

# Agriculture, Nonpoint Source Pollution, and Federal Law

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## INTRODUCTION

Along with an incredible abundance of food, American agriculture produces alarming amounts of water pollution. This problem is not new. Writing in 1970, Professor William Hines of the University of Iowa College of Law chronicled the problem of agricultural pollution.<sup>1</sup> Similarly, Congress identified water pollution from agricultural activities as a significant problem when it enacted the Federal Water Pollution Control Act Amendments of 1972. Section 208 of the Amendments makes specific reference to “agriculturally . . . related . . . sources of pollution.”<sup>2</sup> The Senate Report accompanying the Amendments notes that “[a]griculture is now one of the major contributors to the degradation of the quality of our navigable water.”<sup>3</sup> Nevertheless, unlike pollution from many other industries, agricultural water pollution remains largely unregulated and unchecked.

The lack of progress in reducing agricultural water pollution results from the regulatory structure established in the 1972 Amendments. The 1972 Amendments, which initiated the first serious attempt to address the nation’s water pollution problems, focused primarily on “point source pollution.”<sup>4</sup> To address point source pollution, the 1972 Amendments established the National Pollution Discharge Elimination System (NPDES), which applies technology-derived effluent limita-

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<sup>1</sup> Hines, *Agriculture: The Unseen Foe in the War on Pollution*, 55 CORNELL L. REV. 740 (1970).

<sup>2</sup> Pub. L. No. 92-500, § 208(b)(2)(F), 86 Stat. 816, 841 (codified as amended at 33 U.S.C. § 1288(b)(2)(F) (1982)).

<sup>3</sup> S. REP. NO. 414, 92d Cong., 1st Sess. 15, *reprinted in* 1972 U.S. CODE CONG. & ADMIN. NEWS 3668, 3682; *see also id.* at 39, *reprinted in* 1972 U.S. CODE CONG. & ADMIN. NEWS at 3705.

<sup>4</sup> In general, “point source” pollution comes from a discrete source, such as a pipe, while “nonpoint source” pollution comes from more dispersed sources. For more discussion on this distinction, *see infra* notes 81-101 and accompanying text.

tions through a federally mandated and supervised permit system.<sup>5</sup> “Nonpoint source pollution,” on the other hand, was left primarily to the states and was subject only to loose federal oversight through the Amendment’s planning provisions.<sup>6</sup>

Congress has revised the 1972 Amendments several times,<sup>7</sup> including renaming the “Federal Water Pollution Control Act” the “Clean Water Act.”<sup>8</sup> However, the 1972 framework remains largely in place. Although that framework has enabled significant progress in reducing “point source” pollution, little has been done to reduce “nonpoint source” pollution.<sup>9</sup> Because most pollution produced by agricultural activities comes from nonpoint sources, little progress has been made in reducing agricultural pollution.

The exemption of nonpoint source pollution from the NPDES permit system did not result from a failure to appreciate the problem. Congress recognized that controlling nonpoint source pollution was required to achieve its water quality goals.<sup>10</sup> However, the problem’s magnitude in terms of the number and variety of nonpoint source pollution sources, the site-specific nature of such pollution, the lack of known control technologies, and the perception that many problems could be addressed only through land use controls, a traditional state role, required a different approach.<sup>11</sup> Consequently, Congress chose to address nonpoint source pollution primarily through the section 208 planning process.<sup>12</sup>

Although one congressional report described section 208 as “the most

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<sup>5</sup> Pub. L. No. 92-500, § 403, 86 Stat. 816, 880 (codified as amended at 33 U.S.C. § 1342 (1982 & Supp. V 1987)); *see infra* notes 89-98 and accompanying text.

<sup>6</sup> The principal provision addressing nonpoint source pollution is § 208, titled “Areawide Waste Treatment Management.” Pub. L. No. 92-500, § 208, 86 Stat. 816, 839 (codified as amended at 33 U.S.C. 1288 (1982 & Supp. V 1987)).

<sup>7</sup> *See* Pub. L. No. 100-4, 101 Stat. 7 (1987); Pub. L. No. 97-117, 95 Stat. 1623 (1981); Pub. L. No. 95-217, 91 Stat. 1566 (1977).

<sup>8</sup> *See* Pub. L. No. 95-217, sec. 2, § 518, 91 Stat. 1566, 1566 (1977).

<sup>9</sup> *See* S. REP. NO. 414, 92d Cong., 1st Sess. 39, *reprinted in* 1972 U.S. CODE CONG. & ADMIN. NEWS at 3705.

<sup>10</sup> *See id.*, *reprinted in* 1972 U.S. CODE CONG. & ADMIN. NEWS at 3705-06.

<sup>11</sup> *See id.*, *reprinted in* 1972 U.S. CODE CONG. & ADMIN. NEWS at 3707; V. NOVOTNY & G. CHESTERS, *HANDBOOK OF NONPOINT POLLUTION* 17 (1981); *see also* OFFICE OF WATER, U.S. ENVIRONMENTAL PROTECTION AGENCY, *NONPOINT SOURCES: AGENDA FOR THE FUTURE* 4 (1989) [hereafter *AGENDA FOR THE FUTURE*] (listing four reasons — different problems, different political science, different social science, and different science — why nonpoint source pollution requires different approaches than point source pollution).

<sup>12</sup> *See* 33 U.S.C. § 1288 (1982 & Supp. V 1987).

important aspect of a water pollution control strategy,"<sup>13</sup> the Environmental Protection Agency (EPA) concentrated its efforts on point source programs and was slow to implement the section.<sup>14</sup> In addition, inherent flaws in section 208,<sup>15</sup> the lack of effective enforcement sanctions and the reluctance of EPA to use those available,<sup>16</sup> and the intractable nature of the problem have combined to prevent progress in controlling nonpoint source pollution under section 208. Consequently, recognition of the problem's magnitude and the need for more effective approaches to resolve it have increased.<sup>17</sup>

As a result, in 1987 Congress added a new provision, section 319, to the Clean Water Act.<sup>18</sup> Section 319 is still in the initial implementation stages. It is too early to definitively determine its effectiveness in addressing nonpoint source pollution problems generally and agricultural pollution specifically. However, section 319, like section 208, continues to rely on state planning and implementation to control nonpoint source pollution. Therefore, this Article argues that section 319 will prove only marginally more effective than section 208. This Article examines the problem of nonpoint source pollution from agriculture. Section I describes the problem. Section II discusses physical and technical solutions to the problem, and Section III examines applicable federal law. Finally, Section IV makes observations and discusses policy considerations.

## I. THE PROBLEM

### A. *Extent of the Problem*

Nonpoint sources cause the predominant amount of pollution in sixty-five percent of streams and rivers in the United States not meeting

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<sup>13</sup> See H.R. REP. NO. 911, 92d Cong., 2d Sess. 95 (1972).

<sup>14</sup> See B. HOLMES, INSTITUTIONAL BASES FOR CONTROL OF NONPOINT SOURCE POLLUTION 18-22 (U.S. Environmental Protection Agency, 1979); Williams, *Soil Conservation and Water Pollution Control: The Muddy Record of the United States Department of Agriculture*, 7 B.C. ENVTL. AFF. L. REV. 365, 411-15 (1979).

<sup>15</sup> See Wilkins, *The Implementation of Water Pollution Control Measures — Section 208 of the Water Pollution Control Act Amendments*, 15 LAND & WATER L. REV. 479 (1980).

<sup>16</sup> See *infra* text accompanying notes 185-93.

<sup>17</sup> See Office of Water Program Operations, U.S. Environmental Protection Agency, Report to Congress: Nonpoint Source Pollution in the U.S. (1984) [hereafter Nonpoint Source Pollution].

<sup>18</sup> Pub. L. No. 100-4, § 319, 101 Stat. 7, 52 (1987) (codified at 33 U.S.C. § 1329 (Supp. V 1987)).

water quality standards.<sup>19</sup> In all but seventeen states, nonpoint sources exceed any other category of pollution in water quality impaired rivers and streams and account for more than ninety percent of the problem in five states.<sup>20</sup> Nonpoint sources cause the predominant pollution in seventy-six percent of lake acres not meeting water quality standards.<sup>21</sup> In all but eight states, nonpoint sources exceed any other category of pollution in water quality impaired lakes and cause one hundred percent of the problem in six states.<sup>22</sup> Nonpoint sources account for forty-five percent of impaired estuarine waters<sup>23</sup> and cause the predominant effects in nine of the sixteen states reporting impaired estuarine waters.<sup>24</sup>

Agriculture is the most pervasive cause of nonpoint source water quality problems.<sup>25</sup> More than forty-five states and territories list agriculture as a major cause of nonpoint source pollution.<sup>26</sup> Researchers report agriculture as the primary pollutant source for sixty-four percent of the affected river miles, fifty-seven percent of the affected lake acres, and nineteen percent of affected estuarine areas.<sup>27</sup>

Agriculture also plays a major role in the pollution of groundwater. Seventy-nine percent of the states and territories list agricultural activities as a source of groundwater contamination, and six states list it as the primary source.<sup>28</sup> The extensive use of groundwater for drinking water exacerbates groundwater pollution problems. Groundwater is the principal source of drinking water (fifty percent or greater) in sixty-eight percent of the states and territories and accounts for ninety percent or more of drinking water supplies in five states or territories.<sup>29</sup> In

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<sup>19</sup> OFFICE OF WATER, U.S. ENVIRONMENTAL PROTECTION AGENCY, NATIONAL WATER QUALITY INVENTORY, 1986 REPORT TO CONGRESS 20 [hereafter WATER QUALITY INVENTORY].

<sup>20</sup> *Id.* at 21, Table 2-4. The five states are Iowa, Missouri, Montana, Nebraska, and Wisconsin.

<sup>21</sup> *Id.* at 30.

<sup>22</sup> *Id.* at 31, Table 2-9. The six states in which nonpoint sources account for 100% of the problem are Iowa, Kansas, Mississippi, New Jersey, New Mexico, and West Virginia.

<sup>23</sup> *Id.* at 43.

<sup>24</sup> *Id.* at 43, Table 2-13.

<sup>25</sup> Nonpoint Source Pollution, *supra* note 17, at 2-6.

<sup>26</sup> WATER QUALITY INVENTORY, *supra* note 19, at 81, Figure 4-3.

<sup>27</sup> *Id.* at 82.

<sup>28</sup> *Id.* at 61. The six states are Arizona, Arkansas, California, Connecticut, Hawaii, and Iowa.

<sup>29</sup> *Id.* at 59. The five states or territories are Nevada, Hawaii, Mississippi, Florida, and the Northern Marianas.

addition, groundwater accounts for fifty-seven percent of the water used by rural livestock, forty-one percent of water used for irrigation, and twenty-five percent of water used by self-supplied industrial enterprises.<sup>30</sup> Furthermore, groundwater use is growing at nearly four percent annually, double the increase for surface water use.<sup>31</sup>

In sheer volume, sediment is the largest source of nonpoint source pollution. More than four billion tons of sediment are delivered annually to U.S. streams and rivers, and almost half of this amount originates from agricultural lands.<sup>32</sup>

Nutrients, principally nitrogen and phosphorus, from agricultural fertilizers are another major source of pollution. Each year, agricultural lands contribute over 6.8 million tons of nitrogen and 2.6 million tons of phosphorus to U.S. surface waters.<sup>33</sup> Furthermore, nitrate, a compound of nitrogen ( $\text{NO}_3$ ), is the most common contaminant identified in groundwater.<sup>34</sup> Seventy-five percent of the states and territories report that nitrates which originate from animal waste and the application of chemical fertilizers are major groundwater contaminants.<sup>35</sup>

Pesticides — herbicides, fungicides, insecticides, and rodenticides — represent another significant category of agricultural pollution. In 1984 twenty-three states listed pesticides as a priority agricultural pollution problem.<sup>36</sup> In addition, by 1985 seventeen different pesticides had been detected in groundwater,<sup>37</sup> and in 1986 sixty percent of the states identified pesticides as a major groundwater contaminant.<sup>38</sup>

Salts and minerals, carried into waters in irrigation return flows, constitute another major source of pollution in the western states. The Soil Conservation Service estimates that half of the ninety to one hundred million tons of salt delivered annually to streams comes from agriculture.<sup>39</sup> The Colorado River Basin and the San Joaquin Valley in

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<sup>30</sup> AGRICULTURAL LAW AND POLICY INSTITUTE, ISSUES BOOKLET NO. 1, FARMING & GROUNDWATER: AN INTRODUCTION 7 (1988) [hereafter FARMING & GROUNDWATER].

<sup>31</sup> *Id.*

<sup>32</sup> V. NOVOTNY & G. CHESTERS, *supra* note 11, at 8-9.

<sup>33</sup> Nonpoint Source Pollution, *supra* note 17, at 2-8.

<sup>34</sup> V. NOVOTNY & G. CHESTERS, *supra* note 11, at 287.

<sup>35</sup> WATER QUALITY INVENTORY, *supra* note 19, at 61, Table 3-3.

<sup>36</sup> Nonpoint Source Pollution, *supra* note 17, at 2-10, Table 2.1.

<sup>37</sup> OFFICE OF GROUNDWATER PROTECTION, U.S. ENVIRONMENTAL PROTECTION AGENCY, PESTICIDES IN GROUND WATER: BACKGROUND DOCUMENT 8 (1986) [hereafter PESTICIDES IN GROUND WATER].

<sup>38</sup> WATER QUALITY INVENTORY, *supra* note 19, at 61, Table 3-3.

<sup>39</sup> Nonpoint Source Pollution, *supra* note 17, at 2-9.

central California have particularly severe salt problems.<sup>40</sup> The level of dissolved salts in the lower Colorado River produced complaints from Mexico and eventually resulted in a series of international agreements to assure Mexico a specified water quality.<sup>41</sup> In addition to salt loading, dissolved minerals sometimes can create problems. An extreme example is the high selenium levels in the drainage water in certain parts of the San Joaquin Valley and in other irrigated areas of the West.<sup>42</sup>

### B. *Effects of Agricultural Pollution*

Sediment pollution has a variety of detrimental effects. It alters the aquatic environment by inhibiting penetration of sunlight, changing heat radiation, blanketing the bottom, and retaining organic materials and other substances.<sup>43</sup> Sediment blanketing harms bottom dwelling organisms and smothers fish eggs. It decreases sunlight and reduces the production of photosynthetic organisms that form the base of the food chain. In addition, the sediment's decaying organic material reduces dissolved oxygen, which is the primary parameter indicating the water's suitability for fish life.<sup>44</sup>

Sediment deposition reduces the storage or carrying capacity of lakes, rivers, reservoirs, and canals, which increases flood potential and the costs of dredging and power generation.<sup>45</sup> Sediment also raises the cost

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<sup>40</sup> See Young & Horner, *Irrigated Agriculture and Mineralized Water*, in AGRICULTURE AND THE ENVIRONMENT 77, 94-113 (T. Phipps, P. Crosson & K. Price eds. 1986) [hereafter AGRICULTURE AND THE ENVIRONMENT].

<sup>41</sup> See Minute No. 242, 69 U.S. DEPARTMENT OF STATE BULLETIN 395 (1973); Minute No. 241, 67 U.S. DEPARTMENT OF STATE BULLETIN 198 (1972); Minute No. 218, 52 U.S. DEPARTMENT OF STATE BULLETIN 556 (1965). The Colorado River Basin Salinity Control Act, 43 U.S.C. §§ 1571-1599 (1982 & Supp. V 1987), establishes a program, under the direction of the Secretary of Interior, to reduce salinity in the Colorado River. The program complies with the U.S. obligation primarily through construction of physical facilities. In addition, the seven states of the Colorado River basin (Colorado, New Mexico, Arizona, California, Nevada, Wyoming, and Utah) established the Colorado River Basin Salinity Control Forum in 1973 to coordinate efforts in managing the basin's salinity problem. See *Environmental Defense Fund v. Costle*, 657 F.2d 275, 281 & n.21 (D.C. Cir. 1981).

<sup>42</sup> The Department of Interior has identified high levels of selenium in 18 irrigation projects in the West. 16 Env't Rep. (BNA) 1627 (Dec. 20, 1985); see also *infra* note 61 and accompanying text.

<sup>43</sup> V. NOVOTNY & G. CHESTERS, *supra* note 11, at 35.

<sup>44</sup> *Id.* at 35-36.

<sup>45</sup> Phipps & Crosson, *Agriculture and the Environment: An Overview*, in AGRICULTURE AND THE ENVIRONMENT, *supra* note 40, at 3, 6.

of treating drinking water.<sup>46</sup> Surprisingly, sediment is also a substantial factor in the chemical pollution of water. Certain chemicals, such as phosphorus, have a strong affinity for soil particles and enter water primarily by attachment to sediment.<sup>47</sup>

Dollar estimates of the damage from sediment pollution are difficult to make. However, one study estimates annual off-farm costs from erosion at \$4.2 billion to \$16.9 billion.<sup>48</sup> Another writer suggests that the major social problem caused by soil erosion is off-site damage, principally in the form of water pollution, rather than on-site damage due to reduced farmland productivity.<sup>49</sup>

Agricultural water pollution stimulates eutrophication. Eutrophication occurs when decaying algae and other aquatic plants reduce the water's dissolved oxygen content.<sup>50</sup> Eutrophication reduces the fish population and gives water an unpleasant smell and taste.<sup>51</sup> The major catalysts for eutrophication come from excessive amounts of nutrients, especially phosphorus, which overstimulate the growth of algae and other aquatic plants.<sup>52</sup>

Agricultural water pollution also causes human health problems. The best known problem is methemoglobinemia in infants, caused by nitrates in drinking water. Methemoglobinemia, or "blue baby" syndrome, is a potentially fatal condition resulting from the blood's reduced ability to carry oxygen.<sup>53</sup> Researchers also have correlated high levels of nitrates in drinking water with increased cancer levels and other disorders.<sup>54</sup> In addition, many pesticides are associated with or suspected of causing cancer and various other conditions.<sup>55</sup> Furthermore, research has not determined the chronic effects from nitrate and

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<sup>46</sup> *Id.*

<sup>47</sup> *Id.*; V. NOVOTNY & G. CHESTERS, *supra* note 11, at 221.

<sup>48</sup> Crosson, *Soil Erosion and Policy Issues*, in AGRICULTURE AND THE ENVIRONMENT, *supra* note 40, at 35, 51 (citing work done by Clark, Haverkamp, and Chapman in 1985 at the Conservation Foundation).

<sup>49</sup> *See id.*

<sup>50</sup> Phipps & Crosson, *supra* note 45, at 6-7.

<sup>51</sup> *Id.* at 7.

<sup>52</sup> Although nitrogen also contributes to eutrophication, its role is secondary to that of phosphorus. *See* Keeney, *Transformations and Transport of Nitrogen*, in AGRICULTURAL MANAGEMENT AND WATER QUALITY 48, 60 (F. Schaller & G. Bailey eds. 1983).

<sup>53</sup> *See* FRESHWATER FOUNDATION, NITRATES & GROUNDWATER: A PUBLIC HEALTH CONCERN (1988). Nitrate pollution also can affect livestock, although the level required to produce toxicity is much higher. *See* Keeney, *supra* note 52, at 49.

<sup>54</sup> FARMING & GROUNDWATER, *supra* note 30, at 32.

<sup>55</sup> *Id.* at 32-33.

pesticide long-term exposure nor is much known about the synergistic effects from pesticide and fertilizer combinations.<sup>56</sup>

Besides biological and health programs, water pollution creates agricultural inefficiency. Nutrients and pesticides that pollute water represent the loss of valuable resources to the farmer. For example, half the nitrogen applied to fields does not reach the plants but enters streams and groundwater.<sup>57</sup> In fact, one writer concludes that the farmer's economic loss is the most significant concern of surface water nitrogen pollution.<sup>58</sup>

Dissolved salts from irrigation return flows reduce crop yields, require the substitution of less valuable salt-resistant crops, and require the application of more water at more frequent intervals.<sup>59</sup> In addition, dissolved salts and minerals increase the "hardness" of water, raising water treatment costs and reducing the useful lives of appliances and industrial equipment.<sup>60</sup> Dissolved minerals also can cause serious environmental and health problems. The most infamous example is the selenium pollution of the Kesterson Wildlife Refuge in California's San Joaquin Valley. The refuge, the terminus of an agricultural drain, received water heavily laden with selenium. The selenium, a natural mineral, had leached out of the soil during irrigation. The dissolved selenium produced deaths and serious reproductive defects in waterfowl. Ultimately, the U.S. Bureau of Reclamation closed the refuge, removed and disposed the tainted soils, and filled the drainage ponds, at great expense.<sup>61</sup>

## II. PHYSICAL AND TECHNICAL SOLUTIONS

The lack of progress in controlling agricultural water pollution does not result from lack of information. Scientists and farmers understand the problem reasonably well, and they know much about the techniques to control or eliminate various forms of agricultural water pollution. Thus, agricultural water pollution is less a technical problem than a social, political, economic, and legal one. The following brief discussion of pollution control techniques will help in understanding the social, political, economic, and legal issues that must be resolved to address the

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<sup>56</sup> *Id.* at 30-31.

<sup>57</sup> *Id.* at 17.

<sup>58</sup> See Keeney, *supra* note 52, at 61.

<sup>59</sup> See Young & Horner, *supra* note 40, at 98.

<sup>60</sup> *Id.* at 93-94, 99.

<sup>61</sup> See 15 *Env't Rep.* (BNA) 2014 (Mar. 22, 1985); see also 19 *Env't Rep.* (BNA) 369 (July 15, 1988); 15 *Env't Rep.* (BNA) 2130 (Apr. 5, 1985).

problem effectively.

Erosion produces sediment pollution. A wide variety of farming techniques such as conservation tillage,<sup>62</sup> crop rotation, terracing, contour planting, and the timing of agricultural operations can control erosion and reduce sediment loss.<sup>63</sup> Sediment management provides an alternative method to reduce sediment pollution. Management techniques involve intercepting the sediment before it reaches a watercourse by using vegetation strips, sediment traps, and detention basins.<sup>64</sup> Because unwanted nutrients and pesticides often attach to soil particles, reducing erosion also reduces pesticide and nutrient pollution.

Various farming practices can reduce or eliminate the use of pesticides and chemical fertilizers. These include crop rotation, accurate calculation of fertilizer needs, the adjustment of planting and harvesting times, the planting of pest resistant crops, and the use of biological controls and integrated pest management.<sup>65</sup> Alternative agriculture — farming methods that eliminate or greatly reduce the use of manufactured inputs, notably pesticides and fertilizers<sup>66</sup> — recently gained credibility from a National Research Council report. The National Research Council reported that alternative farming can be as competitive and productive as traditional farming.<sup>67</sup> The choice of pesticide, the method and time of application, and a variety of other choices also can reduce the amount of pesticide required for effective pest control and the amount of pesticide transported to water.<sup>68</sup>

In addition to reducing water demands, better water management and water conservation in irrigated areas can reduce pollution. Conservation techniques, such as lining ditches and using sprinkle and drip

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<sup>62</sup> The U.S. Department of Agriculture defines “conservation tillage” as “any tillage and planting system that keeps at least 30 percent of the soil surface covered by residue after planting.” U.S. DEP’T OF AGRICULTURE, A NATIONAL PROGRAM FOR SOIL AND WATER CONSERVATION: THE 1988-1997 UPDATE 25 (1989) [hereafter SOIL AND WATER CONSERVATION].

<sup>63</sup> For a discussion of various techniques and their effectiveness, see V. NOVOTNY & G. CHESTERS, *supra* note 11, at 446-55.

<sup>64</sup> *Id.* at 441, 468-69.

<sup>65</sup> See OFFICE OF GROUND WATER PROTECTION, U.S. ENVIRONMENTAL PROTECTION AGENCY, PROTECTING GROUND WATER: PESTICIDES AND AGRICULTURAL PRACTICES 29-37 (1988) [hereafter PROTECTING GROUND WATER]; V. NOVOTNY & G. CHESTERS, *supra* note 11, at 458.

<sup>66</sup> See SOIL AND WATER CONSERVATION, *supra* note 62, at 26.

<sup>67</sup> See generally NATIONAL RESEARCH COUNCIL, ALTERNATIVE AGRICULTURE 5-23, 195-96 (1989). The National Research Council is an arm of the National Academies of Science and Engineering.

<sup>68</sup> See PROTECTING GROUND WATER, *supra* note 65, at 20-28.

application systems, reduce sediment, fertilizer, and pesticide loading in the return water flows.<sup>69</sup> Sprinkle and drip application also can reduce water pooling caused by overapplication. These application methods diminish the leaching of soluble pesticides and fertilizers, such as nitrogen, into groundwater.<sup>70</sup> In addition, the timing of irrigation relative to pesticide application can reduce pesticide leaching.<sup>71</sup>

Land use plays a major role in agricultural water pollution. Consequently, restricting or eliminating certain kinds of activities in some areas may be the most effective way of preserving water quality. For example, prohibiting or restricting pesticide use in groundwater recharge areas or around wellheads may prevent pesticide leaching into groundwater. Also, because researchers estimate that ten percent of U.S. cropland accounts for fifty-four percent of soil loss due to sheet and rill erosion,<sup>72</sup> restricting agricultural activities in these highly erodible areas can substantially reduce sediment pollution. Similarly, the EPA has indicated that land conservancy along streams and rivers is an extremely effective way to enhance water quality.<sup>73</sup>

Treatment, a common technique for controlling point source pollution, might prove technically possible in a few cases involving nonpoint source pollution. An example would be the removal of pollutants from agricultural drains. Generally, however, treatment of nonpoint source pollution is impossible or impractical. For example, the EPA stated that currently no techniques exist for cleaning up groundwater contamination of large geographical areas.<sup>74</sup> Thus, the overall strategy for controlling nonpoint source pollution, including agricultural pollution, depends on prevention, not treatment.

Various factors affect agricultural nonpoint source pollution making uniform solutions difficult or impossible. For example, sediment delivery to streams depends on soil characteristics, slope, climate, and proximity to surface waters.<sup>75</sup> In addition, the pollution generated by agricultural activities relates to crop type, tillage practices, and other management factors.<sup>76</sup> A complex set of factors influence pesticide con-

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<sup>69</sup> See G. RADOSEVICH, WESTERN WATER LAWS AND IRRIGATION RETURN FLOWS 3 (U.S. Environmental Protection Agency No. 600/2-78-180, 1978); Shupe, *Waste in Western Water Law: A Blueprint for Change*, 61 OR. L. REV. 483, 514-16 (1982).

<sup>70</sup> See PROTECTING GROUND WATER, *supra* note 65, at 40.

<sup>71</sup> *Id.* at 41-42.

<sup>72</sup> Nonpoint Source Pollution, *supra* note 17, at 2-7.

<sup>73</sup> AGENDA FOR THE FUTURE, *supra* note 11, at 13.

<sup>74</sup> PESTICIDES IN GROUND WATER, *supra* note 37, at 4; *see also id.* at 30.

<sup>75</sup> Nonpoint Source Pollution, *supra* note 17, at 2-7.

<sup>76</sup> *Id.*

tamination in groundwater, including the physical and chemical characteristics of the pesticide, natural and man-made hydrological factors, soil characteristics, and the method of application.<sup>77</sup>

As with most matters, controlling agricultural water pollution involves tradeoffs. The use of one technique may exacerbate other pollution problems. Thus, conservation tillage used to reduce erosion often requires increased use of herbicides to control weeds.<sup>78</sup> Soil conservation techniques that reduce sediment loads of surface streams also may increase percolation of water into the ground; thereby increasing pesticide and nitrogen leaching into groundwater and surface water through subsurface discharges.<sup>79</sup> Furthermore, newer, less persistent pesticides, which have fewer long-term environmental impacts, are more likely to be water soluble and to leach into groundwater.<sup>80</sup>

Despite the foregoing, much remains to be learned about agricultural nonpoint source pollution. As noted, researchers know little about the long-term health effects from drinking water contaminated with low levels of pesticides and fertilizers. Preparing accurate cost-benefit calculations requires better knowledge of these effects. Similarly, there is much to learn about the transportation of some pollutants. Without this knowledge, assessing the effectiveness of various pollution control strategies is difficult. In addition, more research is needed to determine the most cost-efficient methods of controlling agricultural pollution. Nevertheless, government agencies, planners, and farmers certainly have sufficient knowledge to go forward with pollution control efforts.

### III. THE LAW

#### A. *The Clean Water Act*<sup>81</sup>

##### 1. The Point-Nonpoint Source Distinction

Important structural features of the Clean Water Act center on the distinction between "point source" and "nonpoint source" pollution. The Act defines a "point source" as: "any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, chan-

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<sup>77</sup> See PROTECTING GROUND WATER, *supra* note 65, at 6-13.

<sup>78</sup> *Id.* at 31. The EPA suggests, however, that this may be due to inexperience with conservation tillage. *Id.*

<sup>79</sup> B. CROWDER & E. YOUNG, MANAGING FARM NUTRIENTS: TRADEOFFS FOR SURFACE- AND GROUND-WATER QUALITY 2 (U.S. Dep't of Agriculture, Economic Report No. 583, 1988).

<sup>80</sup> Nonpoint Source Pollution, *supra* note 17, at 2-8.

<sup>81</sup> 33 U.S.C. §§ 1251-1387 (1982 & Supp. V 1987).

nel, 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.”<sup>82</sup>

The Act does not define “nonpoint source,” but theoretically this would include any water pollution not caused by a point source. In discussing the distinction, the EPA states that: “In practical terms, nonpoint source pollution does not result from a discharge at a specific, single location (such as a single pipe) but generally results from land runoff, precipitation, atmospheric deposition, or percolation.”<sup>83</sup> In general, nonpoint source pollution is generated by diffused land use activities, is discharged into waters by natural processes rather than being deliberately discharged, and is not susceptible to end-of-pipe treatment.<sup>84</sup>

Classifying a particular source of pollution as point or nonpoint is not always obvious.<sup>85</sup> In addition, legal or regulatory decisions have assigned some sources to one or the other category based on considerations other than the nature of the discharge.<sup>86</sup> For example, Congress has defined irrigation return flows as nonpoint sources of pollution.<sup>87</sup>

The Clean Water Act’s treatment of point and nonpoint source pollution differs in two major ways. First, the Act subjects point source pollution to the “epitome of command-and-control regulation.”<sup>88</sup> The Act provides that the discharge of pollutants from a point source is illegal without first obtaining a permit issued pursuant to the National Pollution Discharge Elimination System (NPDES).<sup>89</sup> The permit sets maximum discharge levels for various pollutants based on uniform national effluent limitations that reflect various levels of technological ca-

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<sup>82</sup> *Id.* § 1362(14).

<sup>83</sup> Office of Water, U.S. Environmental Protection Agency, Nonpoint Source Guidance 3 (1987) [hereafter Nonpoint Source Guidance].

<sup>84</sup> B. HOLMES, *supra* note 14, at 4.

<sup>85</sup> See 2 W. RODGERS, ENVIRONMENTAL LAW: AIR AND WATER § 4.10(B), at 148-50 (1986).

<sup>86</sup> Nonpoint Source Guidance, *supra* note 83, at 3.

<sup>87</sup> See *infra* notes 99-101 and accompanying text (discussing Congress’ decision in more detail).

<sup>88</sup> 2 W. RODGERS, *supra* note 85, § 4.26(A), at 374.

<sup>89</sup> Section 301 of the Clean Water Act provides that the “discharge of any pollutant” is unlawful except as otherwise provided in the Act. 33 U.S.C. § 1311(a) (1982). Section 502 defines “discharge of pollutants” as “any addition of any pollutant . . . from any *point source*,” thereby excluding nonpoint sources from the prohibition of § 301. 33 U.S.C. § 1362(12) (1986) (emphasis added). The major exception to the § 301 prohibition is found in § 402, 33 U.S.C. § 1342 (1982 & Supp. V 1987), the section establishing the National Pollution Discharge Elimination System.

pability.<sup>90</sup> The permit also establishes monitoring and reporting requirements and delineates the permittee's obligations.<sup>91</sup> On the other hand, the Act does not subject nonpoint source pollution to command and control regulation. While the newly adopted section 319<sup>92</sup> provides that the states will adopt regulations, where necessary, neither it nor section 208<sup>93</sup> directly regulate nonpoint source polluters. Furthermore, whether section 319 will achieve greater success than section 208 in inducing the states to regulate nonpoint source pollution remains an open question.

The second major difference in the Clean Water Act's treatment of point and nonpoint source pollution involves the level of federal participation. The federal government mandates and supervises the NPDES permit system. The EPA establishes national effluent limitations<sup>94</sup> and has initial responsibility for administering the NPDES permit system.<sup>95</sup> A state may assume administration of the permit system if it has an EPA approved program meeting established criteria,<sup>96</sup> but the EPA retains the authority to review and veto permits that do not comply with the Act.<sup>97</sup> The EPA may withdraw certification if it determines that the state is not administering the program properly.<sup>98</sup> In contrast, the federal government leaves the control of nonpoint source pollution largely to the states. Sections 208 and 319 direct the states to take certain steps to address nonpoint source pollution, but the states determine the nature of those steps. Further, the Act provides limited sanctions that the federal government may impose on the states for failure to take the required steps, and notably, the Act does not include federal take-over of the program.

In practical effect, the Act's distinction between point and nonpoint

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<sup>90</sup> See Clean Water Act § 301(b), 33 U.S.C. § 1311(b) (1982 & Supp. V 1987); *id.* § 306, 33 U.S.C. § 1316 (1982); *id.* § 307, 33 U.S.C. § 1317 (1982 & Supp. V 1987). See generally 2 W. RODGERS, *supra* note 85, § 4.29(A). In contrast to the use of technology derived effluent limitations, the Clean Water Act § 302, 33 U.S.C. § 1312 (1982 & Supp. V 1987), provides for the imposition of "water quality related effluent limitations" based on uses to be made of receiving waters rather than technological considerations. However, § 302 limitations are intended only as a backup to be applied when technology based limitations will not produce the desired water quality.

<sup>91</sup> See Clean Water Act § 402(a)(2), 33 U.S.C. § 1342(a)(2) (1982).

<sup>92</sup> 33 U.S.C. § 1329 (Supp. V 1987).

<sup>93</sup> *Id.* § 1288 (1982 & Supp. V 1987).

<sup>94</sup> See *supra* note 90 and accompanying text.

<sup>95</sup> Clean Water Act § 402(a), 33 U.S.C. § 1342(a) (1982 & Supp. V 1987).

<sup>96</sup> *Id.* § 402(b), 33 U.S.C. § 1342(b) (1982).

<sup>97</sup> *Id.* § 402(d)(2), 33 U.S.C. § 1342(d)(2) (1982).

<sup>98</sup> *Id.* § 402(c)(3), 33 U.S.C. § 1342(c)(3) (1982).

source pollution creates dramatic differences. The Clean Water Act subjects point source pollution to direct, reasonably aggressive, and reasonably effective federal regulation. In contrast, the Act leaves nonpoint source pollution primarily to the states, with the federal role being indirect, almost passive, and largely ineffective.

Except for pollution from a "concentrated animal feeding operation," which the definition of point source pollution expressly includes, most water pollution generated by agricultural activities is nonpoint source. For example, irrigation return flows discharged through ditches, pipes, or channels could meet the general point source definition. Nevertheless, the EPA initially exempted these return flows from less than 3,000 acres and from several other categories of point source pollution. The EPA reasoned that the exempted sources were not susceptible to end-of-pipe treatment and that issuing permits for the large number of discharges from these sources would prove administratively unworkable. In 1975 a federal court held that the EPA had exceeded its authority in creating the exemption,<sup>99</sup> and the EPA amended its regulations to include irrigation return flows in the permit program. Congress then amended the point source definition to exclude "return flows from irrigated agriculture."<sup>100</sup> In addition, Congress amended section 402 to prohibit the EPA from requiring a permit for discharges "composed entirely of return flows from irrigated agriculture."<sup>101</sup>

## 2. Groundwater Pollution

The Clean Water Act has only limited application to groundwater. The jurisdiction of the Act reaches only to discharges of pollution to "navigable waters."<sup>102</sup> The Act defines "navigable waters" as "waters of the United States."<sup>103</sup> As Congress apparently intended,<sup>104</sup> both the

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<sup>99</sup> National Resources Defense Council v. Train, 396 F. Supp. 1393 (D.D.C. 1975), *aff'd sub nom.* National Resources Defense Council v. Costle, 568 F.2d 1369 (D.C. Cir. 1977).

<sup>100</sup> Pub. L. No. 95-217, § 33(b), 91 Stat. 1577 (1977). The definition was further amended in 1987 to exclude "agricultural stormwater discharges." Pub. L. No. 100-4, § 503, 101 Stat. 75 (1987). These changes are codified at 33 U.S.C. § 1362(14) (1982 & Supp. V 1987).

<sup>101</sup> Pub. L. No. 95-217, § 33(c), 91 Stat. 1577 (1977) (codified at 33 U.S.C. § 1342(l) (1982 & Supp. V 1987)).

<sup>102</sup> Section 502(12) of the Act defines "discharge of a pollutant" as "any addition of any pollutant to *navigable waters*." 33 U.S.C. § 1362(12) (1982) (emphasis added).

<sup>103</sup> Clean Water Act § 502(7), 33 U.S.C. § 1362(7) (1982).

<sup>104</sup> See JOINT CONF. REP. NO. 1236, 92d Cong., 2d Sess. 144, *reprinted in* 1972 U.S. CODE CONG. & ADMIN. NEWS 3776, 3822 (stating that "[t]he conferees fully

EPA and the Army Corps of Engineers<sup>105</sup> have interpreted “waters of the United States” expansively, extending the Act’s jurisdiction to almost all waters that the federal government could constitutionally regulate.<sup>106</sup> In spite of broad interpretation, case law indicates that “navigable waters” does not include groundwater,<sup>107</sup> and federal agencies have made no attempt to directly regulate discharges to groundwater under the Clean Water Act.<sup>108</sup>

Despite the Clean Water Act’s general inapplicability to groundwater, sections 208 and 319 — the primary provisions addressing nonpoint source pollution — specifically refer to groundwater. Section 208(b)(2)(K), dealing with the content of 208 plans, states that these plans must contain “a process to control the disposal of pollutants on land or in subsurface excavations . . . to protect *ground* and surface water quality.”<sup>109</sup> Section 319(b)(2)(A) requires that state management plans submitted under that section identify “best management practices and measures which will be undertaken to reduce pollutant loadings . . . taking into account the impact of the practice on *ground water* quality.”<sup>110</sup> Section 319(i) provides for grants to assist states in carrying out *ground water* quality protection activities.<sup>111</sup> In addition, the EPA has indicated that state assessment reports submitted under section 319

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intend that the term ‘navigable water’ be given the broadest possible constitutional interpretation”).

<sup>105</sup> The Army Corps of Engineers administers § 404 of the Clean Water Act, 33 U.S.C. § 1344 (1982 & Supp. V 1987), which regulates the discharge of “dredged or fill material” into waters.

<sup>106</sup> See 33 C.F.R. § 323.2 (1989); 40 C.F.R. § 122.2 (1989). Initially, it took some prodding to get the Army Corps of Engineers to exercise its full jurisdiction. See *Natural Resources Defense Council v. Callaway*, 392 F. Supp. 685 (D.D.C. 1975). The extreme limit may have been approached in a Corps of Engineers regulation, upheld by the United States Supreme Court, which includes “wetlands.” See *United States v. Riverside Bayview Homes, Inc.*, 474 U.S. 121 (1985).

<sup>107</sup> See *Exxon Corp. v. Train*, 554 F.2d 1310 (5th Cir. 1977); *Kelley v. United States*, 618 F. Supp. 1103 (W.D. Mich. 1985). The issue is not free from doubt, however. See 2 W. RODGERS, *supra* note 85, § 4.8(A), at 112-15.

<sup>108</sup> In *Exxon*, 554 F.2d at 1318, the EPA disclaimed jurisdiction to regulate subsurface discharges directly. Discharges into groundwater that migrate into surface water are probably within the jurisdiction of the Act. See 2 W. RODGERS, *supra* note 85, § 4.8(A), at 112-15. However, the court in *Kelley*, 618 F. Supp. at 1107, held to the contrary.

<sup>109</sup> 33 U.S.C. § 1288(b)(2)(K) (1982) (emphasis added); see also 40 C.F.R. § 130.6(c)(9) (1988) (stating that state may develop groundwater plan if necessary to address groundwater quality problem).

<sup>110</sup> 33 U.S.C. § 1329(b)(2)(A) (Supp. V 1987) (emphasis added).

<sup>111</sup> *Id.* § 1329(i).

should include information on groundwater problems caused by nonpoint sources.<sup>112</sup>

### 3. Nonpoint Source Provisions — Sections 208 and 319.<sup>113</sup>

Section 208 reflects Congress' realization that the application of technology-driven effluent limitations applied through a mandatory NPDES permit system will not remedy all water pollution problems. Congress felt some pollution problems, including nonpoint source pollution, could be better addressed through regional planning and management. A major purpose of section 208 was to induce the states to develop new regional institutions that would undertake the required planning and management.<sup>114</sup> Apart from the purpose of inducing development of new institutions, section 208 essentially directs the states to identify and develop solutions for their nonpoint source pollution problems. Although section 319, enacted in 1987, has abandoned the attempt to induce the states to develop new regional institutions, it does direct the states to identify their problems and to develop plans for their management.

Section 208 requires each state governor to identify areas that have "substantial water quality control problems."<sup>115</sup> The governor then designates a "single representative organization, including elected officials from local governments or their designees,"<sup>116</sup> to develop a "continuing areawide waste treatment management process"<sup>117</sup> for each

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<sup>112</sup> Nonpoint Source Guidance, *supra* note 83, at 6.

<sup>113</sup> Two other planning provisions require brief mention because of their theoretical application for nonpoint source pollution and their relationship to § 208 and § 319. Section 303(e), 33 U.S.C. § 1313(e) (1982), requires each state to have a statewide "continuing planning process." Section 303(e) specifies that the statewide plans must incorporate all elements of applicable § 208 plans. The EPA has merged § 208 and § 303(e) requirements under a single regulatory heading called "Water Quality Planning and Management." See 40 C.F.R. §§ 130.0-.15 (1988). For a discussion of the integration of § 208 and § 303 requirements, see R. BECK & C. GOPLERUD, 3 WATERS AND WATER RIGHTS § 234.4 (3d ed. 1988). The other provision, § 209, 33 U.S.C. § 1289 (1982), which calls for national river basin planning, has never had much impact because of political factors. See 2 W. RODGERS, *supra* note 85, § 4.21(B), at 308-10.

<sup>114</sup> See S. REP. NO. 414, 92d Cong., 1st Sess. 36-40, reprinted in 1972 U.S. CODE CONG. & ADMIN. NEWS 3668, 3702-06; see also S. REP. NO. 370, 95th Cong., 1st Sess. 10, reprinted in 1977 U.S. CODE CONG. & ADMIN. NEWS 4326, 4336 (describing § 208 as "the 1972 act's laboratory for new institutional control mechanisms for vexing nonpoint source problems").

<sup>115</sup> 33 U.S.C. § 1288(a)(2) (1982).

<sup>116</sup> *Id.*

<sup>117</sup> *Id.* § 1288(b)(1)(A). The state has planning responsibility for all undesignated

identified area. Each section 208 plan focuses on two primary areas: (1) future municipal and industrial waste treatment needs, including funding, location, construction, and operation of waste treatment facilities; and (2) identification and control of nonpoint source pollution.<sup>118</sup> After completion of a plan, the governor must designate one or more agencies or political subdivisions to implement the plan.<sup>119</sup> EPA must approve the plans and various designations pursuant to standards set out in the section.<sup>120</sup>

Section 208 plans must contain processes to identify various forms of nonpoint source pollution, and procedures and methods to control such sources.<sup>121</sup> The section specifically requires the plans to address agriculturally related nonpoint source pollution.<sup>122</sup> Although a state presumably is free to use any effective methods to control nonpoint source pollution, section 208 specifically mentions land use requirements as a control mechanism.<sup>123</sup>

Section 319 provides two principal devices that further address nonpoint source pollution: assessment reports and management programs. The section requires that each state submit an assessment report to EPA which, (1) identifies water that cannot meet or maintain water quality standards without additional nonpoint source pollution control; (2) identifies categories, subcategories, and individual nonpoint sources that add significant pollution to the waters not meeting water quality standards; (3) describes processes to identify best management practices and measures to control the nonpoint source pollution sources identified in the prior step; and (4) identifies state and local programs for controlling nonpoint source pollution.<sup>124</sup>

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areas of the state. *Id.* § 1288(a)(6); *Natural Resources Defense Council v. Train*, 396 F. Supp. 1386 (D.D.C. 1975), *aff'd sub nom. Natural Resources Defense Council v. Costle*, 564 F.2d 573 (D.C. Cir. 1977).

<sup>118</sup> 33 U.S.C. § 1288(b)(2) (1982).

<sup>119</sup> *Id.* § 1288(c)(1).

<sup>120</sup> *Id.* § 1288(a)(7), (b)(3), (c)(2).

<sup>121</sup> *Id.* § 1288(b)(2)(F)-(K).

<sup>122</sup> *Id.* § 1288(b)(2)(F).

<sup>123</sup> *Id.* § 1288(b)(2)(F)-(H).

<sup>124</sup> *Id.* § 1329(a)(1) (Supp. V 1987). In addition to new provisions regarding nonpoint source pollution, the Water Quality Act of 1987, Pub. L. 100-4, 101 Stat. 7, imposed new requirements with regard to toxics, clean lakes, and estuaries. The EPA has recommended that the states satisfy all their Water Quality Act requirements through a "Water Quality Strategy," which the EPA describes as "an open and integrated three stage process of waterbody/resources assessment, water resource targeting, and strategic management planning." Office of Water, U.S. Environmental Protection Agency, *State Clean Water Strategies: Meeting the Challenges of the Future 3* (1987)

Section 319 also requires each state to submit a management plan for controlling nonpoint source pollution to the EPA. The plan must cover the four fiscal years after its submission and must: (1) identify best management practices and measures that will be undertaken to reduce nonpoint source pollution, (2) identify programs for implementation of best management practices, (3) provide an implementation schedule containing annual milestones, (4) provide a certification that the state has or will seek adequate legal authority to implement its program, (5) identify funding sources for implementation, and (6) identify federal assistance programs and development projects for which the state will review individual applications to determine consistency with its management program.<sup>125</sup> The section also indicates that states shall develop management programs established separately for each watershed, to the maximum extent possible.<sup>126</sup>

The EPA shall approve or disapprove the assessment reports and management plans within 180 days of submission.<sup>127</sup> Section 319 establishes no criteria for disapproval of the assessment report.<sup>128</sup> However, the section does provide that the EPA shall disapprove the management program if the program does not meet the section's requirements or if it appears inadequate to reduce nonpoint source pollution.<sup>129</sup> In states where the EPA has disapproved the management program in whole or in part, the state has an additional three months to make modifications to obtain approval.<sup>130</sup> Although only a handful of states met the August 4, 1989 deadline for submitting assessment reports and management plans, most states have since responded. The EPA has either reviewed or is in the process of reviewing these submissions.<sup>131</sup> Since January 1,

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[hereafter State Clean Water Strategies].

<sup>125</sup> 33 U.S.C. § 1329(b)(1)-(2) (Supp. V 1987).

<sup>126</sup> *Id.* § 1329(b)(4).

<sup>127</sup> *Id.* § 1329(d)(1). Review and approval of the assessment reports and management plans were delegated to the EPA Regions. OFFICE OF WATER, U.S. ENVIRONMENTAL PROTECTION AGENCY, A REPORT TO THE CONGRESS: ACTIVITIES AND PROGRAMS IMPLEMENTED UNDER SECTION 319 OF THE CLEAN WATER ACT — FISCAL YEAR 1988, at 15 (1989) [hereafter ACTIVITIES AND PROGRAMS].

<sup>128</sup> The EPA developed a document to guide the states in preparing assessment reports and management programs. *See* Nonpoint Source Guidance, *supra* note 83, at 8-10 (1987). The document indicates that the reports must make the identifications and provide the information required by § 319(a). *Id.*

<sup>129</sup> 33 U.S.C. § 1329(d)(2) (Supp. V 1987); *see also* Nonpoint Source Guidance, *supra* note 83, at 16-17 (stating EPA criteria for evaluating state's management program).

<sup>130</sup> 33 U.S.C. § 1329(d)(2) (Supp. V 1987).

<sup>131</sup> Nine states and one territory submitted final assessment reports by the statutory

1988, section 319 requires the EPA to submit to Congress annual reports on activities and programs implemented under section 319 and on progress made in reducing nonpoint source pollution.<sup>132</sup> By January 1, 1990, the EPA must have prepared a final report describing the state programs being implemented, the progress made, and identifying further actions and recommendations for controlling nonpoint source pollution.<sup>133</sup>

#### 4. Best Management Practices

The 1972 Amendments did not mention "best management practices." The term first appeared undefined in the Act's 1977 Amendments.<sup>134</sup> Although incorporated as a prime component of section 319 and adopted as a major administrative strategy even prior to section 319, the term remains statutorily undefined.<sup>135</sup> In connection with nonpoint source pollution, EPA water quality regulations define best management practices (BMPs) as:

Methods, measures or practices selected by an agency to meet its nonpoint source control needs. BMPs include but are not limited to structural and nonstructural controls and operation and maintenance procedures. BMPs can be applied before, during and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters.<sup>136</sup>

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deadline. Five states and one territory submitted final management programs by the statutory deadline. *ACTIVITIES AND PROGRAMS*, *supra* note 127, at 1. As of August 11, 1989, 56 states and territories submitted draft or final assessment reports. The EPA approved 46 reports and took no action on 10. Fifty-five states and territories submitted draft or final management programs. The EPA approved 13 reports in full, 9 in part, disapproved 1, and took no action on 33. U.S. Environmental Protection Agency, Section 319 Status Report (Aug. 11, 1989).

<sup>132</sup> 33 U.S.C. § 1329(m) (Supp. V 1987).

<sup>133</sup> *Id.* § 1329(m)(2). Because most states were delayed in implementing § 319 requirements, the EPA indicated that the final report probably would not be as complete as Congress envisioned. *See ACTIVITIES AND PROGRAMS*, *supra* note 127, at 39.

<sup>134</sup> *See* Clean Water Act, Pub. L. No. 95-217, sec. 34, § 208(b)(4)(B), sec. 35, § 208(j), 91 Stat. 1577, 1579 (1977) (codified as amended at 33 U.S.C. § 1288(b)(4)(B), (j) (1982 & Supp. V 1987)). "Best management practices" is an "administrative creation." 2 W. RODGERS, *supra* note 85, § 4.21, at 316.

<sup>135</sup> Congress apparently prefers to leave the term undefined so as not to "limit the States' flexibility and perhaps undercut existing programs in which best management practices (BMPs) already are being implemented." S. REP. NO. 282, 98th Cong., 1st Sess. 7 (1983).

<sup>136</sup> 40 C.F.R. § 130.2(m) (1989). Best management practices are also used in connection with the control of point source pollution. *See* 33 U.S.C. § 1314(e) (1982). For this purpose, the regulations state that best management practices "means schedules of activities, prohibitions of practices, maintenance procedures, and other management

In a manner particularly appropriate for this Article, one Congressional report states:

The term [BMP] encompasses a broad array of management practices that can be undertaken, alone or in combination, to reduce nonpoint sources of pollution. For example, in soil conservation programs over forty BMP's have been identified, including conservation tillage, grassed waterways, cover crops, undisturbed field perimeters near waterways, and terracing. The selection of the appropriate BMP's in a particular instance would depend upon soil type, topography, desired crop, costs of implementation, and other factors. Simple and cost-free changes in agricultural practices, such as careful scheduling and application of fertilizer and pesticides, may reduce runoff of these pollutants, thereby resulting in cost savings to the farmer.<sup>137</sup>

The foregoing quote clearly suggests that most of the techniques discussed in Section II might apply as best management practices in appropriate cases.<sup>138</sup> The quote also illustrates the fact-specific nature of best management practices which has made the concept so attractive in regard to nonpoint source pollution control.

In its 1984 report on nonpoint source pollution, the EPA identified five general considerations which will determine the selection of best management practices for a specific site: (1) environmental considerations (such as climate and nature of the water body), (2) land considerations (such as slope and soil characteristics), (3) effectiveness, (4) cost considerations, and (5) implementation considerations (such as acceptability and need for training).<sup>139</sup> Also noteworthy is the term's general vagueness. One environmental law expert suggested that this allows the term to mean all things to all people, and as with many successful slogans, accounts for much of its popularity.<sup>140</sup>

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practices to prevent or reduce pollution of 'waters of the United States.' BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage." 40 C.F.R. § 122.2 (1989); *see also* 7 C.F.R. § 634.5(i) (1989) (defining best management practices in connection with USDA's Rural Clean Water Program as "[a] single practice or a system of practices . . . that reduces or prevents agricultural nonpoint source pollution to improve water quality").

<sup>137</sup> S. No. 282, 98th Cong., 1st Sess. 7 (1983).

<sup>138</sup> For an extensive listing of agricultural best management practices, *see* R. BECK & C. GOPLERUD, *supra* note 113, app. IV.

<sup>139</sup> Nonpoint Source Pollution, *supra* note 17, at 2-3 to 2-4.

<sup>140</sup> 2 W. RODGERS, *supra* note 85, § 4.22(C).

### B. Other Laws

#### 1. Safe Drinking Water Act (SDWA)<sup>141</sup>

The SDWA establishes four major programs: (1) national drinking water regulations to set and enforce primary drinking water standards in public water systems, (2) regulation of underground injection wells, (3) protection of "sole source aquifers," and (4) wellhead protection area plans. Only two of these, the sole source aquifer program and the wellhead protection area program, have significant applicability to agricultural nonpoint source pollution.

SDWA describes "sole source aquifer" as that "which is the sole or principal drinking water source for the area and which, if contaminated, would create a significant health hazard."<sup>142</sup> The SDWA provides that federal assistance must be withheld from any project that may contaminate a sole source aquifer through a recharge zone so as to create a significant hazard to public health.<sup>143</sup> State and local governments also may apply for matching grants to develop and implement demonstration programs to protect "critical aquifer protection areas."<sup>144</sup>

Under the well protection area program, the SDWA required that each state adopt and submit to the EPA a wellhead protection area program by June 19, 1989.<sup>145</sup> SDWA defines a "wellhead protection area" as the "surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield."<sup>146</sup> The federal government provides matching grants of fifty to ninety percent to develop and implement wellhead protection programs to states having approved programs.<sup>147</sup> The only penalty for failure to develop an approved program is ineligibility for the matching federal funds.<sup>148</sup>

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<sup>141</sup> 42 U.S.C. §§ 300f to 300j-11 (1982 & Supp. V 1987).

<sup>142</sup> *Id.* § 300h-3(e) (1982).

<sup>143</sup> *Id.*

<sup>144</sup> *Id.* § 300h-6.

<sup>145</sup> *Id.* § 300h-7(a).

<sup>146</sup> *Id.* § 300h-7(e).

<sup>147</sup> *Id.* § 300h-7(k) (Supp. V 1987).

<sup>148</sup> H.R. REP. NO. 575, 99th Cong., 2d Sess. 45 (1986).

2. The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)<sup>149</sup>

FIFRA prohibits the distribution and sale of pesticides not registered with the EPA.<sup>150</sup> The EPA will register a pesticide if it is effective and performs its intended function without “unreasonable adverse effects on the environment.”<sup>151</sup> The registration data includes consideration of the pesticide’s leaching characteristics.<sup>152</sup> A pesticide may be registered for general or restricted use. Pesticides registered for restricted use generally may be applied only by a certified applicator in accordance with EPA restrictions.<sup>153</sup> There are criminal and civil penalties for violation of FIFRA.

3. The Conservation Reserve Program<sup>154</sup>

The Conservation Reserve Program, enacted as part of the Food Security Act of 1985, authorizes the Secretary of Agriculture to enter into ten to fifteen year contracts with farmers to take out of production lands that are highly erodible or that “pose an off-farm environmental threat.”<sup>155</sup> The farmer must convert the land to less intensive uses such as pasture, permanent grass, legumes, forbs, shrubs, or trees, in accordance with an approved plan. In addition, the farmer must agree not to use the lands for agricultural purposes except as permitted by the Secretary.<sup>156</sup>

4. The “Sodbuster” Program<sup>157</sup>

The Sodbuster Program denies price support payments and other forms of federal financial assistance to persons who farm highly erodible lands.<sup>158</sup> Lands in production between 1981 and 1985 were exempt until 1990. After 1990, exemptions will continue for highly erodible lands if the farmer actively is applying an approved soil conservation program on the lands and is in compliance with the plan by 1995.<sup>159</sup>

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<sup>149</sup> 7 U.S.C. §§ 136-136y (1988).

<sup>150</sup> *Id.* § 136a.

<sup>151</sup> *Id.* § 136a(c)(5).

<sup>152</sup> PESTICIDES IN GROUND WATER, *supra* note 37, at 11.

<sup>153</sup> *See* 7 U.S.C. §§ 136a(d), 136j(a)(2)(F)-(G) (1988).

<sup>154</sup> 16 U.S.C. §§ 3831-3836 (1988).

<sup>155</sup> *Id.* § 3831.

<sup>156</sup> *Id.* § 3832.

<sup>157</sup> *Id.* §§ 3811-3812.

<sup>158</sup> *Id.* § 3811.

<sup>159</sup> *Id.* § 3812.

#### IV. POLICY CONSIDERATIONS AND OBSERVATIONS

This Section explores a number of policy considerations that relate to agricultural nonpoint source pollution. In some cases, these considerations have been addressed by the relevant law. In others, Congress has not adequately come to grips with issues that must be resolved to achieve an effective nonpoint source pollution program.

##### A. *The Role of Cost-Benefit Considerations*

The Clean Water Act is somewhat schizophrenic regarding the relationship between economic costs and water quality benefits. On the one hand, the Act establishes a 1985 goal to eliminate the discharge of pollutants and a 1983 interim goal to achieve water quality sufficient to protect fish, shellfish, wildlife, and recreation in and on the water.<sup>160</sup> These goals suggest that clean water is a virtue in itself without regard to the costs or benefits of achieving it. Similarly, the Act requires the states to establish water quality standards for each body of water based on desired uses without regard to the cost of meeting those standards.<sup>161</sup>

On the other hand, the Act considers economic factors (although not a true cost-benefit calculation) in setting the technology-based effluent limitations that provide the Act's primary enforcement mechanism for point source pollution.<sup>162</sup> Even section 302 of the Act, which requires applying more stringent effluent limitations where necessary to achieve the Act's 1983 fishable and swimmable waters goal, exempts individuals who show that the economic and social costs do not reasonably relate to the benefits obtained.<sup>163</sup>

The Clean Water Act does not indicate what role, if any, economic

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<sup>160</sup> Clean Water Act § 101(a)(1)-(2), 33 U.S.C. § 1251(a)(1)-(2) (1982). Neither goal has been met. The 1985 goal declaring that it is not acceptable to use waterways to dispose of waste seems more like a philosophical statement than a realistic goal.

<sup>161</sup> *Id.* § 303(c), 33 U.S.C. § 1313(c) (1982 & Supp. V 1987); 40 C.F.R. § 130.3 (1989).

<sup>162</sup> 33 U.S.C. §§ 1314(b)(1)(B), (b)(2)(B), (b)(3), (b)(4)(B), 1316(b)(1)(B) (1982); see also 2 W. RODGERS, *supra* note 85, § 4.29(A)(1), (B).

<sup>163</sup> 33 U.S.C. § 1312(b)(2)(A) (Supp. V 1987). Water quality derived effluent limitations are an exception to this pattern. Pursuant to Clean Water Act §§ 303(d), 301(b)(1)(C), 33 U.S.C. §§ 1313(d), 1311(b)(1)(C) (1982), the states must apply more stringent water quality derived effluent limitations when the application of the usual technology-based effluent limitations are not sufficient to achieve compliance with water quality standards. Water quality derived effluent limitations are applied without regard to cost considerations. For a discussion of this complex process, see R. BECK & C. GOPLERUD, *supra* note 113, § 231.2(A). It is perhaps not surprising that § 303 limitations have not been widely enforced. See 2 W. RODGERS, *supra* note 85, § 4.18.

considerations have in controlling nonpoint source pollution. The difference in the Act's approach to point and nonpoint source pollution explains this. For point source pollution, the Act mandates a comprehensive program with very specific controls, and understandably, specifies the role of economic factors in implementing those controls. For nonpoint source pollution, the Act mandates no particular program. Instead, it directs each state to develop a program. Because the Act has left the content of these state programs undefined, the Act, not surprisingly, also has failed to specify the role of economic considerations.

Nevertheless, economic factors surely must be considered in the attack on nonpoint source pollution. With regard to point source pollution, the absolutes expressed by the Act's goals were abandoned in practice because Congress recognized the societal value in the activities producing point source pollution. Thus, society would have to tolerate some pollution. The activities that produce nonpoint source pollution, particularly agriculture, are similarly valuable. Some balance must be struck between the need to reduce nonpoint source pollution and the cost which reduction will impose on these activities. This does not mean that every dollar of expenditure must show a dollar of benefit. The difficulty of putting dollar values on environmental, aesthetic, recreational, health, and other benefits of clean water argues against using a strict cost-benefit requirement. When the costs become too excessive in relation to the perceived benefits, however, the popular and political support required to make the program effective will certainly evaporate.

Applying an economic calculus to nonpoint source pollution control raises some unique problems. An underlying premise of point source pollution control is that a particular type of industrial process is essentially the same whether conducted in California, Illinois, or New Jersey. Thus, in setting effluent limitations for a particular type of industrial process, the EPA needs to consider the economic effect on only that type of process. On the other hand, farming and other activities that generate nonpoint source pollution are much less homogeneous. The amount of pollution produced by the activity and the cost of producing a particular level of reduction depends heavily on location. This suggests that cost considerations used in setting nonpoint source pollution controls must be more responsive to individual circumstances than those applied in controlling point source pollution.

At the same time, states need some assurance that all the states will expend a roughly equal financial effort to control nonpoint source pollution. One of Congress' great advances in the 1972 Water Pollution Control Act Amendments was the development of national effluent lim-

itations. National limitations assured each state that its industries were not put at a competitive disadvantage. Similarly, whether a state chooses to vigorously and effectively attack nonpoint source pollution by spending tax dollars and imposing regulatory controls, such as land use planning and mandatory best management practices, may depend on the state's knowledge that other states will incur similar costs.

Finding the proper balance between responsiveness to individual circumstances and uniformity of effort has difficulties. A standard too responsive to individual circumstances may not produce an acceptable level of water quality in cases where the situation requires extensive and expensive efforts. A standard leaning too far toward uniformity may prove unworkable because of the disparate and excessive costs it imposes. One solution, although presently unlikely, would require greater availability of federal dollars to even the playing field.

In its 1984 report to Congress, the EPA suggested that the key to nonpoint source pollution control was effective "targeting" of priority water bodies where nonpoint source control strategies will yield significant results and where abatement activities will provide the greatest improvement for the least cost.<sup>164</sup> Similarly, in a 1987 document encouraging the states to adopt "clean water strategies" to meet the Water Quality Act of 1987, including section 319 nonpoint source pollution provisions, the EPA again emphasized "targeting" to maximize benefits.<sup>165</sup> Although these statements demonstrate that the EPA recognizes the role economic considerations have in designing nonpoint source pollution control programs, the statements address cost effectiveness, not cost-benefit concerns. While persons may not quarrel that dollars should be spent where they achieve the greatest "bang for the buck," this notion does not disclose how many actual dollars to spend. Perhaps it is too early in the nonpoint source pollution control effort to worry about these matters. Ultimately, however, the answers to these questions will determine the level of nonpoint source pollution reduction achieved. And, without some answers, very little will be achieved.

Groundwater issues most likely will concern how to determine the appropriate level of protection. The level of protection adopted, usually described as water quality standards, indirectly states pollution control benefits and is central to cost-benefit. Unlike surface water, federal law does not mandate state adoption of groundwater quality standards. As efforts to reduce groundwater pollution intensify, the debate will probably center on whether to adopt a uniform standard (typically a

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<sup>164</sup> Nonpoint Source Pollution, *supra* note 17, at 2-1.

<sup>165</sup> State Clean Water Strategies, *supra* note 124, at 5-7.

nondegradation standard) applicable to all groundwater or a protection system based on aquifer classifications.

In 1984, the EPA rejected the notion of uniform protection in favor of a classification scheme based on an aquifer's actual or potential beneficial uses.<sup>166</sup> The EPA established three classes of groundwater. Class I, or special groundwater, is groundwater in need of special protective measures because it is highly vulnerable to contamination and is an "irreplaceable source of drinking water" or is "ecologically vital."<sup>167</sup> Class II includes all other groundwater currently used or potentially available for drinking water or other beneficial uses.<sup>168</sup> Class III groundwater is not a potential source of drinking water or other beneficial use because of high saline or other contaminant levels.<sup>169</sup> By recognizing that not all aquifers produce the same level of benefits and, therefore, do not merit the same protection efforts, this system responds somewhat to cost-benefit concerns. However, this classification scheme is not a true cost-benefit approach because it does not consider the protection cost in a given case, such as the cost of foregone land uses that could detrimentally effect groundwater.<sup>170</sup>

Some writers have made a compelling case for establishing a nondegradation standard for high quality groundwater.<sup>171</sup> Factors supporting this policy include: the lack of knowledge about the health effects of various contaminants, the difficulty of monitoring groundwater quality, the practical impossibility of cleaning an aquifer once it becomes contaminated, and the ability to isolate and protect aquifer segments.<sup>172</sup> Nevertheless, situations may occur in which the benefits derived from protecting a particular high quality aquifer from degradation, even considering the above factors, will not justify the costs to achieve such protection.<sup>173</sup> And certainly, a nondegradation policy

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<sup>166</sup> See U.S. ENVIRONMENTAL PROTECTION AGENCY, GROUND-WATER PROTECTION STRATEGY 41-48 (1984).

<sup>167</sup> *Id.* at 43-44. "Ecologically vital" groundwater is groundwater that "contributes to maintaining either the base flow or water level for a particularly sensitive ecological system that, if polluted, would destroy a unique habitat." *Id.* at 44.

<sup>168</sup> *Id.* at 45.

<sup>169</sup> *Id.* at 46.

<sup>170</sup> See Getches, *Controlling Groundwater Use and Quality: A Fragmented System*, 17 NAT. RESOURCES L. 623, 632 (1985).

<sup>171</sup> See Tripp & Jaffe, *Preventing Groundwater Pollution: Towards a Coordinated Strategy to Protect Critical Recharge Zones*, 3 HARV. ENVTL. L. REV. 1, 32-35 (1979).

<sup>172</sup> *Id.* at 33.

<sup>173</sup> The EPA classification guidelines recognize this to some extent. Only groundwater that is an "irreplaceable source of drinking water" or is "ecologically vital"

makes little sense for groundwater that already has poor quality and little beneficial use.

### B. Who Pays — The Farmer or Society?

Reducing nonpoint source pollution will be costly. Central to any serious effort at pollution control is the question of who will pay the costs. Should farmers pay or will society shoulder the burden through government expenditures? The argument for requiring the farmer to pay is straight forward. Government requires other industries to bear the costs of preventing the pollution that their activities cause. Simple fairness suggests that farmers should receive similar treatment.

In addition, nonpoint source pollution is an economic “externality” — an agricultural production cost that the farmer does not presently bear, but imposes upon others.<sup>174</sup> Because prices do not reflect true costs of production, farmers overproduce agricultural goods and overcommit resources to agricultural activities.

“Internalization” is the classic solution to an externality problem. If external costs are internalized — borne by the farmer — the price of agricultural goods will reflect the true cost of production. As a result, some resources presently devoted to agricultural production will be diverted to other, more valuable activities, which will increase the total size of the economic pie.<sup>175</sup> This result increases economic efficiency. However, only the most saintly of farmers will voluntarily internalize these costs. Consequently, internalization will require some form of government inducement.

On the other hand, most of the benefits of cleaner water occur off the farm. This suggests that government, not the farmer, should bear the cost of controlling agricultural nonpoint source pollution. One study indicates that even erosion control, which typically is perceived as benefitting the farmer by preserving the productivity of the soil, produces only minor on-farm benefits.<sup>176</sup> However, the fact that most of the clean

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would be absolutely protected from degradation. *See supra* note 167 and accompanying text. One might assume, almost per se, that the value of preserving such waters exceeds the costs of doing so.

<sup>174</sup> “An externality exists when an activity by one or more parties affects, for good or bad, another one or more parties who are not part of, or are external to, the activity.” *ENCYCLOPEDIA OF ECONOMICS* 357 (D. Greenwald ed. 1982)

<sup>175</sup> *See Demsetz, Some Aspects of Property Rights*, 9 *J.L. & ECON.* 61, 62 (1966).

<sup>176</sup> Crosson, *supra* note 48, at 49-51. Some nonpoint source pollution control efforts obviously benefit the farmer. For example, reduced fertilizer and pesticide use also reduces production costs and benefits the farmer if she does not experience an offsetting production loss. Likewise, the elimination of groundwater pollution will benefit the

water benefits occurs off-farm merely underscores the fact that agricultural nonpoint source pollution is an externality.

In addition, farmers may argue that imposing the substantial and potentially bankrupting costs of nonpoint source pollution control on them is simply unfair. First, farmers will claim that they did not expect to have pollution controls when they began farming and that to require this now changes the rules during the game. Farmers also may point to the intense economic assault that they have recently endured and will observe that farmers are "price takers," with little ability to pass added production costs on to consumers.<sup>177</sup> The disparate impact of pollution control efforts caused by the heterogeneous nature of the farm economy and the uneven impact of pollution control measures also supports this position.<sup>178</sup>

The choice between these positions does not have to be, and probably will not be, all or nothing. Agriculture, like other industries, should be required to pay much of the costs of cleaner water. Furthermore, economic efficiency is a reasonable goal. On the other hand, government bears some of the responsibility for agricultural nonpoint source pollution. Government has played a major role in the structure of the farm economy, and government programs have indirectly encouraged some of the agricultural practices responsible for agricultural pollution.<sup>179</sup> For example, the Soil Conservation Service's mission has gradually shifted from exclusive concern with soil conservation to an emphasis on increased farm production and profits.<sup>180</sup> Not only has this shift diluted the Service's erosion control efforts, it has encouraged farmers to adopt more intense cultivation methods that frequently increase erosion.<sup>181</sup> Similarly, government agricultural price and income support programs sometimes encourage destructive cultivation practices.<sup>182</sup> Furthermore, all Americans have benefitted from the incredible abundance of American agriculture. Society should take care to preserve this achievement.

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farmer who also uses groundwater for drinking and stockwatering.

<sup>177</sup> See Torres, *Theoretical Problems with the Environmental Regulation of Agriculture*, 8 VA. ENVTL. L.J. 191, 206 (1989). Instead of making the case that government should pay, the argument that farmers are price takers may provide support for national regulation. If farmers are required to bear increased costs nationally, agricultural prices presumably will rise.

<sup>178</sup> *Id.*

<sup>179</sup> *Id.*

<sup>180</sup> See Williams, *supra* note 14, at 373-95.

<sup>181</sup> See Davidson, *Environmental Analysis of the Federal Farm Programs*, 8 VA. ENVTL. L.J. 235 (1989); see also *infra* note 198.

<sup>182</sup> Davidson, *supra* note 181.

Finally, like economic efficiency, concern for the welfare of individual citizens is a legitimate government concern. The challenge is to find a middle ground which balances these various considerations.

### C. *Methods of Implementation*

Most of the agricultural nonpoint source pollution effects occur off-farm.<sup>183</sup> As a result, substantial voluntary efforts by farmers to control this pollution are unlikely. For real progress, government must provide strong inducements for farmers to reduce pollution. These inducements can either be "sticks," in the form of land use regulations and mandatory best management practices, or "carrots," in the form of subsidies.<sup>184</sup>

In notable contrast to the Clean Water Act's regulation of point source polluters, the Act does not provide direct federal regulation of nonpoint source polluters, but directs the states to develop programs under sections 208 and 319.<sup>185</sup> Sections 208 and 319 both require that the states to utilize regulation, as necessary, to control nonpoint source pollution. Section 208 states that areawide plans shall "set forth procedures and methods (including land use requirements) to control to the extent feasible" nonpoint source pollution.<sup>186</sup> State agencies designated to implement the plans must have "adequate authority" to carry out the plans.<sup>187</sup> In addition, the legislative history concerning section 208 makes repeated references to "regulatory programs."<sup>188</sup> Also, EPA regulations state that water quality management plans shall identify regulatory programs to control nonpoint source pollution where nonregulatory approaches are inappropriate in accomplishing that objective.<sup>189</sup>

Despite section 208's mandate for the states to use regulatory controls, the 208 effort in most states was largely voluntary. Several states implemented regulatory programs to control selected forms of nonpoint source pollution, but the use of regulatory controls generally has been

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<sup>183</sup> See *supra* notes 174-76 and accompanying text.

<sup>184</sup> The EPA acknowledges that voluntary approaches alone are not generally sufficient to deal with nonpoint source pollution. See AGENDA FOR THE FUTURE, *supra* note 11, at 19-20.

<sup>185</sup> See *supra* notes 92-93, 113-14 and accompanying text.

<sup>186</sup> 33 U.S.C. § 1288(b)(2)(F)-(H) (1982).

<sup>187</sup> *Id.* § 1288(c)(2)(A).

<sup>188</sup> See S. REP. NO. 414, 92d Cong., 1st Sess. 36-40, reprinted in U.S. CODE CONG. & ADMIN. NEWS at 3703-06.

<sup>189</sup> 40 C.F.R. § 130.6(c)(4) (1989). The current regulations, however, do not appear as insistent regarding the use of regulatory programs to control nonpoint source pollution as those prior to 1985. See R. BECK & C. GOPLERUD, *supra* note 113, § 234.2(B).

spotty and virtually nonexistent for agricultural nonpoint source pollution.<sup>190</sup> A study of 136 section 208 plans relating to agricultural nonpoint source pollution concluded that, almost without exception, the plans did not provide for regulatory programs.<sup>191</sup> Instead, the plans established initial periods of voluntary effort, followed by a review to determine the need for regulatory programs. Despite the lack of regulatory programs, the EPA approved most of these section 208 plans.<sup>192</sup> Although the plans made little progress in reducing nonpoint source pollution through voluntary efforts, the review came and passed without any movement toward regulatory controls.<sup>193</sup>

The lack of progress under section 208 led to the adoption of section 319 in the Water Quality Act of 1987. Although the Water Quality Act did not repeal section 208, the nonpoint source pollution control effort has now been shifted almost entirely to section 319. Section 319 provides even clearer requirements for regulatory programs than did section 208. State management programs submitted under section 319 must identify programs to achieve implementation of best management practices, including "nonregulatory or regulatory programs."<sup>194</sup> In addition, the state must certify that the state's laws provide adequate authority to implement the state's management plan or, if not, that the state will seek the necessary authority.<sup>195</sup>

The EPA appreciates the need for regulatory controls. In 1989, the EPA described regulatory programs as "[a] vital part of the NPS [nonpoint source] toolbox" and stated that "voluntary approaches alone generally are not sufficient to deal with the NPS problem. In almost every case, a need exists for some kind of regulatory program as

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<sup>190</sup> R. BECK & C. GOPLERUD, *supra* note 113, § 234.2(D). A reasonable number of § 208 plans provide for regulatory programs for construction site nonpoint source pollution, but most of the programs for agriculture and silviculture are voluntary. See Nonpoint Source Pollution, *supra* note 17, Table 3-1.

<sup>191</sup> Beck, *Agricultural Water Pollution Control Law*, in 2 AGRICULTURAL LAW § 8.28 (J. Davidson ed. 1981 & Supp. 1989); see also Nonpoint Source Pollution, *supra* note 17, at 3-2 to 3-5. Beck notes that in many geographic areas the plans merely called for further study and monitoring, almost all called for increased financial and technical assistance, and one plan sought to tie further efforts to additional federal funds. Beck, *supra*, at 224-26.

<sup>192</sup> Beck, *supra* note 191, at 227. The EPA reports that by 1982 it had approved 213 water quality management plans containing elements addressing nonpoint source pollution control. The same report lists most of the state programs as voluntary. Nonpoint Source Pollution, *supra* note 17, at 3-1, 3-3 to 3-4, 3-16.

<sup>193</sup> See R. BECK & C. GOPLERUD, *supra* note 113, § 235.

<sup>194</sup> 33 U.S.C. § 1329(b)(2)(B) (Supp. V 1987).

<sup>195</sup> *Id.* § 1329(b)(2)(D).

well.”<sup>196</sup> Despite this, the EPA has not indicated a strategy to induce the states to actually adopt these controls. The EPA’s failure to act more forcefully may result partly from the limited means given the EPA to induce state compliance.<sup>197</sup>

In contrast to the EPA, the U.S. Department of Agriculture (USDA) clings to the myth that agricultural nonpoint source pollution can be conquered through voluntary measures. Various agencies of the USDA, most notably the Soil Conservation Service, play important roles in the fight against nonpoint source pollution.<sup>198</sup> Although the USDA recently made nonpoint source pollution control its number two priority under the National Program for Soil and Water Conservation, it states that, “This will be accomplished by working . . . to help farmers and ranchers to conserve natural resources through *voluntary actions*.”<sup>199</sup> Similarly, in July 1989, the USDA stated that the program’s primary goal was to “[p]rovide farmers, ranchers, and foresters the knowledge and technical means to respond independently and *voluntarily* in addressing on-farm environmental concerns and related State water quality requirements.”<sup>200</sup>

Subsidies provide a nonregulatory means of inducing farmers to undertake activities to reduce nonpoint source pollution. The question whether to use subsidies or regulations to fight nonpoint source pollution is merely another variation of “who pays.”<sup>201</sup> Regulatory programs force farmers to pay the cost of controlling nonpoint source pollution by

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<sup>196</sup> AGENDA FOR THE FUTURE, *supra* note 11, at 19.

<sup>197</sup> See *infra* notes 92-93, 113-14 and accompanying text (discussing limitations on EPA’s ability to force state compliance).

<sup>198</sup> The Soil Conservation Service (SCS) was created during the Depression to combat soil erosion. Much SCS work involves technical assistance to local soil conservation districts, which are state political subdivisions created under model state legislation developed by the SCS. Williams, *supra* note 14, at 373-83. Because of their historic involvement with erosion control, soil conservation districts were obvious institutions to enlist in controlling agricultural nonpoint source pollution. In fact, most states use soil conservation districts as “designated” agencies for the implementation of § 208 programs in agricultural areas. Beck, *supra* note 191, § 8.28, at 223. The SCS has been criticized because of a shift in emphasis from erosion control to production enhancement. One observer has called for its transfer from the USDA to the EPA in order to reaffirm its original purpose. Davidson, *supra* note 181, at 265-67. The EPA relies on the SCS to implement § 208 and § 319 agricultural control measures. See Williams, *supra* note 14, at 415 & n.300; ACTIVITIES AND PROGRAMS, *supra* note 127, at 28.

<sup>199</sup> SOIL AND WATER CONSERVATION, *supra* note 62, at 12 (emphasis added); see also *id.* at 11-14.

<sup>200</sup> U.S. DEP’T OF AGRICULTURE, WATER QUALITY PROGRAM PLAN TO SUPPORT THE PRESIDENT’S WATER QUALITY INITIATIVE 4 (1989).

<sup>201</sup> See *supra* notes 174-82 and accompanying text.

limiting agricultural activities or by undertaking control measures. Under subsidy programs the government pays farmers to engage in these activities.

One early, abortive example of a subsidy program is the "Rural Clean Water Program," enacted in 1977 as an amendment to section 208.<sup>202</sup> That program called for the federal government to share the cost of installing and maintaining best management practices to control agricultural nonpoint source pollution. The federal share usually could not exceed fifty percent of the cost, although it could go higher if the main benefits would occur offsite and if the matching requirement would impose a burden on the land owner and would probably prevent him from participating.<sup>203</sup>

Congress failed to fund this program, except as an experimental program under separate statutory authorization.<sup>204</sup> However, unless the exception to the fifty percent federal share had been construed very liberally, it is doubtful that this program would have attracted much participation. As one writer noted, "[a]ltruism, discounted by fifty percent, has yet to win its first political campaign."<sup>205</sup> In other words, a cost sharing subsidy is likely to be effective only if it provides benefits to the farmer which exceed the costs to the farmer. This situation frequently will not occur in nonpoint source pollution control activities. Experience under the experimental program bears this out. EPA reports that those cost sharing projects that have received a high level of participation have been successful because they provide for practices that farmers want, such as animal waste storage structure installation, conservation tillage, and irrigation system improvements.<sup>206</sup>

The Conservation Reserve program, which pays farmers to take highly erodible lands out of production, probably will have more success.<sup>207</sup> The USDA estimates that this program will reduce erosion by 800 million tons per year. This figure represents twenty-six percent of U.S. cropland erosion.<sup>208</sup> However, even this program has its critics. Professor Davidson notes that: (1) in periods of high agricultural prices farmers are likely to let their contracts lapse and return the land to cultivation; (2) that some highly erodible land is also highly productive

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<sup>202</sup> Pub. L. No. 95-217, sec. 35, § 208, 91 Stat. 1579 (1977) (codified as amended at 33 U.S.C. § 1288(j) (1982 & Supp. V 1987)).

<sup>203</sup> 33 U.S.C. § 1288(j)(2) (1982).

<sup>204</sup> Pub. L. No. 96-108, 93 Stat. 821, 835 (1979).

<sup>205</sup> 2 W. RODGERS, *supra* note 85, § 4.9, at 141.

<sup>206</sup> ACTIVITIES AND PROGRAMS, *supra* note 127, at 12.

<sup>207</sup> See *supra* notes 154-56 and accompanying text.

<sup>208</sup> SOIL AND WATER CONSERVATION, *supra* note 62, at 10.

and, thus, will not voluntarily be placed in the program; (3) that the program rewards farmers for past mismanagement practices; and (4) whatever its success, most farmland will remain outside the program.<sup>209</sup> Perhaps even more significant, the cost of subsidy programs will likely prevent widespread use except in cases, like the Conservation Reserve program, in which relatively high returns occur.

One little-used but potentially effective variation on the subsidy theme, cross-compliance, bears mention. Cross-compliance refers to the practice of tying receipt of existing agricultural subsidies to nonpoint source pollution control efforts. An example is the "sodbuster" program,<sup>210</sup> which denies various financial subsidies to farmers who farm highly erodible lands unless they are using an approved soil conservation program. The extension of this type of program to other lands and to other government programs, such as subsidized irrigation water programs in the West, could greatly increase its impact.<sup>211</sup>

On the other hand, cross-compliance has some disadvantages. First, the subsidies involved in cross-compliance have no direct link to nonpoint source pollution control efforts but result from other social, economic, and political considerations. To some extent, cross-compliance undermines the original purposes of these subsidies because it imposes costs on farmers for purposes not considered in establishing the subsidy programs. Therefore, cross-compliance, in effect, reduces subsidies provided by other programs. Assuming that some societal purpose existed in providing the subsidy (an assumption many might refute), reducing the subsidy indirectly may be poor policy. Arguably, if a reduction is made, it should result from a critical examination of the subsidy, its purposes, the appropriate funding level, and other factors directly related to the subsidy.

Second, cross-compliance might prove to be an inefficient way of subsidizing nonpoint source pollution control efforts. Faced with higher costs associated with pollution control efforts, farmers may demand and receive greater subsidies to offset the cost of compliance. In this case, farmers who produce little pollution or who can reduce pollution relatively cheaply would receive subsidies in excess of their costs. Farmers

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<sup>209</sup> Davidson, *Thinking About Nonpoint Sources of Water Pollution and South Dakota Agriculture*, 34 S.D.L. REV. 20, 56 (1989).

<sup>210</sup> See *supra* notes 157-59 and accompanying text.

<sup>211</sup> The USDA has indicated that it will expand the use of cross compliance. In 1982 the "Farmers Home Administration implemented a policy requiring that recipients of farm ownership loans and soil and water loans have, or have applied for, conservation plans for the land on which the loan was to be used." SOIL AND WATER CONSERVATION, *supra* note 62, at 23.

who must undertake more expensive measures would receive inadequate subsidies. In other words, if government is to subsidize nonpoint source pollution control efforts (this is really the end result of cross-compliance), direct subsidization will probably produce the greatest level of reduction per dollar of expenditure.

#### *D. Government Responsibility for Controlling Nonpoint Source Pollution*

The federal government continues to place primary responsibility for controlling nonpoint source pollution with state and local governments.<sup>212</sup> This results from several factors. First, the sheer number of nonpoint source polluters, including farmers, poses extreme administrative difficulties for a federally managed program. Second, the site-specific nature of nonpoint source pollution negates the use of uniform national standards and underscores the need for programs that are sensitive to local situations. Third, effective controls of nonpoint source pollution will require land use controls, a function traditionally left to the states.<sup>213</sup> Finally, federal budget constraints prohibit widespread use of federal funds.<sup>214</sup> Thus, the federal role, as defined by sections 208 and 319, consists of attempting to induce or goad the states to take effective action and of providing information, education, research, technical assistance, and some financing to the states.

While the factors mentioned above undoubtedly indicate that the states must play a major role in controlling nonpoint source pollution, steps could be taken to increase the effectiveness of the federal government's efforts. First, the federal government must find ways to increase the pressure on the states to induce effective action. Effective control on nonpoint source pollution will be expensive for the states and their citizens and is certain to be politically unpopular. Despite this, one of section 208's great weaknesses was the failure to provide adequate incentives or sanctions which caused states to implement their section 208 plans. Section 319 has this same weakness. Although section 319 is replete with "shalls," the only direct consequence of a state's failure to develop and implement effective nonpoint source pollution controls is denial of federal implementation funds.<sup>215</sup>

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<sup>212</sup> See *AGENDA FOR THE FUTURE*, *supra* note 11, at 5.

<sup>213</sup> *Id.* Although federal land use control to protect water quality would probably withstand a constitutional attack, it is not feasible politically, now or for the foreseeable future. See B. HOLMES, *supra* note 14, at 27-31.

<sup>214</sup> See *AGENDA FOR THE FUTURE*, *supra* note 11, at 15-17.

<sup>215</sup> See 33 U.S.C. § 1329(h)-(i) (Supp. V 1987). Reflecting the lack of sanctions, the

Because these sections lack sanctions, one commentator suggested that many states might fail to submit assessment reports and management programs.<sup>216</sup> Subsequent submissions by most states have shown that this prediction was overly pessimistic.<sup>217</sup> However, the lack of penalties may have been partly responsible for the failure of most states to meet the statutory deadline. In any case, submission to implementation is a big step, and states may prove much more recalcitrant in taking politically unpopular steps, such as imposing land use controls and mandatory best management practices.

In addition, the lure of the federal implementation funds provided by section 319 will probably not move many states to take steps that they would not otherwise take. Section 319 provides that federal grants to implement management programs shall not exceed sixty percent of implementation costs, leaving the states to pay at least forty percent of these costs. Furthermore, Congress has not yet appropriated funds for section 319 grants.<sup>218</sup> Other Clean Water Act sections make available some funds for section 319 activities.<sup>219</sup> Thus far, however, states have spent this money mostly on section 319 program development, which does not require state matching funds, rather than on implementation.<sup>220</sup> In addition, much of the money available under these other sections can, and the EPA predicts will, be used for purposes besides section 319 activities.<sup>221</sup> Finally, the funding under these sections is being phased out and will be unavailable after fiscal year 1990.<sup>222</sup> Thus, un-

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EPA states: "There are no penalties for states failing to prepare section 319 assessments and programs." *ACTIVITIES AND PROGRAMS*, *supra* note 127, at 14. Section 319(d)(3), 33 U.S.C. § 1329(d)(3) (Supp. V 1987), does provide for the EPA to prepare an assessment report if the state fails to prepare one. Further, § 319(e), 33 U.S.C. § 1329(e) (Supp. V 1987), provides for the preparation and implementation of management programs by local public agencies if the state does not submit a program. The EPA, correctly, does not view these as penalties.

The Clean Water Act is not the only water pollution statute in which Congress has ordered the states to undertake a program but provided no penalty for failure to do so, other than the denial of federal matching funds to develop and implement the program. For a discussion of matching funds and wellhead protection areas, see *supra* text accompanying notes 145-48.

<sup>216</sup> Davidson, *supra* note 209, at 44.

<sup>217</sup> See *supra* note 131.

<sup>218</sup> *ACTIVITIES AND PROGRAMS*, *supra* note 127, at 22.

<sup>219</sup> See Clean Water Act § 205(j)(5), 33 U.S.C. § 1285(j)(5) (Supp. V 1987); *id.* § 201(g)(1)(B), 33 U.S.C. § 1281(g)(1)(B); see also *ACTIVITIES AND PROGRAMS*, *supra* note 127, at 22-27.

<sup>220</sup> *ACTIVITIES AND PROGRAMS*, *supra* note 127, at 23.

<sup>221</sup> *Id.* at 26.

<sup>222</sup> See 33 U.S.C. § 1287 (1982 & Supp. V 1987); see also *ACTIVITIES AND PRO-*

less Congress funds section 319 activities, even section 319's limited inducement will become nonexistent.

One article suggested that the EPA might impose indirect sanctions under other Clean Water Act sections if the states did not make reasonable efforts to develop effective nonpoint source pollution control measures. The article suggested that the EPA might require more stringent pollution control measures of point source polluters on streams not meeting water quality standards due to nonpoint source pollution. The article also identified other regulatory programs which might be utilized to force greater state efforts.<sup>223</sup> However, most of the sanctions that the article mentions also might have been applied to force greater state action under section 208. The EPA and other federal agencies' failure to use these sanctions pursuant to section 208 suggests small likelihood that the agencies will use them to give section 319 more teeth. Thus far, little in the EPA literature suggests that the EPA will use these sanctions against unresponsive states.<sup>224</sup>

Some critics claim that section 319 added little to section 208.<sup>225</sup> This criticism seems accurate. At best, section 319 somewhat more insistently calls for states to reduce nonpoint source pollution and presents a veiled threat of more direct federal action if states fail to act.<sup>226</sup> It seems questionable whether large numbers of states will heed this call. As noted, imposition of land use restrictions and mandatory best management practices usually will be unpopular. Furthermore, states may be reluctant to put their citizens, including farmers, at a competitive disadvantage with citizens in other states. Thus, more forceful federal action

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GRAMS, *supra* note 127, at 27.

<sup>223</sup> Hobbs & Raley, *Water Quality Versus Water Quantity: A Delicate Balance*, 34 ROCKY MTN. MIN. L. INST. § 24.03(4), at 37-38 (1988).

<sup>224</sup> For example, the EPA defines its role in the nonpoint source effort as providing: (1) research on nonpoint source impacts to receiving water resources, (2) technical training, (3) educational and information materials, (4) technology transfer materials, and (5) increased coordination with other federal agencies. Similarly, the EPA states that through its five-year NPS Agenda (covering fiscal years 1989-1993), the EPA will "channel its resources and energies into assisting and supporting states and local governments." ACTIVITIES AND PROGRAMS, *supra* note 127, at 2. These statements do not suggest that the agency plans to engage in serious arm twisting to force states into implementing regulatory controls.

<sup>225</sup> Davidson, *supra* note 209, at 44.

<sup>226</sup> The EPA suggests that Congress placed special emphasis on nonpoint source pollution by moving the program from Title II of the Clean Water Act (Grants for Construction of Treatment Works) to Title III (Standards and Enforcement). The EPA also suggests that if § 319 does not work, Congress may again move the program to Title IV (Permits and Licenses). AGENDA FOR THE FUTURE, *supra* note 11, at 1, 28.

seems inevitable. Because the federal government's current fiscal situation makes extensive use of grants unlikely, federal action most likely will consist of commands to the states, backed up by threats of direct federal regulation.

As a second step, Congress should repeal or restructure federal farm programs which encourage farming practices that exacerbate nonpoint source pollution problems.<sup>227</sup> The EPA has indicated its intention to debate federal agricultural policy and to work with the USDA on these problems.<sup>228</sup> Similarly, the USDA recently reported that it will pay more attention to the effect that commodity and price support programs have on the environment and will seek appropriate modifications in these programs.<sup>229</sup> Cross-compliance also could serve a useful role. However, relying on cross-compliance as a primary enforcement mechanism has disadvantages.<sup>230</sup> Nevertheless, it could serve as a useful tool to strengthen and supplement state enforcement.

A strong federal presence also could occur in areas suitable for uniform regulation. An obvious example is pesticide regulation under FIFRA, through which the federal government is in the best position to assess and register pesticides.<sup>231</sup> In addition, by registering pesticides for restricted use, rather than general use, the EPA can assist the states in efforts to see that only qualified people apply dangerous chemicals.<sup>232</sup>

Finally, of course, the federal government should have a role in research, education, and the exchange of information. Much remains to be learned about best management practices, how various pollutants are transported, the effects of various pollutants, and many other related matters. Federal agencies are in the best position to orchestrate these efforts. Clearly, both the EPA and the USDA are committed to such roles.

### CONCLUSION

As recent efforts demonstrate, controlling pollution from agricultural activities will not be easy. In contrast to point source pollution, which generally can be controlled by simply attaching end-of-pipe treatment

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<sup>227</sup> See Davidson, *supra* note 181, at 235.

<sup>228</sup> AGENDA FOR THE FUTURE, *supra* note 11, at 17.

<sup>229</sup> SOIL AND WATER CONSERVATION, *supra* note 62, at 23.

<sup>230</sup> See *supra* notes 210-11 and accompanying text (discussing cross compliance).

<sup>231</sup> See *supra* notes 149-53 and accompanying text.

<sup>232</sup> In 1988 the EPA stated it would propose adding new criteria for classifying pesticides for restricted use based on groundwater concerns. ACTIVITIES AND PROGRAMS, *supra* note 127, at 38.

devices on production facilities, agricultural pollution is a "lifestyle" issue which will require fundamental changes in farming practices. Lifestyle changes are never easy, and most likely the latest federal attempt to induce agriculture to make them — section 319 — will not be sufficient.

Nevertheless, current efforts provide several useful lessons. First, section 319, like section 208, seems doomed to failure because it lacks devices that force the states to implement necessary regulatory controls. Ultimately, Congress will have to abandon the methods that "nag" states to comply and will have to put real teeth into the nonpoint source pollution control efforts. Nagging seldom produces results unless backed by credible threats of serious consequences. Thus far, federal provisions for control of nonpoint source pollution lack credible threats.

Second, Congress should adopt more realistic time frames. The deadlines required by section 319 were too short to put such a complex program into action and to assess its effectiveness. Most states could not meet the deadline for the submission of assessment reports and management programs. The EPA is still in the process of approving the management programs for many states.<sup>233</sup> As a consequence, the EPA's "final" report on section 319, due on January 1, 1990,<sup>234</sup> cannot possibly reflect the states' experience or success in implementing these programs. However, even if states had submitted and the EPA had approved assessment reports and management programs within the time frames contemplated by section 319, states would have had only approximately eleven months of implementation experience prior to the deadline for the final report.<sup>235</sup> In short, Congress expected too much, too fast.

Water pollution is a serious problem that must be addressed forcefully and expeditiously. Nevertheless, nonpoint source pollution in general and agricultural pollution in particular reflects decades, if not centuries, of human habits. Significant changes in these habits cannot be expected overnight. Rather, Congress must commit the federal government to a resolute and long-term effort. The current form of section 319 does not represent the solution to the nonpoint source pollution problem. However, section 319 could represent an important milestone if the EPA reports frankly on the deficiencies that experience exposes and if Congress has the fortitude to make corrective adjustments.

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<sup>233</sup> See *supra* note 131.

<sup>234</sup> See *supra* notes 131-33 and accompanying text.

<sup>235</sup> The deadline for the assessment reports and management programs was August 4, 1988. The EPA had six months thereafter to approve or disapprove the reports. 33 U.S.C. § 1329(c)(2)-(d)(1) (Supp. V 1987).