

January 2001

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### Recommended Citation

Paula J. Lebowitz, *Land Use, Land Abuse and Land Re-Use: A Framework for the Implementation of TMDLs for Nonpoint Source Polluted Waterbodies*, 19 Pace Env'tl. L. Rev. 97 (2001)

DOI: <https://doi.org/10.58948/0738-6206.1255>

Available at: <https://digitalcommons.pace.edu/pelr/vol19/iss1/4>

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## NOTES AND COMMENTS

# Land Use, Land Abuse and Land Re-Use: A Framework for the Implementation of TMDLs for Nonpoint Source Polluted Waterbodies

PAULA J. LEBOWITZ\*

### I. Introduction

Although the Clean Water Act (CWA or the Act)<sup>1</sup> has resulted in significant progress in reducing water pollution from point sources,<sup>2</sup> there has been limited success<sup>3</sup> in reducing pollution from nonpoint sources.<sup>4</sup> Nonpoint sources of pollution include such categories as urban runoff, sedimentation from natural runoff and poor land management activities, heat due to vegetative removal, fertilizers and pesticides carried off by precipitation or watering after application, and residues and runoff from roads and highways.<sup>5</sup> All of these can result in the degradation of waterbody quality as the result of a complex interaction of activi-

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1. Federal Water Pollution Control Act (FWPCA) §§ 101-607, 33 U.S.C. §§ 1251-1387 (1999). After the 1977 amendments to the FWPCA, the Act has generally been referred to as the Clean Water Act.

2. The term 'point source' means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural stormwater discharges and return flows from irrigated agriculture. 33 U.S.C. § 1362(14) (1999).

3. OLIVER A. HOUCK, *THE CLEAN WATER ACT TMDL PROGRAM: LAW, POLICY AND IMPLEMENTATION* 3-4 (Env'tl. L. Inst. ed., 1999).

4. 33 U.S.C. § 1314(f)(A-F). Nonpoint sources are those sources of pollutants other than point sources, such as pollution resulting from runoff from agricultural activities, mining activities, construction activities, the disposal of pollutants in wells, salt water intrusion and changes in flow caused by dams or levees. *Id.*

5. *Id.*

ties, practices, and conditions. "Nonpoint source pollution is the main cause of forty percent or more of the remaining water quality problems in the United States"<sup>6</sup> and is now the major focus of the Environmental Protection Agency (EPA)<sup>7</sup> to achieve its goals<sup>8</sup> under the CWA.<sup>9</sup> Nonpoint source pollution is distinguished from point source pollution because of its intimate relation to land use.<sup>10</sup>

Recognizing that nonpoint source pollution is inextricably linked to land use activities and also recognizing that land use control is a well-protected province of state and local governments, the CWA created a planning approach for the states to address nonpoint source pollution control. Section 208 called for states to develop "area wide waste treatment management plans" and required states to develop regulatory controls for nonpoint source polluters.<sup>11</sup> However, it contained no substantive or procedural

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6. Joe Cannon, *Choices and Institutions in Watershed Management*, 25 WM. & MARY ENVTL. L. & POL'Y REV. 379, 388 (2000).

7. The Environmental Protection Agency is the administrative agency created to carry out the goals of, and enforce, the Clean Water Act.

8. The objective of this chapter is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. In order to achieve this objective it is hereby declared that, consistent with the provisions of this chapter—(1) it is the national goal that the discharge of pollutants into the navigable waters be eliminated by 1985; (2) it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983; (3) it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited; (4) it is the national policy that Federal financial assistance be provided to construct publicly owned waste treatment works; (5) it is the national policy that areawide waste treatment management planning processes be developed and implemented to assure adequate control of sources of pollutants in each State; (6) it is the national policy that a major research and demonstration effort be made to develop technology necessary to eliminate the discharge of pollutants into navigable waters, waters of the contiguous zone, and oceans; and (7) 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 and nonpoint sources of pollution.

33 U.S.C. § 1251(a) (1999).

9. HOUCK, *supra* note 3, at 57.

10. James C. Buresh, *State and Federal Land Use Regulation: An Application to Groundwater and Nonpoint Source Pollution Control*, 95 YALE L.J. 1433, 1433 (1986).

11. 33 U.S.C. § 1288 (1999). This provision called for the states to identify areas that had substantial water quality control problems as a result of urban industrial concentrations or other factors. The governor of each state would designate the boundaries of the area and also designate a single representative organization, including elected officials from local governments or their designees, to create areawide

requirements designed to enhance state control over land uses that cause nonpoint source pollution. Thus, the resulting programs relied primarily on voluntary controls that would comply with the state's program objectives and be implemented if funding could be acquired through a state/federal matching grant program.<sup>12</sup> After the 1987 amendments to the Act, section 319<sup>13</sup> provided the primary funding and guidance to states to implement nonpoint source pollution management programs. Although there have been achievements under that section's programs<sup>14</sup> and many efforts are underway, they are primarily volunteer efforts based upon the receipt of funding.<sup>15</sup>

Another potentially effective method for controlling nonpoint source pollution through land use controls is found in section 303(d) of the CWA. For certain waters within a state that do not meet the water quality standards (WQS) established for their designated use,<sup>16</sup> section 303(d)(1)(C) mandates that the state establish total maximum daily loads (TMDLs) for certain pollutants.<sup>17</sup> TMDLs represent the maximum input, or load, of a certain pollu-

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waste treatment management plans for such areas. The plan was to include the identification of treatment works necessary to meet anticipated municipal industrial waste treatment need to the area over a twenty-year period, the necessary wastewater collection and urban stormwater run-off systems as well as identification of open-space and recreation opportunities that would be expected to result from improved water quality.

12. HOUCK, *supra* note 3, at 31.

13. 33 U.S.C. § 1329 (1999). Nonpoint source management programs.

14. See, e.g., U.S. EPA, OFFICE OF WATER: SECTION 319 SUCCESS STORIES, EPA 841-S-94-004 (Nov. 1994), <http://www.epa.gov/owow/nps/Section319/index.html> (last updated Oct. 4, 1999).

15. HOUCK, *supra* note 3, at 31.

16. The states are required to create a classification system for the waters within the states that designates their particular use, such as drinking water, recreation or trout fishing. Once the use has been designated, water quality standards for that use are set by the state, or EPA if the state fails to set them. 33 U.S.C. § 1313(a)-(c).

17. Each state shall establish for the waters identified in paragraph (1)(a) [within its boundaries for which the effluent limitations required under the act are not stringent enough to implement any water quality standards applicable to such waters], and in accordance with the priority ranking, the total maximum daily load, for those pollutants which the Administrator identifies under section 1314(a)(2) of this title as suitable for such calculation. Such load shall be established at 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.

33 U.S.C. § 1313(d)(1)(C).

tant<sup>18</sup> from all of the contributing point and/or nonpoint sources that may be added to a waterbody on a daily basis such that the waterbody can achieve or maintain its designated use.<sup>19</sup> Once the TMDL has been determined for a particular waterbody, the total load will be allocated among the various point and nonpoint sources.<sup>20</sup> This allocation then serves as a means of controlling the pollutants that enter the waterbody from that particular source or category of sources. This control is asserted through permit requirements under section 402 National Pollutant Discharge Elimination System<sup>21</sup> permits or other measures that the state will mandate for nonpoint sources. The identification of impaired waterbodies and the determination of maximum loads of a particular pollutant that a waterbody can assimilate is a long, complex and costly process<sup>22</sup> that states have been very reluctant to undertake due to the scientific uncertainty involved in setting them and the potential difficulty of implementing them.<sup>23</sup> As a result of this reluctance, there have been a significant number of lawsuits against EPA for not establishing TMDLs when the state has failed to do so.<sup>24</sup> In response to mounting pressure due to the lack of setting TMDLs and the lack of progress in controlling nonpoint source pollution generally, EPA recently proposed new regulations to implement the 303(d) requirements.<sup>25</sup> However,

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18. TMDLs must be set for each pollutant listed under the guidelines established pursuant to CWA § 304(a)(2). 33 U.S.C. § 1313(d)(1)(c) (1999). One impaired waterbody could, therefore, have several TMDLs.

19. 33 U.S.C. § 1313(a) (1999).

20. Water Quality Planning and Management, 40 C.F.R. § 130.7 (2000). Point sources will receive a waste load allocation (WLA) and nonpoint sources will receive a load allocation (LA).

21. 33 U.S.C. § 1342 (1999). Under this section, permits are issued by EPA or a state agency that is administering its own permitting program under CWA § 402(b) for the discharge of a pollutant or combination of pollutants from any point source provided that the discharge met the requirements of all of the applicable sections of the Clean Water Act.

22. Clayton L. Walton, *TMDL Implementation In Virginia To Be Very Costly*, 8 No. 5 VA. ENVTL. COMPLIANCE UPDATE 3 (Nov. 2000). For example, according to the Virginia Department of Environmental Quality (DEQ), approximately 648 TMDLs must be developed for Virginia's 600 impaired waterbodies. As of May 1999 only one had been developed, and only thirty are expected to have been developed by May 2002. DEQ estimates that over the next ten years it will cost approximately \$60 million to implement the TMDL program. *Id.*

23. HOUCK, *supra* note 3, at 58-59.

24. *Id.* at 55. See also U.S. EPA, OFFICE OF WATER, TMDL LITIGATION BY STATE, <http://www.epa.gov/owow/tmdl/lawsuit1.html> (last revised July 19, 2001).

25. See generally U.S. EPA OFFICE OF WATER, Final TMDL Rule: FULFILLING THE GOALS OF THE CLEAN WATER ACT, EPA 841-F-00-008 (July 2000), <http://www.epa.gov/owow/tmdl/finalrule/factsheet1.html> (last revised July, 11, 2000).

the tension between land use control authority and nonpoint source control measures is still at the forefront of any significant progress in reducing nonpoint source pollution.<sup>26</sup>

The final rule for the new regulations implementing section 303(d), 40 C.F.R. Part 130, was signed by President Clinton on July 11, 2000; however, due to a Congressional effort to delay the rule, the effective date of the program was scheduled for October 1, 2001.<sup>27</sup> Currently, in settlement of a lawsuit brought by both environmentalists and agricultural interests challenging the rule<sup>28</sup> EPA has moved to delay the effective date of the regulations until March 2003. EPA will review previous comments made on the proposed rule and will conduct more meetings with interested groups to decide if changes to the rule are warranted.<sup>29</sup> EPA is seeking additional comments and ideas for implementation of the TMDL program.<sup>30</sup>

According to the EPA comments on the new final rule, as it was adopted in July 2000, most of the implementation measures for TMDLs for nonpoint source polluted waters are expected to be an extension and/or reinvigoration of current programs which focus primarily on management activities or programs under section 319.<sup>31</sup> EPA anticipates that traditional management measures such as the use of erosion and sediment control Best Management Practices (BMPs); the new storm water regulations under section 402, the National Pollution Discharge Elimination System (NPDES); activities required under the Coastal Zone Act Reauthorization Amendments (CZARA);<sup>32</sup> and implementation of

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26. See generally Revisions to the Water Quality Planning and Management Regulation and Revisions to the National Pollutant Discharge Elimination System Program in Support of Revisions to the Water Quality Planning and Management Regulation [hereinafter Revisions] 65 Fed. Reg. 43,586 (July 13, 2000) (to be codified at 40 C.F.R. pts. 9, 122, 123, 124, & 130).

27. Press Release, U.S. EPA, Clinton-Gore Administration Moves Forward on Clean Water Plan (July 11, 2000), available at <http://yosemite.epa.gov/opa/admpress.nsf> (last visited Feb. 2, 2002).

28. "About a dozen interest groups representing farmers, environmental advocates, industry, and others sued EPA over various components of the TMDL rule." *Water Quality Standards: EPA Moves to Delay Action on TMDL Rule; Rule Changes May Be Proposed in Spring*, 32 Env't Rep. No. 29, at 1415 (July 20, 2001). See, e.g., *American Farm Bureau Federation v. Whitman*, D.C. Cir., No. 00-1320 and consolidated cases, July 18, 2000.

29. *Id.*

30. *Id.*

31. Revisions, *supra* note 26, at 43,626.

32. 16 U.S.C. §§ 1452, 1453, 1455b (1999) (codified as amended by Coastal Zone Act Reauthorization Amendments of 1990, Pub. L. No. 101-508, §§ 6203, 6217, 104 Stat. 1388). These amendments established a Nonpoint Source Pollution Control Pro-

other federal programs, such as the Conservation Reserve Program<sup>33</sup> and Wetland Reserve Program<sup>34</sup> under the United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) will make up the bulk of TMDL implementation plans.<sup>35</sup>

The new TMDL regulations are intended to provide the regulatory stick to finally end the delays in putting nonpoint source management plans in place. It is difficult to discern, however, the ways in which the future implementation of nonpoint source pollution control will be any different than the past. If, as EPA anticipates,<sup>36</sup> existing programs will be used to accomplish the goals of the implementation plans for TMDLs for nonpoint source polluted waterbodies, with the exception of revisions to permitting programs, the effort for all practical purposes remains voluntary. However, these programs are still dependent on receipts of funding and still subject to the political will of the local governing bodies that control the land use activities that need to be managed. EPA can mandate state compliance with the new regulations, and set TMDLs if the state fails to do so. However, there is little guidance in the new regulations to assist the states in securing compliance from local governments and individuals that control source activities that must be regulated. Although water quality may be the appropriate focus, and further limits in section 402

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gram and recognized the growing pressures on coastal zone areas, the proper management of the territorial sea and ocean waters, controlling land use activities that contribute to the nonpoint source pollution of coastal waters and sea level rise. Each state is required to establish a program to protect coastal waters from nonpoint pollution from adjacent coastal land uses. *Id.* Each state must also develop a program for implementation of its own nonpoint program. 16 U.S.C. § 1455b(a)(1) (1999). To review the legislative history for the 1990 amendments, see H.R. 4450, 101st Cong., 2d Sess., 136 Cong. Rec. H8068-01 (1990).

33. The Conservation Reserve Program "provides incentives and assistance to farmers and ranchers; . . . it encourages farmers to voluntarily plant permanent covers of grass and trees on land that is subject to erosion, where vegetation can improve water quality or provide food and habitat for wildlife." U.S. DEP'T OF AGRIC., NAT. RESOURCES CONSERV. SERV., THE CONSERVATION RESERVE PROGRAM: INNOVATION IN ENVIRONMENTAL IMPROVEMENT, *available at* <http://www.fsa.usda.gov/dafp/cepd/12cr-plgo/page3.htm>. (last visited Feb. 2, 2002). Farmers receive financial benefits as well as technical assistance by enrolling in the program. *Id.*

34. The Wetlands Reserve Program is a voluntary program that provides financial incentives to landowners to enhance wetlands and retire marginal agricultural land. U.S. DEP'T OF AGRIC., NAT. RESOURCES CONSERV. SERV., WETLANDS RESERVE PROGRAM, *available at* <http://www.nhq.nres.usda.gov/programs/wrp> (last updated Oct. 12, 2001).

35. Revisions, *supra* note 26, at 43,626.

36. *Id.*

NPDES and stormwater permits may prove effective, the rule is likely to fall far short of its promise for nonpoint source pollution management without an adequate mechanism for regulating land use activities.

The key issue that must be addressed is why the previous nonpoint programs, which will now be the focus of new time and energy, resulted in such slow progress in controlling nonpoint source pollution. The new rule assumes that it was lack of clear and enforceable demands for planning and the lack of time frames for implementation that resulted in the delay. It also assumes that the previous approaches were appropriate, but the lack of regulations for TMDL implementation was the shortcoming. This may be true in part, but, the new regulations do not give the states significant guidance for making effective implementation plans, they only place pressure on them to do so. Unfortunately, the implementation history of the CWA is replete with unmet deadlines and delays, and there is no guarantee that setting time limits will do as much for pollution control as it will for averting lawsuits.<sup>37</sup> Land use controls remain the key ingredient to any recipe for the successful control of nonpoint source pollution; an ingredient that remains conspicuously absent in the new federal regulations for TMDL implementation.

This article will attempt to provide guidance for developing implementation plans for TMDLs for nonpoint source polluted waters based upon the recognition that the regulation and control of land use is the key to success in controlling nonpoint source pollution. The general thesis of this article proposes that land use is, in reality, made up of three distinct categories of regulated or voluntary activities. These categories, or approaches, are based on the temporal aspect of the management objective of the land involved: prospective, current or retrospective. Within each of these approaches lies a unique and complex constellation of important political, social, economic, and scientific values, needs and interests, which affect governments and citizens that should be involved in the proposed measures in the implementation of the TMDL. Although at first glance the distinctions may appear more semantic than substantive, this paper should elucidate the value of placing the goal of the proposed TMDL into one of these categories. By knowing which set of values and interests are most likely to be involved in successful implementation of the program, scarce re-

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37. HOUCK, *supra* note 3, at 63-64.



sources may be used more effectively and water quality improvement, and environmental protection generally, may be more likely to be achieved.

The Land Use Approach is the prospective component of land use regulation and management. It is comprised of all of the forward-looking tools and techniques, obstacles and conflicts that must be utilized or addressed to determine where development will be placed, where land will be preserved and how communities will support economic growth and stability and, at the same time, implement measures to protect environmental resources and reduce nonpoint source pollution. This is the approach that must be taken to assure long-term water quality and environmental improvement. It relies heavily on political and social support and will require innovative regulatory and incentive-based strategies.

The Land Abuse Approach is the current component of land use regulation and management. This approach encompasses the tools and techniques involved in implementing management practices and controls on development projects that are undertaken on land for which the use has already been determined. This approach relies heavily on scientific and technical expertise to reduce impervious surfaces, provide adequate buffer areas to reduce the impacts of development on water resources, reduce applications of polluting substances to land cover, reduce vegetation removal, decrease erosion and sediment runoff, and maintain or increase the infiltration capabilities of the soils on which development takes place.

The Land Re-Use Approach is the retrospective component of land use regulation and management. This approach encompasses the tools and techniques that are necessary for restoration of degraded waterbodies and environmental resources. This approach relies heavily on community and political support, funding mechanisms for restoration or retrofit planning and technical expertise for implementation. This approach can present a very positive political opportunity for community or regional support.

Part II will provide a brief overview of the CWA sections that address nonpoint source pollution and point out the current controls over land use activities under the Clean Water Act. Part III will chronicle the evolution of EPA policies that led to the new TMDL regulations and will describe the elements of TMDLs as defined in the new regulations. It will discuss any new authority that the regulations provide to EPA, or the states implementing the CWA programs, to control local land-use activities. Part IV

will propose a framework for analysis to determine the appropriate approach that states implementing the TMDL regulations or EPA should follow in determining how to create and implement their plans to regulate or encourage appropriate land use. It will point out the critical differences in the types of values and interests involved in each approach and suggest a framework for prioritizing efforts of implementation. Part V will offer concluding remarks.

## II. Development of Nonpoint Source Pollution Regulations and Controls Under the Clean Water Act.

Since the 1972 amendments to the Federal Water Pollution Control Act, collectively referred to as the Clean Water Act, significant progress has been made in controlling point sources of pollution.<sup>38</sup> This has been based primarily on technological achievements and implementation of the NPDES permit program under section 402.<sup>39</sup> This permit process imposes technology-based controls for limiting the discharge of pollutants from point sources. The EPA, or a state with an approved NPDES program,<sup>40</sup> will determine the amounts of certain pollutants that may be discharged by a particular discharger, from a particular source, and issue a permit that describes all of the requirements and limitations that the discharger must comply with for operation.<sup>41</sup> The issuance and continued authorization of an NPDES permit is conditioned upon the compliance of the permittee with all of the effluent limitations established in the permit.<sup>42</sup> The CWA authorizes EPA and state enforcement actions to enforce compliance with the terms of the permit<sup>43</sup> as well as citizen suit remedies for non-compliance with the NPDES permit requirements and reporting procedures.<sup>44</sup>

The Act also requires each state to adopt water quality standards (WQS) for its waters, identify the designated uses of such waters and establish the water quality criteria for them based upon those uses.<sup>45</sup> These standards describe the criteria of chemi-

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38. HOUCK, *supra* note 3, at 3.

39. *Id.*

40. 33 U.S.C. § 1342(b) (1999). The state may, with approval from EPA, administer its own permit program under this section.

41. *See id.* § 1342(a)-(b).

42. *See id.* § 1311.

43. *See id.* § 1319.

44. *See id.* § 1365.

45. *See id.* § 1313(a).

cal and biological components of the water that must be maintained for the waterbody to be of sufficient quality for its designated use. These standards should take into consideration the value of the waters for public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial and navigational purposes.<sup>46</sup> Water Quality Standards are subject to review by the EPA<sup>47</sup> and include numeric criteria, narrative criteria, waterbody uses and anti-degradation requirements.<sup>48</sup>

Thus, a permit under section 402 must limit the discharge of pollutants so water quality standards for the waterbody will be maintained or, if the waterbody does not currently meet WQS, the water quality will be improved. Water quality standards should also serve as the baseline for determining criteria to control nonpoint source (NPS) pollution. Unfortunately, states were slow to set Water Quality Standards. Thus, while NPDES permits for point sources limited discharges to certain levels, without WQS there were no concrete criteria on which to base controls over nonpoint pollution sources. This resulted in the improvements in water quality made through controlling point sources being overtaken by the decline in water quality due to the lack of nonpoint source controls.<sup>49</sup>

#### A. Clean Water Act Sections That Address Nonpoint source Pollution.

There are several sections in the CWA that address, either directly or indirectly, nonpoint source pollution. Section 205(b) authorizes funds for river basin planning demonstration projects to implement advanced techniques to control pollution from both point and nonpoint sources as well as stream water quality improvement techniques.<sup>50</sup> This is intended to encourage development of new management practices and serve as a source of information that will be available to assist agencies and individuals concerned with water quality management. Section 205(j) requires that the EPA Administrator reserve certain funds allocated to the states for water quality management plans, including a sig-

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46. 33 U.S.C. § 1313(c)(2)(A) (1999).

47. *See id.* § 1313(c)(3-4).

48. Water Quality Planning and Management, 40 C.F.R. § 130.7(b)(3) (1999).

49. Houck, *supra* note 3, at 4.

50. Demonstration projects for advanced treatment and environmental enhancement techniques to control pollution in river basins. 33 U.S.C. § 1255(b) (1999).

nificant effort to address nonpoint source pollution.<sup>51</sup> Section 208<sup>52</sup> calls for area wide waste treatment management plans which require identification of, and management plans to address, areas that have substantial water quality control problems. These plans are also required to include a nonpoint source component, and furthermore, section 208(b)(2)(H) requires that the plan include a process to identify construction activity related sources of pollution and set forth procedures and methods (including land use requirements) to control those sources to the extent feasible. Section 209 requires River Basin Plans under the Water Resources Planning Act, for seven major river basins, that also require a nonpoint source component.<sup>53</sup> Section 303(d)<sup>54</sup> calls for

51. *See id.* § 1285(j).

52. *See id.* § 1288(b)(2)(H).

53. 33 U.S.C. § 1289 (2000). The Water Resources Planning Act of 1965 established the Water Resources Council to implement a national strategy for planning for water and related land resources in 21 water regions. It was established within the executive branch, and statutory members consisted of the Cabinet secretaries relevant to water resources development, the Secretaries of Interior, Agriculture, Army, and Health, Education and Welfare, the chairman of the Federal Power Commission, and the secretary of the Department of Transportation. The council's river basin planning and federal policy coordination efforts generally focused on federal agency water resources development activities. The act created seven River Basin Commissions to plan for water management in seven large river basins. These commissions were intended to service the principal agency for coordination of federal, state, interstate, local, and non-governmental plans for water and related land resources development in the basin. The Act also called for comprehensive plans for river basin management.

54. 33 U.S.C. § 1313(d) provides:

(1)(A) each State shall identify those waters within its boundaries for which the effluent limitations required by section 1311(b)(1)(A) and section 1311 (b)(1)(B) of this title are not stringent enough to implement any water quality standard applicable to such waters. The State shall establish a priority ranking for such waters, taking into account the severity of the pollution and the uses to be made of its waters . . . (C) Each state shall establish for the waters identified in paragraph (1)(A) of this subsection, and in accordance with the priority rankings, the total maximum daily load, for those pollutants which the Administrator identifies under section 1314(a)(2) of this title are suitable for such calculation. Such load shall 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 . . . (D)(2) Each state shall submit to the Administrator from time to time, with the first such submission not later than one hundred and eighty days after the date of publication of the first identification of pollutants under section 1314(a)(2)(D) of this title for his approval, the waters identified and a load established under paragraphs (1)(A), (1)(B), (1)(C), and (1)(D) of this subsection. The Administrator shall either approve or disapprove such identification and load not later than thirty days after the date of submission.

TMDL determinations for waters not able to meet water quality standards through other permitting processes or control technologies. Section 303(e) calls for the states to have a continuing planning process to ensure compliance with all applicable sections of the Act, including implementation of area wide waste treatment management plans under section 208, basin plans under section 209, and TMDL development under section 303(d).<sup>55</sup> Section 319 requires states to develop nonpoint source management programs and provides a grant program for implementation.<sup>56</sup> Section 320, the National Estuary Program, requires plans for identifying estuaries of national significance and the development of plans to control both point and nonpoint source pollution affecting those estuaries.<sup>57</sup> Section 314, the Clean Lakes Program, requires the states to assess the impacts of both point and nonpoint sources of pollution on their public lakes and to describe procedures and processes for controlling pollution of the lakes.<sup>58</sup> Finally, section 604(b) requires states to set aside a certain percentage of funds allocated to them to carry out planning under section 205(j) and 303(e), thus requiring continued planning with a nonpoint source component.<sup>59</sup>

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If the Administrator approves such identification and load, such state shall incorporate them into its current plan under subsection (e) of this section. If the Administrator disapproves such identification and load, he shall not later than thirty days after the date of such disapproval identify such waters in such State and establish such loads for such waters as he determines necessary to implement the water quality standards applicable to such waters and upon such identification and establishment the State shall incorporate them into its current plan under subsection (e) of this section.

*Id.*

55. "Each State shall have a continuing planning process approved under paragraph (2) of this subsection which is consistent with this chapter." 33 U.S.C. § 1313(e)(1).

56. The Governor of each State, for that State or in combination with adjacent States, shall, after notice and opportunity for public comment, prepare and submit to the Administrator for approval, a management program which such State proposes to implement in the first four fiscal years beginning after the date of submission of such management program for controlling pollution added from nonpoint sources to the navigable waters within the State and improving the quality of such waters.

33 U.S.C. § 1329(b)(1) (1999).

57. *See id.* § 1330.

58. *See id.* § 1324.

59. *See id.* § 1384(b). Title VI set-aside water quality management planning funds can be used to determine the nature, extent, and causes of water quality problems. The Fund can be used in identifying cost-effective and locally acceptable facility and nonpoint measures to meet and maintain water quality standards and development

To date, the most expansive of these provisions for addressing nonpoint source pollution has been section 319.<sup>60</sup> Through this section, states are required to develop nonpoint source management programs for controlling pollution added from nonpoint sources to the waters of the state that cannot attain or maintain applicable water quality standards without additional control of nonpoint sources.<sup>61</sup> The plans are also required to provide methods for improving the quality of those waters.<sup>62</sup> The plans must identify the categories and subcategories of nonpoint sources which add significant pollution to each portion of the identified waters.<sup>63</sup> This section also requires the state to identify BMPs that will be used to control nonpoint source pollution, identify programs to implement those BMPs, create schedules for implementing the plans, and to identify other sources of potential funding for implementation.<sup>64</sup> Section 319(h)<sup>65</sup> funds the implementation of approved NPS management programs, which are targeted at particular watersheds, on a cost sharing basis with the federal government.<sup>66</sup> To date, the primary control over nonpoint source pollution and land use under section 319 has not been a result of any particular grant of authority or guidance, but a *de facto* result of voluntary efforts to receive funding for the state-created management plans.

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and implementation plans to obtain state local financial regulatory commitments to implement such measures. *See id.* § 1285(j)(2)(A)-(D).

60. HOUCK, *supra* note 3, at 28-31.

61. 33 U.S.C. § 1329 (1999).

62. *See id.* § 1329(a)(1)(A).

63. *See id.* § 1329(a)(1)(B).

64. *See id.* § 1329(b)(2)(A)-(F).

65. Section 319(h) provides:

Upon application of a state for which a report submitted under subsection (a) of this section and a management program submitted under subsection (b) of this section is approved under this section, the Administrator shall make grants, subject to such terms and condition as the Administrator considers appropriate, under this subsection to such state for the purpose of assisting the state in implementing such management program. Funds reserved pursuant to section 1285(j)(5) of this title may be used to develop and implement such management program.

*See id.* § 1329(h).

66. *See id.* § 1329(b)(4) (1999).

B. Current federal legal authority to control land use activities under the CWA.<sup>67</sup>

Although not technically termed land use regulations, the CWA provides several avenues for federally mandated control of land use activities. For point sources of pollution, activities are controlled primarily by permits through NPDES programs under section 402.<sup>68</sup> EPA, or a state with an approved NPDES program,<sup>69</sup> has direct permitting authority over any discharge of a pollutant from a point source. Although this does not directly address the use of land, it does directly control permitted discharges from certain types of uses that discharge pollutants through a point source. This includes, *inter alia*, runoff that has been channeled by man and concentrated animal feeding operations.<sup>70</sup> Consequently, for certain types of activities, section 402 permits can require protective land management techniques or require modifications of processes or the location of channels to meet permit requirements.

Section 404 provides for concurrent control between EPA and the Army Corps of Engineers (ACOE) over the discharge of dredged and fill materials into "waters of the United States."<sup>71</sup> This is a source of permitting authority for land use activities that may alter wetlands subject to the jurisdiction of the Act. The ACOE may issue individual permits for regulated activities or general permits for categories of activities it has determined pose a limited threat of environmental degradation.<sup>72</sup> The ACOE has recently issued five new general Nationwide Permits (NWP) and modified six to increase regulation of activities on smaller wetlands and to include more categories of activities than the previous Nationwide Permits.<sup>73</sup> The new permits now regulate

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67. Rufus Young, 2000 Update; *Beyond Superfund-The Clean Water Act and Other Federal Laws Hazardous to Land Use*. SF08 A.L.I.-A.B.A. 227, 232 (2000).

68. 33 U.S.C. § 1342 (1999).

69. *See id.* § 1342(b).

70. *See id.* § 1362(14).

71. *See id.* § 1344.

72. *See id.* § 1344(e).

73. News Release, U.S. Army Corps of Engineers Announces Replacement Nationwide Permits, PA-00-05, (Mar. 6, 2001), <http://www.usace.army.mil/inet/functions/cw/cecwo/reg/press/nwp>. *See also* 33 U.S.C. § 1344(e):

[T]he Secretary [of the Army Corps of Engineers] may . . . issue general permits on a State, regional, or nationwide basis for any category of activities involving discharges of dredged or fill material if the Secretary determines that the activities in such category are similar in nature, will cause only minimal adverse environmental effects when performed sepa-

activities in jurisdictional wetlands down to one tenth of an acre;<sup>74</sup> however, this jurisdiction, particularly over isolated intrastate wetlands identified solely because of their potential to serve as migratory bird habitat, has recently been severely diminished by the Supreme Court.<sup>75</sup> Nevertheless, this permitting authority can still have a substantial effect on both the ability to use wetlands for specific purposes and the methods that must be employed for using them.

The NPDES program has been expanded under the new Phase II Storm water regulations to cover all municipal separate storm sewer systems within urban areas and all construction sites that cover over one acre.<sup>76</sup> Municipal sources are responsible for nearly fifty percent of the impairment of the nation's estuaries.<sup>77</sup> EPA has proposed Phase II storm water rules that include permitting for an estimated 3,500 more municipalities and another 100,000 construction sites per year.<sup>78</sup> The Phase II rules include "mandatory standards for 'post construction stormwater management in new development and redevelopment', which may require 'limiting growth to identified areas', 'minimizing impervious area', 'maintaining open-space', and 'structural BMPs'" such as reten-

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rately, and will have only minimal cumulative adverse affect on the environment.

74. The ACOE has established a half-acre maximum size limit for the new permits. Notification to the district engineer will be required for most activities that result in the loss of greater than one-tenth acre of waters of the United States. For NWP's 39, 40, 42 and 43, the ACOE has imposed a 300 linear foot limit for filling and excavating stream beds. The Corps has also increased the notification review period to 45 days. The new NWP general conditions limit activities in designated critical resource waters and fills in waters of the United States within 100-year floodplains. All above-grade fill under NWP's 29, 39, 40, 42, 43 and 44 is prohibited within the FEMA-mapped 100-year floodplain below the headwaters of any stream. Within the headwaters, above-grade fill is prohibited within the FEMA-mapped regulatory floodway, and any above-grade fill in the flood fringe must meet FEMA standards. U.S. ARMY CORPS OF ENGINEERS, BACKGROUND OF NATIONWIDE PERMITS (Mar. 6, 2001), at <http://www.usace.army.mil/inet/functions/cw/cecwo/reg/press/background> (last visited Feb. 2, 2002).

75. *Solid Waste Agency of Cook County v. U.S. Army Corps of Engineers*, 531 U.S. 159 (2001); see also Linda Greenhouse, *Justices Bar Wide U.S. Role Under the Clean Water Act*, N.Y. TIMES, Jan. 10, 2001, at A15. "Depending on how future rulings define 'isolated' the [five (Rhenquist, Scalia, Kennedy, Thomas and O'Connor) to four (Ginsburg, Souter, Breyer, and Stevens)] decision could remove [twenty] percent of the country's waters from federal protection." *Id.*

76. U.S. EPA, OFFICE OF WATER, PHASE II NPDES STORM WATER PROGRAM, at <http://cfpub.epa.gov/npdes/stormwater/swphase2.cfm> (last modified Nov. 1, 2001).

77. HOUCK, *supra* note 3, at 92-93.

78. *Id.* at 93.



tion ponds, wetland buffers, and porous pavement.<sup>79</sup> Municipal Storm Water Permits, with or without numerical limits, are also required.<sup>80</sup> Although potentially effective in their own right, where stormwater discharge will affect an impaired water with a TMDL, this permitting process could be quite effective.

In addition, section 313 mandates that all federal agencies with jurisdiction over any property, or engaged in any activity that results in the discharge or runoff of pollutants, must comply with all state requirements and processes respecting the control and abatement of water pollution in the same manner as non-governmental entities. Thus, all federal land-use activities, or those that require a federal permit, will be subject to the same requirements as states and private owners under TMDL implementation plans.

### III. The TMDL Program.

Prior to addressing the TMDL requirements directly, EPA decided to include the TMDL process into its regulations for basin planning<sup>81</sup> under sections 106 and 209, area-wide waste treatment under 208,<sup>82</sup> and continuing planning under 303(e).<sup>83</sup> These requirements provided for a planning process for water pollution control to administer programs for the prevention, reduction, and elimination of water pollution. Basin plans encompassed all industrial, municipal and nonpoint source controls and were intended to establish TMDLs and discharge load allocations.<sup>84</sup> However, the failure to adequately address TMDLs in the basin planning process led to the need for EPA to directly address the 303(d) requirements.<sup>85</sup>

Very few states identified impaired waters as directed under 303(d). The EPA also failed to identify impaired waters as directed, prior to a scathing report by the U.S. General Accounting Office on EPA's efforts to improve water quality<sup>86</sup> and a series of

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79. *Id.* at 93-94; see also U.S. EPA, OFFICE OF WATER, EPA STORM WATER PHASE II PERMITS FINAL RULE, available at <http://www.epa.gov/owm/sw/phase2/index.html> (last modified Nov. 14, 2000).

80. *Defenders of Wildlife v. Browner*, 191 F.3d 1159, 1166-67 (9th Cir. 1999).

81. HOUCK, *supra* note 3, at 50; see also Preparation of Water Quality Management Basin Plans, 40 C.F.R. § 130(1) (1996).

82. 33 U.S.C. § 1288(a) (1999); see also HOUCK, *supra* note 3, at 50.

83. 33 U.S.C. § 1313(e) (1999); see also HOUCK, *supra* note 3, at 50-51.

84. Determination of Total Maximum Daily Loads, 40 C.F.R. § 131.304(a) (1996).

85. HOUCK, *supra* note 3, at 56-57.

86. *Id.* at 53-54.

federal court cases in the late 1980s and early 1990s.<sup>87</sup> In the wake of the extensive litigation that followed, states began making lists of impaired waters and schedules for determining the first TMDLs.<sup>88</sup> At this point in time, over 20,000 waterbodies, including 300,000 miles of river and shoreline, and approximately five million acres of lakes have been identified as polluted by States, Territories and authorized Tribes.<sup>89</sup> However, only a handful of TMDLs have been established and most of those only require plans for controlling point sources through the NPDES permit process.<sup>90</sup>

#### A. The Evolution of the New TMDL Regulations.

In 1991, the EPA Office of Water created the Watershed Protection Approach Framework and in 1996 the EPA adopted the Watershed Approach as its framework for environmental management.<sup>91</sup> This coincided with the mounting pressure from lawsuits concerning TMDLs and general criticism of EPA water quality programs. This framework focuses on consensus building and community participation in defining environmental improvements within watersheds. The land use element of this approach is inherent, but subtle. The approach seeks to integrate federal programs into the management and implementation of beneficial programs that take into consideration the social, economic, financial and administrative concerns of the watershed communities.<sup>92</sup> This framework recognizes the complexity of nonpoint source pollution controls, the importance of a holistic approach on a watershed-based ecological unit, and the importance of stakeholder involvement in successful environmental protection.<sup>93</sup> This approach does not represent a new program under the CWA, but rather, a method for integrating current programs under the CWA and other federal programs to effectively achieve the goals of the CWA.

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87. *Id.* at 55-56.

88. *Id.*

89. U.S. EPA, OFFICE OF WATER, FINAL TMDL RULE: FULFILLING THE GOALS OF THE CLEAN WATER ACT, EPA 841-F-00-008, <http://www.epa.gov/owow/tmdl/finalrule/factsheet1.html> (last revised May 17, 2000).

90. HOUCK, *supra* note 3, at 146.

91. U.S. EPA, OFFICE OF WATER, WATERSHED APPROACH, *available at* <http://www.epa.gov/owow/watershed/framework.html> (last revised July, 17, 1996).

92. *See generally id.*

93. *Id.*

In 1997, EPA also launched a new policy guidance for its regions and the states for TMDL implementation strategies<sup>94</sup> and formed a Federal Advisory Committee Act (FACA) committee to analyze these strategies.<sup>95</sup> The guidance was intended to try to get the TMDL program ahead of all the litigation.<sup>96</sup> The FACA committee was convened to “try to achieve consensus among the states, environmental groups, and potentially affected point and nonpoint source dischargers” for methods of implementing the TMDL requirements under section 303(d).<sup>97</sup> While EPA still continued to stress its watershed approach framework, the TMDL program became the driving force, and potential regulatory bite of the program, as well as the incentive for the stakeholders to come to the table.

The FACA committee convened stakeholders to address issues concerning the TMDL program. Some of the toughest issues included the scope of eligible waters, the scientific uncertainty involved in setting TMDLs, implementation,<sup>98</sup> and nonpoint source controls.<sup>99</sup> Agricultural and timber interests argued strongly that section 303(d) should not apply to nonpoint sources.<sup>100</sup> They argued that section 319 offered a complete remedy for nonpoint source pollution and that the application of management practices, without specific limits on pollutants, was all that was called for. In general, “the committee reached considerable agreement on the need for better information, for public and ‘stakeholder’ participation, for comprehensive listings, for specificity in TMDLs, for an ‘implementation plan’, for ‘reasonable assurances’ that the plans would be implemented, and on mechanisms for monitoring and implementation.”<sup>101</sup> However, there was still disagreement about setting TMDLs for nonpoint sources. EPA stated that the final changes to the regulations were the compromised result of many conversations and meetings of the FACA committee and concerned interest groups and citizens, and comments received on

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94. HOUCK, *supra* note 3, at 77.

95. *Id.* at 57.

96. *Id.*; see also U.S. EPA, OFFICE OF WATER, TMDL LITIGATION BY STATE, <http://www.epa.gov/owow/tmdl/lawsuit.html> (last revised July 19, 2001).

97. HOUCK, *supra* note 3, at 57.

98. *Id.* at 57-58.

99. *Id.*

100. For an informative discussion of the lack of intersection between farming and environmental regulation see J.B. Ruhl, *The Environmental Law of Farms: 30 years of Making a Mole Hill Out Of A Mountain*, 31 *Envtl. L. Rep.* 10203 (2001). See also HOUCK, *supra* note 3, at 93.

101. HOUCK, *supra* note 3, at 83.

the proposed revisions to the rules published on August 23, 1999.<sup>102</sup> However, they are now reconsidering the rules. Due to the lack of agreement among affected parties and interests, the land use control component, essential to the reduction of nonpoint source pollution and the successful implementation of TMDLs for nonpoint sources, was left up to the existing programs that rely primarily on voluntary controls and receipt of funds.

In 1998, President Clinton announced his Clean Water Action Plan (CWAP)<sup>103</sup> to address the limited progress in meeting the goals of the Clean Water Act. This plan strengthened the administration of section 319 grant programs by requiring upgraded state nonpoint source management programs.<sup>104</sup> The Action Plan stressed coordination and collaboration among state, federal, tribal, regional and local entities to develop long and short term goals and objectives to protect surface and ground water.<sup>105</sup> It called for federal agencies to develop a unified policy for managing federal lands and resources, for increasing the maintenance of roads in the national forests, for accelerating Bureau of Land Management and Forest Service programs to protect riparian areas and stream corridors, and for modifying range allotment programs to improve the health of federal rangelands.<sup>106</sup> On February 22, 2000, the U.S. Departments of Agriculture, Commerce, Defense, Energy, and Interior, the EPA, the Tennessee Valley Authority, and the ACOE announced a proposed Unified Federal Policy on Watershed Management<sup>107</sup> that was formally adopted on October 18, 2000.<sup>108</sup> The CWAP has been the initiative that resulted in new rule changes to the Water Quality Standards Program, the NPDES stormwater permit regulations, the ACOE Nationwide Permit amendments, and the TMDL program.<sup>109</sup>

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102. Proposed Revisions to the Water Quality Planning and Management Regulations, 64 Fed. Reg. 46,012, 46,055 (Aug. 23, 1999).

103. U.S. EPA, CLEAN WATER ACTION PLAN, at <http://www.cleanwater.gov/action/overview/html> (last revised Aug. 7, 1998).

104. *Id.*

105. *Id.*

106. Robert Jerome Glennon, *Federal Environmental Restoration Initiatives: An Analysis of Agency Performance and the Capacity For Change*, 42 ARIZ. L. REV. 483, 500 (2000).

107. Unified Federal Policy for Ensuring a Watershed Approach to Federal Land and Resource Management, 65 Fed. Reg. 8834 (Feb. 22, 2000).

108. U.S. EPA, CLEAN WATER ACTION PLAN, UNIFIED FEDERAL POLICY FOR A WATERSHED APPROACH TO FEDERAL LAND AND RESOURCE MANAGEMENT, at <http://www.cleanwater.gov/ufp> (last revised May 9, 2001).

109. Glennon, *supra* note 106, at 501.

Furthermore, the CWAP has been the driving force behind the shift among federal, state and local agencies and organizations to the watershed management approach.<sup>110</sup>

The recognition implicit in all of these endeavors and the focus on watershed management is the critical role that land-use controls and land management activities play in any successful water pollution control program and the difficulties that this recognition presents.

## B. The New TMDL Program.

Simply put, "[a] TMDL . . . is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources."<sup>111</sup> "The TMDL specifies the amount of a particular pollutant that may be present in a waterbody (for it to maintain its designated use), allocates allowable pollutant loads among sources, and provides the basis for attaining or maintaining water quality standards. TMDLs are established for . . . waterbodies impaired by point sources, nonpoint sources, or combination of both point and nonpoint sources."<sup>112</sup> However, a TMDL is much more than a numerical concentration or quantity.

A TMDL consists of eleven elements: (1) impaired waterbody name and geographic location; (2) identification of the pollutant and the applicable water quality standard; (3) quantification of the pollutant load that may be present in the waterbody and still ensure attainment and maintenance of water quality standards; (4) quantification of the amount or degree by which the current pollutant load in the waterbody, including the pollutant load from upstream sources that is being accounted for as background loading, deviates from the pollutant load needed to attain and maintain water quality standards; (5) identification of source categories, source subcategories or individual sources of the pollutant, based upon feasibility; (6) waste load allocations for point sources; (7) load allocation for nonpoint sources; (8) a margin of safety to allow for uncertainty; (9) consideration of seasonal variations; (10)

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110. *Id.*

111. U.S. EPA, OFFICE OF WATER, TOTAL MAXIMUM DAILY LOAD (TMDL) PROGRAM: TMDL DEFINITION-WHAT IS A TOTAL MAXIMUM DAILY LOAD (TMDL)?, available at <http://www.epa.gov/owow/tmdl/intro> (last updated Aug. 12, 1999).

112. Revisions, *supra* note 26, at 43,588 (July 13, 2000).

allowance for reasonably foreseeable increases in pollutant loads including future growth; and (11) an implementation plan.<sup>113</sup>

Waste Load Allocations for point sources could be allocated to categories or subcategories, sources subject to a general permit under the NPDES permit program, or to each point source covered by an individual NPDES permit.<sup>114</sup> When an existing permit expires, upon reissuance of that permit, the permitting authority will evaluate whether the effluent limitations under the permit are consistent with the waste load allocations in an applicable TMDL.<sup>115</sup> Under the new regulations, NPDES permit modifications may be necessary to reflect waste load allocations in a TMDL.<sup>116</sup> For new sources of discharge, EPA regulations mandate that no new source may "contribute to" violation of water quality standards.<sup>117</sup> Therefore, if a TMDL has been prepared, the new source must demonstrate that there is a waste load allocation for its discharge and that all other discharges to that waterbody are in compliance with the water quality standards.

Importantly, however, EPA can and must set TMDLs for waterways that are impacted solely by nonpoint source pollution.<sup>118</sup> For nonpoint sources, states must assign individual load allocations<sup>119</sup> to specific nonpoint sources (including air deposition and natural background) unless doing so would not be feasible. In cases where it is not feasible to assign individual load allocations, specific nonpoint sources could be grouped together into categories or subcategories. Each category or subcategory must then be given a load allocation.

The implementation plan must include a schedule for implementation actions and the date by which the plan will attain water quality standards. It must also include modeling and/or monitoring plans and a description of the interim, measurable milestones in criteria to be used to determine progress towards

113. *Id.* at 43,594.

114. A Waste Load Allocation is the allowable contribution from a point source to an impaired waterbody. *Id.* at 43,594-95.

115. *Id.* at 43,626.

116. *Id.*

117. "No permit may be issued . . . to a new source or a new discharger, if the discharge from its construction or operation will cause or contribute to the violation of water quality standards." EPA Administered Permit Programs: The National Pollutant Discharge Elimination System, 40 C.F.R. § 122.4(i) (July 1, 2001).

118. *Pronsolino v. Marcus*, 91 F. Supp. 2d 1337 (N.D. Cal. 2000).

119. Load allocations are the discharge contributions allowable from nonpoint sources of pollution. Revisions, *supra* note 26, at 43,593-94.

achieving water quality standards.<sup>120</sup> Implementation plans “must also include a description of specific regulatory or voluntary actions, including management measures or controls” that governments and individuals will implement to provide reasonable assurance that load reductions will be achieved.<sup>121</sup> The state may consider such factors as “technical feasibility of installing controls and measures or changing practices within five years, competing program priorities in providing necessary funding and/or necessary technical assistance, and time to work with members of the affected community” in determining whether it can implement management measures within five years.<sup>122</sup> As mentioned above, EPA believes that the types of management measures that will be used to implement the TMDL for nonpoint sources will consist of a set of well-established practices that are already commonly used within the affected industries and can be implemented within a five-year timeframe.

For urban runoff, typical measures will include prevention techniques such as erosion and sediment control in new developments (which are required by new NPDES regulations for all developments larger than one acre), continued treatment of post development runoff through a variety of best management practices, restoration of degraded areas and/or structures, and techniques to treat runoff in developed areas. Practicability may hinge on section 319 grant money and other sources of funds to implement the relevant management measures.

#### IV. The Framework for Approaching TMDL implementation for NPS Polluted Waterbodies: Land Use, Land Abuse and Land Re-Use.

It is clear that EPA, other federal agencies, the states, and many concerned citizens and industries have worked diligently to create solutions to the problem of nonpoint source pollution and TMDL implementation generally. This article is not a critique of those efforts. The framework described hereafter is a suggestion for a new angle of vision for implementing the generally agreed upon goals of the TMDL program and the Clean Water Act through land use controls. This article suggests that land use control, the key ingredient that must be addressed to control

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120. *Id.* at 43,626.

121. *Id.*

122. *Id.*

nonpoint source pollution and to implement TMDLs, is actually comprised of three distinct temporal management perspectives. The "approaches" described below are based on the temporal aspect of the management objective: prospective, current and retrospective. This aspect on which the management techniques will operate results in the political, economic and social attributes and challenges that characterize the successful implementation of each approach.

This framework is not a starting point but, rather, a point of departure once a comprehensive watershed resource analysis has been developed. Comprehensive scientific data and the identification of important hydrologic resources, important surrounding lands that should be protected, and degraded sites that should be restored form the basis for the implementation of any of these approaches. However, once this information is collected and needed actions are identified, the categorization of those actions into one of the following approaches should help to determine how to execute the overall plan for TMDL implementation. There is not, nor should there be, a short cut around the watershed approach framework developed by EPA and being used throughout the country to gain consensus on environmental protection goals. Locally led, resource driven initiatives provide a very valuable approach. For example, in some areas, such as the Long Island Sound watershed, numerous federal, state, local and citizen groups have been engaged in a long productive process to determine the steps needed to restore and protect Long Island Sound.<sup>123</sup> The goals that have been determined through a planning and capacity building process such as this could now be categorized according to the approaches outlined below to aid in their realization.

A holistic and complete plan for NPS control is needed and each approach is an important ingredient of a comprehensive plan to control nonpoint source pollution. However, reality dictates that some measures will be easier to achieve in certain locations and situations than others. Moreover, not every management objective requires the same suite of professionals or level of public

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123. See generally AUDUBON NEW YORK, LISTEN TO THE SOUND 2000-A CITIZENS AGENDA FOR LONG ISLAND SOUND, available at <http://ny.audubon.org/lts/lts2000.html> (last visited Jan. 28, 2001). The Agenda is a publication by the National Audubon Society in partnership with the Regional Plan Association and Save the Sound. The Save the Sound program conducted citizen hearings over the past ten years and created a Long Island Reserve Proposal through their efforts.



support. The purpose of this article is to assist with the prioritization of the needed measures by understanding the differing social, political, economic and scientific values associated with the perspective on which the approach operates and focusing the appropriate efforts in the places they are most likely to succeed.

A. The Land Use Approach: Long term environmental security.

The Land Use Approach exemplifies a prospective vision. It is the approach taken to regulate the purposes for which land will be used; it encompasses the typical local regulatory framework that generally includes comprehensive planning, open space preservation, zoning, and overlay or floating zones, but it also encompasses the acquisition and preservation of sites that play an important role in the protection of water quality and environmental integrity. This is a forward-looking approach. This approach deals with land that has not yet been developed, including land functioning, at least to the extent it has not been degraded by neighboring land uses, in its proper watershed or ecosystem manner and capacity. This approach deals with changing the prospective or allowable use of land from one that potentially degrades water quality and environmental resources to one that is protective. The heart of this approach is placing development in appropriate places and preserving areas that are more environmentally sensitive. This may include preservation of single parcels of land that have the potential to impact surface or groundwater resources, creating a network or reserve system to maintain or increase environmental functions, or preserving buffers along wetlands, streams, rivers and lakes to protect them from the impacts of surrounding land uses.

The Land Use Approach is also a protectionist approach. It is the smart growth approach. It involves decisions that are extremely complex due to competing values and interests. It exemplifies the notion that environmental protection, at its core, touches on the most basic aspects of human behavior and emotion, and on the most fundamental rights and interests of citizens.

More importantly, this approach does not reduce current loading to an impaired waterbody; rather, it reduces future impairment and impacts. Thus, in terms of TMDL implementation, it will not aid in reaching a particular load goal in the short term. However, this approach is a critical component of the ability of the state to predict what future loads in the watershed will be. There-

fore, this approach is critical for long range implementation of TMDLs.

Difficulties with this aspect of land management are apparent. Local zoning and the determination of permitted land uses within a community encompass two of the most important elements of land development: Economic growth and viability for the community and private property rights for landowners. The economic welfare of the community is critical to the provisions of services to its citizens and the regulation of a healthy, safe place for people to live and work. Local governments depend on tax revenues from land and businesses to run schools, pay for police, fire and ambulance services, and provide recreational and cultural amenities for the citizens. Regulations and measures that detract from, or infringe upon, a community's ability to maintain and attract new sources of revenue are likely to be politically unpopular.

A landowner's ability to use his land for the purpose for which it has been designated under a zoning ordinance or, if there is no zoning, the purpose for which the owner wishes to use it, is a right that is critically important to landowners. A developer searches for sites where he can build to get the most return for his money. People buy homes and land with the expectation of the potential use and value of the land. Across the country, private property rights activists have lobbied for compensation when land value is reduced due to environmental regulations.<sup>124</sup>

This approach operates in a negative way in the short term and the benefits are often not as immediately apparent as the burdens. Therefore, a positive, incentive-based scheme is likely to be the most effective.<sup>125</sup> Implementation plans that include this approach should be targeted for completion in the long range and should include: 1) the creation of state regulatory measures and incentives to encourage local governing bodies to create protective zoning regulations that will be reviewed and harmonized throughout the particular watershed to meet future TMDL requirements; 2) the creation of funding mechanisms available for land acquisition, purchase of conservation easements and purchase or trade of development rights; and 3) the creation of property rights incentives to gain landowner support for preserving important areas.

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124. William L. Inden, *Compensation Legislation: Private Property Rights vs. Public Benefits*, 5 DICK. J. ENVTL. L. & POL'Y 119, 120 (1996).

125. For a general critique of how purely incentive-based programs have worked in the control of NPS from farms, see generally Ruhl, *supra* note 100.

1. State Review of Local Land Use Regulations: Municipal Incentives.

The regulation of land use has been delegated from the state to the municipalities within the state by enabling legislation that allows them nearly exclusive control over the determination of how land within the municipality will be used. By and large, this system of fragmented local control has been a failure in the protection of environmental resources and water quality.<sup>126</sup> Neighboring municipalities may have completely different sets of regulations that regulate activities that directly or indirectly affect nonpoint source pollution and will contribute to the load of the waterbody. This could lead not only to a failure to meet TMDL load allocations, but also to downstream municipalities bearing the costs of upstream development in terms of polluted or sediment filled waterbodies. Alternatively, differing regulations regarding potential use of land may lead to one municipality bearing increased growth pressure, resulting in increased nonpoint source pollution loads because of stricter regulations and less land for development in neighboring communities.<sup>127</sup> For example, if an upstream community has large lot zoning and strict preservation of critical areas, the downstream community that does not have these measures may face increased pressure to build on all of their smaller sized lots and unpreserved critical areas. This variance in local zoning and land use regulations will lead to the state's inability to predict and allocate future load allocations from nonpoint sources.

Regulations governing future development are the most sensitive from a political, social and economic perspective. Zoning, overlay zoning, and natural resource protection ordinances such as wetlands and steep slopes ordinances, typically determine what a particular parcel of property can be used for and how much of the property may or may not be developed. This directly affects the economic value of the land.

Since it is the local governments that enact and enforce regulations to control prospective land use, the appropriate target for regulation and incentive programs by the state would be the governments themselves rather than the landowners.<sup>128</sup> Property rights incentives to individual landowners would flow through the

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126. Cannon, *supra* note 6, at 409.

127. Buresh, *supra* note 10, at 1441.

128. *Id.* at 1441-42.

local governmental body and are discussed more fully in the next section. The state, with the assistance from EPA and additional regional or federal sources, is in the best position to help create goals on a watershed level for the harmonization of regulations so that all the potential NPS sources are taken into account.

Landowners and developers are constrained by the regulations and ordinances under which they must build. Local governments are not currently held to any particular standard in their creation and enforcement of land use regulations. By mandating the load allocations for a particular waterbody within a watershed that expands beyond political boundaries, the state is in the best position to review local land use regulations to determine whether they are harmonized to achieve the total protection needed. By reviewing and approving local regulations rather than local developments, the state will play an orchestrating role rather than a restrictive one. The state will not be involved in individual land use decisions, thus leaving traditional control over development in the hands of local boards, commissions and governments.

For TMDL implementation, the state should develop guidelines or criteria for the municipalities to follow when enacting their land use scheme; provide education to local officials and citizens regarding the benefits of a comprehensive water quality focused suite of land use regulations; provide scientific assistance to help the communities identify areas that need special protection or should be left undeveloped; support the municipalities by providing technical assistance for scientific and hydrologic evaluations to determine appropriate land uses; and develop and distribute model ordinances to the municipalities. The state should coordinate with law schools and universities, legal experts and economists to bring the most advanced and innovative regulatory techniques to the municipality, so it can choose a combination of ordinances that suit the particular political and social organization of the community. The state should provide the guidance and funding mechanisms for these preparations and review and approve the municipal laws and enforcement plans. Importantly, the regulatory tools that the municipality uses to achieve the objectives of the plan should be left up to the creativity of the municipalities, so long as they are feasible and reasonably likely to succeed. The state should set goals and incentives for reaching them, but the local governments should be rewarded for their own regulations and development plans that meet or exceed the state guidelines by using state-created financial incentives.

The states could devise a Compliance Review Incentive Program (CRIP) that awards designations to municipalities based upon the level of protection they achieve with their regulatory scheme. This would not be a permit, but a designation by the state that the municipality has complied with the guidelines of the state and is therefore entitled to certain beneficial incentive programs. This would reward the municipalities that are willing to conform their forward-looking land use regulations to the state's recommendations for NPS control for TMDL implementation or watershed protection. The state should require a minimum level of protection, but should also provide additional incentives in the form of tax credits, priority grant status, or low interest loans for sets of regulations and plans that exceed these minimum levels. Localities that are given a high environmental rating by the state may be able to participate in a TMDL trading scheme in which they could sell their "credits" from extra protection to another municipality or source of nonpoint source pollution. The state could also provide additional incentives for compliance by certain deadlines to encourage municipalities to act quickly, and should also encourage municipalities to work together to defray the costs of regulation development.<sup>129</sup>

## 2. State Funding mechanisms for preservation.

This section follows closely on the section above. In order to provide proper incentives for municipalities to select areas for preservation, the creation or identification of funding mechanisms available for land acquisition, purchase of conservation easements, and purchase or trade of development rights is essential. In addition to direct bond acts and state grant programs, the state should provide a database of funding sources and criteria under state, federal, and private programs to municipalities and all partners involved in preserving critical areas.

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129. See generally Cannon, *supra* note 6. Cannon suggests that "regulatory authority should go to the political jurisdiction that comes closest to matching the geographic area affected by a particular externality" of NPS pollution. *Id.* at 383. He also suggests that "competition and cooperation among agencies and jurisdictions in a political theater can help select the best decision-maker or best combination of decision-makers for a given problem and assist the public assessment of the policies chosen." *Id.* at 389.

### 3. Property Rights Incentives

The overall pattern of development, expressed in terms of zoning, is critical to the impacts on water bodies, but is also critical to property owners.<sup>130</sup> Although people are cognizant of controls on the potential use of their land, they are quite reluctant to add any new controls onto the future use of their land. Efforts to change land use regulations often result in diminishing the value of the land to the property owners. Land that is deemed the most desirable for protection, such as wetlands, may, through regulation, become the least valuable to the landowner. This forces certain landowners to lose potential value without compensation and may even encourage destruction of certain resources on a site to avoid regulation. Property rights initiatives are being introduced in several states to require government payments for diminutions in value due to restrictive environmental regulations.<sup>131</sup>

To account for these concerns about losing development potential, several creative incentives could be offered. The state could assist the municipalities in granting, or grant directly, tax subsidies or tax reductions for properties according to the amount of property that is constrained by environmental regulation; these could be termed Water Quality Tax Credits. State tax subsidies would relieve pressure on the municipalities to permit development in sensitive areas to pay for schools and services, and provide recreation and cultural amenities for the citizens. Land could also be reassessed according to its environmental limitations, and landowners and potential purchasers could be allowed to benefit, or at least not lose, from the purchase and protection of sensitive land. By equalizing the tax benefits and burdens, there would be more incentives to preserve land on which development has detrimental effects on impaired waterbodies.<sup>132</sup>

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130. Although this paper focuses on property rights as they relate to land, property rights relating to water are equally important and an often a neglected issue. For a discussion of the relationship between water rights and watershed protection, see generally Dan Tarlock, *Reconnecting Property Rights To Watersheds*, 25 WM. & MARY ENVTL. L. & POL'Y REV. 69 (2000).

131. Inden, *supra* note 124.

132. Another long term solution may be the amendment of the CWA to create set-aside programs like the Wetlands Reserve and Conservation Reserve Programs offered through the USDA-NRCS. These programs could provide for the payment to landowners for the development rights on their properties. Alternatively, those programs under USDA could be expanded to accommodate the preservation of urban landscapes.

Aside from tax incentives, other preservationist approaches that could compensate landowners for their environmentally sensitive land include land trust purchases,<sup>133</sup> municipal purchases, conservation easements,<sup>134</sup> and transfer of development rights.<sup>135</sup> Education and citizen involvement would play an important role in gaining support for these implementation measures. The state and EPA could play a facilitative role in creating community consensus and providing information on these techniques. This will be carried out hand in hand with the techniques described under the state role outlined above.

In summary, the key suggestions for implementing activities that are encompassed by the land use approach include:

- The recognition that this approach has a long-term implementation timeline and will not affect current load allocations and meeting current TMDL requirements.
- The recognition that this approach operates in a negative manner and should be offset by positive programs to equalize the benefits and burdens of water quality control.
- The state<sup>136</sup> should work with concerned citizens, municipalities, universities, environmental organizations, and other agencies to help form the scientific database to identify appropriate areas for growth and important areas that should be protected within the watershed for the impaired waterbody. The state

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133. Land trusts are not-for-profit groups that protect natural resources and open space through various land transactions including conservation easements and purchase of development rights. Charles Wilkinson, *Land Use, Science and Spirituality: The Search for a True and Lasting Relationship With The Land*, 21 PUB. LAND & RESOURCES L. REV. 1, 16 (2000).

134. See JOHN R. NOLON, *WELL GROUNDED: SHAPING THE DESTINY OF THE EMPIRE STATE* 236 (Land Use Law Center, Pace Univ. School of Law ed., 1998):

A conservation easement is a voluntary agreement between a private landowner and a municipal agency or qualified not-for-profit corporation to restrict the development, management, or use of the land. The owner of the real property deeds an interest in the land, called a conservation easement, to a qualified public or private agency. That agency holds the interest and enforces its restrictions against the transferring owner and all subsequent owners of the land.

*Id.*

135. A landowner of undeveloped land can be allowed to sell or transfer the rights to develop his property allowed under the current zoning ordinance to another property owner or his own property in a less sensitive or higher density zone. Wilkinson, *supra* note 133, at 22.

136. Although the suggestions focus on the role that states should play in implementing TMDLs, this does not mean that the state government or agencies should play a solitary role. Rather, they should play an orchestrating and facilitative role in finding the appropriate and most effective group or organization for implementing TMDLs and achieving TMDL goals.

should assist and help coordinate information between groups and agencies that have already begun or completed that process.

- The state should create concrete goals on a watershed level for guiding growth to less sensitive areas for each municipality to meet through its regulations and preservation/acquisition plan. The state should also provide ongoing information, through connections with law schools, universities, legal experts, and economic experts on innovative regulatory tools that are available to manage growth and protect resources.

- The state should offer a Compliance Review Incentive Program (CRIP) that provides rewards to municipalities that create and implement a comprehensive suite of land use regulations to direct growth to appropriate areas and that identifies important parcels that should be preserved or protected. Beyond that, the state should provide additional incentives in the form of tax credits, TMDL tradable credits, priority grant status or low interest loans for municipalities that include extra measures of protection.

- The state should create funding programs that will be available to municipalities or intermunicipal groups for acquisition of important parcels. Municipalities that meet the special CRIP requirements should get heightened priority for receiving grant funds.

- The state should provide mechanisms so that municipalities can provide tax credits or reduced assessment values for environmentally sensitive parcels so that these landowners do not bear an unproportional burden of the cost of protection.

#### B. The Land Abuse Approach: Protecting the status quo.

The Land Abuse Approach involves controlling the methods by which the land is utilized for its designated purpose. This is a technical approach that operates in the present sense and is the approach taken through permitting and enforcement of land management techniques. Unlike the Land Use Approach, at this stage, the use has already been determined or projects have already been approved. This approach applies to actions that are imminent and the method that will be used to implement these actions. It relates to how things are done, not whether they are done. Examples are regulations regarding erosion, sediment control, application of fertilizers and pesticides, and the use of BMPs. These regulations face their major obstacles in technical assistance, scientific data requirements, education and enforcement, rather than social and citizen action. Activities that are within



this approach will have a direct and current effect on load allocations and meeting TMDL goals.

The state should provide the guidelines that must be met in the TMDL implementation plans, but it should then be up to the municipality to create the regulations that will meet or exceed the goals in the TMDL. Some of these changes in regulations will be mandated by the new Phase II Stormwater regulations, but the state should seek to improve and harmonize all of the protective management techniques throughout the municipalities in the watershed. Although this may not be viewed as imposing serious property rights issues, government officials may still be concerned about imposing too many costs on developers and making their communities non-competitive. However, since the TMDL implementation plan will apply to every source or potential source of nonpoint source pollution for the affected waterbody, the municipalities within the watershed should generally face the same requirements; therefore, fears of being less competitive for economic development should be alleviated to some extent. Moreover, harmonization of land management techniques throughout a watershed should make it easier for developers and engineers to anticipate the measures that will be needed and, as explained below, be rewarded for their innovation.

The state can play a major guidance role by providing Best Management Practice Manuals, and training and education to developers and enforcement personnel; distributing model ordinances for erosion and sediment control, compliance ordinances, buffer determinations<sup>137</sup> and maintenance regulations; and by conducting training on advanced techniques. However, the municipalities should be given incentives to implement the most advanced technological requirements in their ordinances even more so than those directed by the states.

States, in cooperation with universities, NRCS, Soil and Water Conservation Districts, and local governments and citizens should create an ongoing database to exchange information on the latest technology and scientific information on land management techniques. The state should conduct educational seminars that bring experts in the fields together and highlight the most innovative techniques available for protection from nonpoint source pol-

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137. The determination of buffer requirements varies according to the function of the waterbody in water quality control, the types of soil and the slope of the buffer area and the annual anticipated rainfall events. *See generally* JAMES MACBROOM, CT DEPT OF ENV'TL PROTECTION, *THE RIVER BOOK* (2000).

lution. A series of videotapes could be developed that could be required viewing for certain building permits or certain types of land use known to potentially create NPS pollution. Experts that contribute to the educational materials should include engineers, hydrologists, scientists, developers, and municipal public works employees. The state should allow the municipalities to create menus of engineering and construction techniques from which developers could choose in order to meet the requirements of the regulations. By having flexible regulations, those developers that choose the most protective techniques, or even submit more protective innovations on their own, would receive special benefits. Benefits should include special designations as Premium Water Quality Developments that could provide lower taxes to homeowners or special financing to either developers or homeowners.

Incentives for municipalities to create innovative regulations and enforcement mechanisms could also take the form of preferred grant status or special tax incentives from the state.

In summary, the key suggestions for implementation of activities that are encompassed by the Land Abuse Approach include:

- The recognition that this approach has a short to medium-term implementation timeline.
- The recognition that this approach places restrictions on conducting an approved activity rather than reducing an existing right to conduct the activity at all. Therefore, the need to balance negative effects of the regulations is not as strong as in the Land Use Approach.
- The state should provide guidelines for land management and protection regulations that serve as a minimum level of management required for regulations within a municipality, but should encourage flexible regulations that advance technology.
- The state, in partnership with other agencies, universities and citizens, should create a database and program of information exchanges in seminars and symposiums to disseminate the most advanced technology and management techniques available for land management.
- The state should offer incentives to municipalities to create special designations for Premium Water Quality Developments to developers to use and create better land management techniques. These specially designated developments could benefit from lower taxes, favorable financing programs, and special community recognition.

- Municipalities that initiate special enforcement monitoring programs; training programs for enforcement personnel; and regulatory mechanisms, such as environmental performance bonds or letters of credit, should be given priority grant status or special tax benefits for strict enforcement.

C. The Land Re-Use Approach: A centerpiece for community action.

The Land Re-Use Approach is a restorative, backward-looking approach. This approach encompasses restoration activities on land that has already been used, structures that have already been built, degradation that has already occurred, and problems that are already apparent. This approach involves the determination of the restoration potential of a particular site, the creation of a plan for restoration, the actual restoration, and continued monitoring. It also involves the retrofit of degraded infrastructure, sewage and stormwater systems.<sup>138</sup>

Restoration and retrofit measures include activities such as stream bank restorations, wetland re-creations and restorations, brownfields redevelopment, and infrastructure improvements. These are a critical part of TMDL implementation for several reasons. First, if degraded areas are not restored, they may continue to contribute to nonpoint source pollution and negate other control efforts. Contaminated sites may be a source of pollution and continue to pollute waterbodies. In this respect, restoration activities operate to help meet the current TMDL goals. Furthermore, by increasing the proper assimilative or filtering functions of degraded wetlands or infrastructure retrofits, water quality may begin to improve over the long term through natural processes. For example, re-vegetation along streambanks can reduce thermal pollution of the water by providing shade. Other riparian vegetation and stabilization of the bank can reduce channel scouring, and reduce sediment transport from unprotected banks. It can also provide filtering, groundwater recharge, and decrease flow velocities in times of flooding.<sup>139</sup>

For these restoration efforts to be accomplished the critical elements will be community and political support, scientific information, engineering and planning expertise, and money to imple-

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138. The retrofit of sewage and stormwater facilities is not addressed in this paper as much as the restoration of degraded sites.

139. See generally KENNETH N. BROOKS, ET AL., *HYDROLOGY AND THE MANAGEMENT OF WATERSHEDS* (1991).

ment the restorations and retrofit projects. The first step is to identify the degraded parcels, the restoration of which would improve water quality. This should be part of the database created for the Land Use Approach mentioned above and should be part of the overall watershed plan that has been created through citizen participation. Stakeholders should be the driving force behind the prioritization of sites and projects for restoration.

Once the sites have been identified, two major efforts should be put into motion: raising community and political support for the effort and finding funding sources for the project. A degraded site can be a focal point for community action and political activism. The state, along with local and regional citizen and environmental groups, can raise awareness and community support for restoration projects. Unlike the Land Use or Land Abuse Approach, which result in progress that is largely invisible to the average citizen, this approach encompasses activities that are highly visible to the ordinary citizen. This is an actual physical benefit that people can see and feel; an aesthetic as well as environmental benefit. It is often easier to gain support for a project that is visible and can have an immediate impact on a community.

From a political perspective, these types of projects should be able to garner significant citizen, and therefore political, support. Elected officials and citizens can take a great deal of pride in restored areas as they can be used as centerpieces of community action. The social aspects of this approach center around community support and awareness, education, and promotion of the idea of restoration.

However, this approach involves a process that is usually slow and expensive. It requires scientists, designers, materials, and construction. Scientific and technical information will be critical to project completion. The state can play an important role in providing information on potential partnerships for funding and implementation for these types of activities. There may be many other federal, state, or private programs that may be available for funding restoration purposes. The state can also play a critical funding role by offering grant programs and helping the municipalities coordinate, facilitate, and encourage the citizen efforts.

In summary, the key suggestions for implementation of activities that are encompassed by the Land Re-Use Approach include:

- The recognition that these types of activities operate to help achieve both short and long term TMDL goals.

- The identification and prioritization of restoration sites and activities to reach TMDL goals.
- Raising community and political awareness and support for the restoration efforts. Political support can come from federal, state, and local officials in a position to help with the implementation of projects in their jurisdictions.
- The state should create funding sources for restoration projects through bonds and grant programs.
- The state should create databases of funding partnerships and programs that can help citizens and officials locate and apply for restoration dollars.

## V. Conclusion

It should be apparent that the approaches outlined above suggest that TMDL implementation is not an end in itself, but could be the orchestrating element of the development of the long awaited solution to the control of NPS pollution. This recognition can help states, municipalities, and citizens understand that the means to implement them may, in the long term, be well justified by the ends achieved.

Each approach involves the combination of many professionals and citizens; the creation of watershed resource inventories to identify sensitive lands that should be preserved or restored; the creation of educational programs, and the identification of funding sources for implementation. However, each approach is driven by a somewhat different set of key actors. The Land Use Approach, which depends upon incentive based regulatory and compensation schemes, will rely primarily on the integration of legal and economic expertise. The Land Abuse Approach, which depends on the regulation and implementation of advanced technology, will rely primarily on engineers, scientists, and hydrologists to inform those in the legal profession during the creation of regulatory mechanisms to achieve the goals of the TMDL load requirements. The Land Re-Use Approach, which depends on site specific planning and implementation, will rely primarily on community and political leaders to encourage education and engagement, and on the availability of funding. All of the approaches can benefit from the use of new communications technologies to provide an information network of funding sources.

This paper has proposed suggestions for EPA to consider as it reviews the TMDL rules, and for the state to consider when developing short and long term water quality improvement mecha-

nisms and TMDL implementation plans for NPS polluted waterbodies. It has also focused on more urban/suburban than agricultural watersheds. EPA should consider changes to the rules that would provide guidance, incentives, and financial support to assist the states in following the suggestions outlined above. Although the ultimate solutions depend on the nature of the economic base and the cultures of the communities affected, this paper suggests that regardless of the community involved, the implementation plans for TMDLs for NPS polluted waterbodies would do well by recognizing that all implementation plans encompass one or more of the suggested approaches.

The political landscape does not yet provide the solutions to the problems that are associated with NPS pollution. It is only through the exchange of ideas and perspectives that any ultimate solution will eventually be revealed. In fact, it is not the revelation of one solution but the combination of many that may ultimately prove effective. This paper modestly proposes that by approaching land use as a three-dimensional aspect of NPS control, the solutions to TMDL implementation might be more easily understood and developed.