET AL., *supra* note 406, at 80.

425. *Id.*

426. *Id.*

427. *Id.* at 85.

428. *Id.* at 87.

429. For the Long Island Sound, the "bulk of the Sound's watershed is in Connecticut, as are most of the point sources discharging nutrients that threaten its water quality." *Id.* at 80. For Lake Champlain, fifty-six percent of the watershed is located in Vermont. *Lake and Basin Facts*, LAKE CHAMPLAIN BASIN PROGRAM (2004), http://www.lcbp.org/Atlas/HTML/nat_lakefax.htm. Vermont is responsible for most of the Lake's phosphorus loading. *See supra* Part III.A (discussing the results of 2002 Lake Champlain Phosphorus TMDL).

430. *The Current Controversy Regarding TMDLs*, *supra* note 408, at 19.

percent living in primarily rural Vermont).⁴³¹ Importantly, while the Sound is mostly impaired by point source discharges, pollution attributed to point sources in the Champlain Basin was less than ten percent of the Lake's total phosphorus load in 2008.⁴³² This difference is significant for water quality trading because point sources, which are regulated under the CWA, represent the primary market demand for the purchase of nutrient pollution credits.⁴³³

While there is at least one established nonpoint-nonpoint source trading system nationally,⁴³⁴ the other thirty-eight trading programs established as of 2004 include either point-point, point-nonpoint, or both water quality trades.⁴³⁵ However, even within these existing programs, point/nonpoint trades have been few.⁴³⁶ The Grassland Drainage trading program (formally the Grassland Area Farmers Tradable Loads Program) in California's San Joaquin Valley was the first U.S. trading program among nonpoint sources and includes an internal cap-and-trade program for selenium. However, since selenium loading from irrigated agriculture is accurately measured at drainage pumps, the Grassland Program "may be more akin to a point-point

431. *Lake and Basin Facts*, *supra* note 429 (including 541,000 in the United States from the 2000 Census Data, and 30,000 in Quebec, Canada).

432. LCBP REPORT 2008, *supra* note 103, at 7.

433. Shortle & Horan, *supra* note 423, at 234. Further, according to King & Kuch, *supra* note 405, at 10,360, the only recorded trades in the United States as of 2003 occurred in 1997, between a point and agricultural nonpoint source located within Minnesota. The trade was involved in permitting to build a wastewater treatment facility in exchange for upstream financing of agricultural practices to reduce farm runoff. *Id.* "These practices included soil erosion controls, livestock fencing, rotational grazing, critical-area set-asides, and creating/restoring wetland systems." *Id.* A more recent point-NPS trading program has also developed in Canada on the South Nation River. Here, new point sources face a zero phosphorus discharge limit, which they can meet by *totally* eliminating their discharges or purchasing phosphorus credits from farmers at a four-to-one ratio. *Id.* Agricultural landowners can generate credits by undertaking eligible farm and conservation practices such as: manure and wastewater management, conservation tillage, constructing buffer strips, or implementing on-farm nutrient management plans. *Id.* However, while the South Nation River program could provide a useful model for Vermont, careful deliberation would need to be taken in considering which agricultural BMPs and other farm practices could qualify as credits. Some, such as NMPs, are already required in Vermont and this article further recommends making practical and low-capital BMPs mandatory. Finally, United States state and federal BMPs cost-sharing programs present the potential for 'double-dipping' by participating farmers.

434. As proposed by one young legal scholar, the Grassland drainage basin trading program's success is based on the presence of five key criteria, including: 1) incentives for polluters within a trading region to meet water quality standards; 2) a locally controlled agency to regulate polluters and enforce pollution limits; 3) a cap on the amount of discharge allowed; 4) a system to monitor polluters; and 5) the likelihood that differences exist in the marginal cost of reducing pollution among regional polluters. Sonya Dewan, Note, *Emissions Trading: A Cost-Effective Approach to Reducing Nonpoint Source Pollution*, 15 FORDHAM ENVTL. L. REV. 233, 245-52 (2004).

435. See BREETZ ET AL., *supra* note 406, at 8-9 (listing point-point and point-nonpoint projects).

436. Shortle & Horan, *supra* note 423, at 239.

trading program.”⁴³⁷ This program was established in 1998 and includes seven irrigation and drainage districts covering 97,000 acres of irrigated farmland (a geographic area much smaller than Vermont’s side of the Champlain Basin). Trading of selenium credits among districts occurs via a fairly simple administrative structure based on existing record-keeping and monitoring. Selenium loads are monitored at the sixty-two sumps where irrigation drainage waters are pumped. In addition to district-based monitoring, the U.S. Bureau of Reclamation also continuously monitors irrigation discharges at its stations within the San Luis Drain. This federal drain allows irrigation and drainage districts within the Grassland Drainage to convey their irrigation drainage to the San Joaquin River.⁴³⁸

Due to its very unique characteristics outlined above, the Grassland Drainage trading program is clearly not applicable to Vermont and its effort to reduce its dispersed agricultural NPS phosphorus loads. Unlike any potential NPS trading program in Vermont, within the Grassland trading program there “is a high degree of certainty compared to many other trading programs, since trades are based on measured selenium loads rather than estimates of BMP effectiveness.”⁴³⁹ Also unlike the Lake Champlain Basin, which includes many dispersed NPS discharges, “there is no need to adjust credits [within the Grassland trading program] for relative environmental impacts because there is a single discharge point [the San Luis Drain].”⁴⁴⁰ Finally, the thirty-nine selenium credit trades made within this program as of 2000 were among well-established irrigation and drainage districts.⁴⁴¹ In Vermont, most NPS trading would likely need to occur between individual farmers and for specific farm operations, which would increase the administrative burden on the State, as well as transaction costs associated with potential trades.

In conclusion, given the likely lack of demand from point sources for water quality credits generated by nonpoint sources;⁴⁴² high administrative

437. BREETZ ET AL., *supra* note 406, at 10.

438. *See id.* at 10–18.

439. *Id.* at 14.

440. *Id.*

441. *Id.* at 15.

442. Furthermore, consider the low population density in northern New York, existing New York State constitutional restrictions on development of extensive state-owned lands within the Adirondack Park, and regional land use regulations administered by the Adirondack Park Commission which strictly limit the development and use of privately-owned lands. These factors combined with New York’s (as well as Quebec’s) relatively low contribution to the phosphorus loading in Lake Champlain and the involvement of New York (and/or Quebec) in any trading program, would not likely add much to its overall viability (in terms of adding pollution credit demand) or the likelihood of its success.

costs; “devil-in-the-details” work for establishing the duration of phosphorus credits and their legal nature, trading ratios, nonpoint source risks (e.g., who’s liable if BMPs fail to produce projected load reductions); the difficulty of accurately measuring reductions; and likely policy conflicts between water quality trading, cost-sharing and regulatory controls, implementation of a water quality trading program in the Lake Champlain Basin is not recommended. At most, this article tentatively suggests a pilot program, contingent on the receipt of substantial federal grants, in one of Lake Champlain’s more developed river basins, such as the Winooski.⁴⁴³ Or, upon further review, one-time offset agreements for specific point sources could be considered for capital-intensive NPS reductions not required by applicable regulations.⁴⁴⁴

IV. HOW TO IMPLEMENT THE LAKE CHAMPLAIN TMDL: FINAL THOUGHTS

This last section provides final remarks on the federalism issues related to the now long-standing, but still slow-moving, efforts across the U.S. to improve the chemical, physical, and biological quality of our nation’s limited water resources. It gives an overall assessment of TMDL

443. Although this is only a rough concept, building on ideas included in *Farms, Their Environmental Harms, and Environmental Law*, *supra* note 334, at 345–46, annual farm release inventories created through Vermont farms’ NMPs and future Whole Farm Conservation Plans could provide data for fertilizer, manure, and other farm compost applied annually in problematic watersheds. State regulators could impose a total (and declining) combined agrochemical, manure, and farm compost land application ceiling within a specific watershed (e.g., a river basin), and individual allotments for each farm in the watershed. Note that, learning from pending federal climate change cap-and-trade proposals, how individual allotments are made is important. Ideally, allotments should be made on reasonable per-acreage application levels for specific fields and soils, established after on-farm nutrient and soils assessments. Farmers could use, save (depending on the duration of pollution credits; NCEP credits expire annually), sell, or purchase additional pollution credits depending on their individual decisions for the use of *enhanced* BMPs (e.g., those *not* required by state or local regulations) or other advanced technological solutions. According to Ruhl, this type of trading system would satisfy factors considered economically necessary including: a large number of sources emitting the same pollutant, each with different abatement costs; a common pollution-shed in which each source is of no great consequence to the outcome, so long as all sources are included in the trading regime; and a closed market in which the total quantity of allowable pollution being traded is capped (and, very importantly, declines over time to ultimately reduce the overall NPS phosphorus load below levels established by the Lake Champlain TMDL). *Id.*

444. For examples of existing project-specific, one-time offset agreements, see BREETZ ET AL., *supra* note 406, and Shortle & Horan, *supra* note 423. Note that the use of offsets also potentially raises general (e.g., which farmers get selected to enter offset agreements with point sources) and environmental (e.g., the effects of continued point source waste loading on downstream communities and resources) equity issues.

implementation proposals included herein, as well as closing thoughts on how Vermont can implement its Phosphorus TMDL for Lake Champlain and ultimately protect and restore the “disturbed harmonies” of this very significant in-state, interstate, and international body of water. Specifically, this may be accomplished by reducing pollution loads from agricultural nonpoint sources, or in the lightly embellished words of George Perkins Marsh, reconstructing the “damaged fabric which the negligence or the wantonness of former [and current] lodgers had rendered untenable.”⁴⁴⁵

As discussed at length in Part II, the control and reduction of NPS pollution, particularly pollution stemming from diffuse agricultural land use and management activities, presents challenging federalism issues which decrease the potential effectiveness of federal solutions for reducing related nutrient loading. While the Clean Water Act regulates point source discharges, it leaves the regulation of nonpoint sources, specifically through land use and management controls, largely within the discretion of individual States. The text of the Act requires the development of TMDLs for waters listed under section 303(d) of the CWA, including those impaired exclusively by nonpoint sources. On-the-ground implementation of TMDLs, according to existing case law and this author’s review of the Act’s legislative history, is left to States, particularly as related to NPS pollution.

In sum, for better or worse (depending on the issue at stake), our long-revered federalist system of governance divides authority and related legal jurisdiction between Washington, D.C. and the legislative chambers of individual States (including those in Montpelier, Vermont, the least populous state capital).⁴⁴⁶ While our federalist system, with its long-standing deference to states on certain issues and within specific fields of law and policy, including the regulation of land use and management, can be slow to yield results (such as measurable reductions in NPS pollution), it is the system handed down to us by our forefathers and mothers. Hopefully, Vermonters can muster the necessary amount of state-based social and political will to correct legislatively and administratively at least some, if not all, of the many existing perverse incentives for residents to use environmental commons (e.g., clean air and water) as cesspools for

445. MARSH, *supra* note 1, at 35.

446. See *Vermont: Place and County Subdivision*, U.S. CENSUS BUREAU (2000), http://factfinder.census.gov/servlet/GCTTable?_bm=n&_lang=en&mt_name=DEC_2000_PL_U_GCTPL_ST7&format=ST-7&_box_head_nbr=GCT-PL&ds_name=DEC_2000_PL_U&geo_id=04000US50 (according to 2000 Census data, Montpelier, Vermont was reported to have a population of 8,035 and the total population of the State of Vermont was 608,827, which was the second lowest reported state population).

dispersed but cumulatively detrimental pollution. Hopefully, we can overcome the classic “tragedy of the commons” for these essential natural resources, specifically for the waters of Lake Champlain which are a defining feature and regional attraction of the Green Mountain State.⁴⁴⁷

For Vermont’s implementation of its Phosphorus TMDL for Lake Champlain, this article recognizes the state’s recent release of a revised TMDL Implementation Plan. In requiring this Plan and delivering its timely completion, the State of Vermont (including the legislature and ANR) has taken commendable first steps. However, as discussed in Part III and IV, there remain additional pollution reduction strategies that must be considered and used to help Vermont successfully implement this TMDL. As the ANR stated, this recently revised Implementation Plan should remain adaptive and open to both continued reevaluation and modification.⁴⁴⁸ Present and future state legislatures and executive administrations should follow through with the implementation of this adaptive management approach, which can be used in a socially and scientifically responsible manner.⁴⁴⁹

In a final assessment of possible strategies for implementation of the Lake’s phosphorus TMDL included in this article, there is, at this time, likely a lack of market demand in the majority of the Lake Champlain Drainage Basin to drive most local transfer of developments rights or watershed-based point-nonpoint source water quality trading. Additional drawbacks for TDRs and pollution trading include the need for new administrative accounting systems to track related transfers and trades, as well as effective long-term monitoring and enforcement. While endorsed by the ANR through its current Vermont Watershed Initiative, voluntary river-basin-based collaboration will likely not succeed in reducing existing agricultural NPS pollution unless all essential stakeholders, including affected farmers, are dissatisfied with the status quo. There will likely be vocal social and political opposition to a tax or administrative penalty on field-based applications of both commercial and manure fertilizers above an accepted threshold level, and such a comprehensive nutrient-loss tax scheme would also likely prove to be complex and costly for the state to administer properly. However, an increased tonnage fee on instate fertilizer

447. Garret Hardin, *The Tragedy of the Commons*, 162 *SCI.* 1243, 1243–48 (1968).

448. See REVISED IMPLEMENTATION PLAN: LAKE CHAMPLAIN TMDL, *supra* note 201, at 6 (“The ability to routinely revisit, reevaluate, modify, and adapt the implementation plan is essential, applying what has been learned from past watershed-based actions and producing improvements in the landscape and water quality in as efficient and effective a manner as possible. In complex systems we need to act in order to learn; a living implementation plan is central to the process of action.”).

449. See generally SHABMAN ET AL., *supra* note 100.

sales coupled with state tax incentives for improved manure storage and management would be administratively more straightforward and may prove politically palatable. Based on its popularity among in-state landowners, Vermont's Current Use Program will likely receive continued social and political support. However, this article strongly recommends revision of enrollment eligibility criteria for this existing in-state property tax abatement program, specifically to require annual certification by landowners of their use of Accepted Agricultural Practices and audited compliance by the state with farm-specific Nutrient Management and Whole Farm Conservation Plans.

The best, and likely most successful (in terms of reducing NPS pollution, improving regional water quality and garnering the necessary level of social and political support), proposals for TMDL implementation today and the near future (e.g., next three to five years) call for Vermont to proactively pursue a regulatory shift from relying on voluntary Best Management Practices used by private landowners and loosely enforced baseline Accepted Agricultural Practices to the development of enforceable Whole Farm Conservation Plans (including for the state's Small Farm Operations) and mandatory basic BMPs. The existing delegation of enforcement authority for AAPs should be removed from the Vermont Agency of Agriculture, Food and Markets and vested with the Agency of Natural Resources, specifically its Department of Environmental Conservation, whose administrative and statutory mission is more aligned with monitoring AAPs and improving water quality. Further, the state must work aggressively to link (both administratively and statutorily) existing institutional frameworks for its river basin planning initiatives with watershed-based or localized land use zoning and land management regulations. While Vermont cities, towns, or counties could be statutorily charged with enacting agricultural land use and management controls as an extension of their current planning and zoning duties, it appears preferable for this authority to be further developed by Vermont's Natural Resources Conservation Districts. The jurisdictional boundaries of existing Districts should be modified to correspond with watersheds, specifically Vermont's river basins. Finally, this article recommends several key changes to the Vermont Soil Conservation Act of 1939, including amendments aimed at increasing democratic representation of all residents within a district, not just landowners, and for the democratic selection of new watershed-based Conservation District Councils.

Supporting the regulatory role of enhanced watershed-based conservation districts is an essential step that the state of Vermont needs to take today to successfully address the cumulative environmental effects of

industrialized agricultural land use and management. Watershed-based planning and regulation of agricultural land uses and land management need to carefully assess and objectively evaluate farming inputs and outputs, including environmental externalities.⁴⁵⁰ Enhanced districts must be able to control, regulate, and mitigate the harmful externalities produced by today's modern farming operations, including polluted stormwater runoff, soil erosion, and sedimentation. These watershed-based districts should build upon institutional frameworks in place for current county-level NRCs, the many years of experience gained from their past natural resources conservation efforts, and incorporate the well-tested procedures and substantive essence of representative democracy.⁴⁵¹ State legislation and policies guiding enhanced district functions need to blend successful voluntary conservation efforts (e.g., Purchase of Agricultural Conservation Easements) and potentially new, innovative Payment of Environmental Services programs with the firm application of state environmental authority, as well as localized land use authority.⁴⁵² The implementation of environmental and land use laws and policies by the state and enhanced districts represent a critical turning point for Vermont's agriculture and water quality.

In the last paragraph of *Man and Nature*, Marsh includes the legal maxim *de minimis non curat lex* or "the law does not concern itself with trifles." However, as he observes "in the vocabulary of nature, little and great are terms of comparison only; she [Nature] knows no trifles, and her laws are as inflexible in dealing with an atom as with a continent or a planet."⁴⁵³ The CWA is among the few federal statutes that attempt to frame a socially constructed law within the more rigid laws of nature. However, despite lofty federal goals, the ultimate success of the Act's TMDL provisions included within section 303(d) largely depends on state-based land use planning, regulation, enforcement and localized implementation. In Vermont, the institutional and statutory framework for land use planning and controls already exists—it rests in the hands of today's Vermonters to use this framework to successfully address and reduce the nonpoint source pollution that continues to impair the water quality of Lake Champlain.

450. *Local and Watershed Land Use Controls*, *supra* note 281, at 14.

451. *Id.*

452. *Id.*

453. MARSH, *supra* note 1, at 464.