Appendix F
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A Planner's Guide to Nonpoint-Source Pollution Control

By Mark S. Dennison

Nonpoint-source (NPS) water pollution—pollution that enters our rivers, lakes, and bays from diffuse sources such as farm fields and traffic arteries—has been a particularly complex and difficult environmental management problem. After the nation made noticeable strides toward regulating point-source pollution (such as emissions from factory drain pipes), Congress built NPS provisions into its 1987 amendments to the Clean Water Act. Since then, federal, state, and local regulators, water-quality managers, and government planners have invested considerable time, money, and effort in developing programs to manage water-quality problems caused by NPS pollution. This year's reauthorization of the Clean Water Act is certain to include additional mandates for controlling nonpoint-source pollution.

This issue of *Environment & Development* explains the current intergovernmental system for managing NPS pollution, provides a review of information sources on the subject, and looks at new controls contained in proposed amendments to the Clean Water Act.

NPS Pollution as a National Priority

The nation's primary water protection law is the Clean Water Act, whose main objective is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." The focus during the program's first 15 years was on regulating point-source pollution. After considerable success in restoring many polluted streams, lakes, and other water bodies to acceptable water quality, the 1987 Amendments to the Clean Water Act initiated a movement toward control of pollution from more diffuse sources.

Nonpoint-source pollution is a major and extremely difficult problem. Recent studies by the U.S. Environmental Protection Agency and state water-quality agencies indicate that most of the remaining water-quality impairments to the nation's rivers, streams, lakes, estuaries, coastal waters, and wetlands result from these pollutants.

EPA and the states together have developed nonpoint-source pollution management programs. In addition to controls under Clean Water Act Section 319, several other federal, state, and local programs supplement and interface with the act's NPS pollution program. A review of the act and these other NPS programs appears below.

Sources and Impacts

Nonpoint-source pollution often starts far from the waters that are eventually contaminated. It begins when rainwater and snowmelt run over the land and carry away pollutants that occur naturally or are caused by human effects on surface water or groundwater.

Water runoff that enters and is discharged by pipes, ditches, canals, tunnels, and other conduits is considered a point source, subject to Clean Water Act permit requirements. But diffuse runoff is generally treated as a nonpoint source. It is harder to identify, isolate, and control than traditional discharge sources.

Clean Water Act section 319(a) is the principal federal control for nonpoint-source pollution. It requires states to identify waters affected or threatened by non-point sources and to trace the sources affecting them. The states have told the federal EPA that wildlife and recreation are most severely affected. Rivers, streams, lakes, estuaries, coastal waters, and wetlands are all experiencing major effects.

Agriculture is the single largest source of nonpoint-source pollution problems. Siltation and nutrients cause the greatest share of NPS impacts on U.S. surface waters. Table 1 shows the leading nonpoint sources, pollutants, and impacts.

TABLE 1. LEADING SOURCES, POLLUTANTS, AND STATE-DESIGNATED USE IMPACTS RELATED TO NONPOINT SOURCE POLLUTION[1]

Waterbody Type (# States Reporting)	Leading Sources[2]	Leading Pollutants	Uses Impacted
Rivers (40 states)	Agriculture Unknown	Siltation Nutrients	Wildlife Recreation
Lakes (33 states)	Agriculture Unknown	Nutrients Siltation	Recreation Wildlife
Estuaries (13 states)	In-place contaminants Urban	Nutrients Pathogens	Wildlife Recreation
Coastal Waters (7 states)	Waste storage tanks Petroleum activities	Oil and grease Metals, pesticides Pathogens, inorganics	Shellfish Recreation, high quality Industry, navigation
Great Lakes (2 states)	In-place contaminants Unknown	Priority organics Pesticides	Fisheries Wildlife
Wetlands (3 states)	Agriculture Hydrologic modification	Siltation Metals	Wildlife Recreation, high quality
Groundwater (9 states)	Not available	Pesticides Unknown toxicity Priority organics	Drinking

[1] Listed sources, pollutants, and uses impacted are not necessarily linked. The number of states reporting is the maximum number that may have contributed data under each of the information columns. For example, while 40 states reported the river mileage impacted by nonpoint sources, only 33 states reported pollutant information in a quantitative manner.

[2] Leading sources, pollutants, and uses impacted determined by the number of miles of acres affected. Top two, with ties, are listed.

Silt is the major pollutant affecting rivers and streams. Nutrients, pathogens, metals, and pesticides are also present in varying degrees. Nationally, the greatest adverse impacts from siltation are found in Missouri; from nutrients, in North Dakota; from pathogens, in Virginia; from metals, in Colorado; from pesticides, in Iowa; from habitat modification, in Montana; and from organic sediments, in North Carolina. The sources responsible are (in order of impact) agriculture, surface mining, streambank modification, on-site wastewater systems, subsurface mining, petroleum activities, channelization, flow regulation/modification, and urban runoff.

Nutrients (primarily nitrogen and phosphorus) are the greatest cause, and siltation the second major cause, of NPS pollution of lakes and ponds. Again, agricultural use constitutes the largest source, followed by on-site wastewater systems, contaminants created on the site, petroleum activities, flow regulation/modification, streambank modification, atmospheric deposition, urban growth, highway maintenance and runoff, recreation, and urban runoff.

Oil and grease are the primary NPS pollutants fouling coastal waters. Metals, pesticides, other inorganics, and pathogens (disease-causing agents) are major NPS pollutants, while nutrients, siltation, and dissolved oxygen from nonpoint sources affect coastal waters to a lesser degree. Waste storage and storage tank releases account for the greatest share of nonpoint-source pollution of coastal waters, followed by impacts from mining and urban sources.

Nutrients are the greatest problem for estuaries, although pathogens cause the greatest damage. Dissolved oxygen, oil and grease, salts, highly toxic organic chemicals, and metals rank high as nonpoint-source polluters of estuaries. Contaminants produced on site are the biggest identified source of nonpoint-source pollution of estuaries, followed by on-site wastewater systems and petroleum activities. Urban runoff is also a large source of estuary pollution.

An understanding of the various types of water bodies, types of pollutants, and sources of nonpoint-source pollution enables states to create effective pollution-control programs. When establishing planning measures to reduce the adverse impacts of NPS pollution, local governments should review the information in the state's nonpoint-source assessments.

Federal NPS Regulatory Programs

Several different agencies and laws govern control of nonpoint-source pollution. Clean Water Act Section 319 provides the primary framework for integrating all the various federal programs into state nonpoint-source management programs. EPA and state water-quality agencies have directed construction of sewage treatment plants and established water-quality criteria and standards, national point-source pollution-control programs, wetland regulatory programs, and drinking water quality standards. The U.S. EPA implements and oversees many different programs (see sidebar) aimed at protecting and restoring water quality. Unfortunately, it is not possible to describe each of these programs in much detail here, but here is a limited summary of some of them.

Section 319 Management Programs

Recognizing the many nonpoint sources of pollution and their interrelation with other aspects of water pollution control, Congress assigned EPA the role of establishing and coordinating a national nonpoint-source control program through Section 319 of the Clean Water Act.

States must develop NPS management programs under Section 319. Specifically, these programs must:

- Identify the best management practices (BMPs) that will reduce pollutant loadings from nonpoint sources identified in state assessment reports;
- Identify programs to achieve implementation of BMPs including nonregulatory or regulatory programs for enforcement, technical assistance, education, training, technology transfer, and demonstration projects;
- Provide a schedule of annual milestones for the management program;
- Include certification by the state attorney general that the state laws provide adequate authority to implement the state's management program;

U.S. EPA Water Quality Programs

Clean Lakes Program
Great Lakes Program
Chesapeake Bay Program
National Estuary Program
(Clean Water Act Section 320)
Wellhead Protection Program
National Pollutant Discharge Elimination System
(Clean Water Act Section 402)
Stormwater Program
(Clean Water Act Section 402(p))
Pesticides Program
(Federal Insecticide, Fungicide, and Rodenticide Act)
Coastal Nonpoint Source Control Program
(Coastal Zone Management Act Section 1455b)
Wetlands Protection Program
(Clean Water Act Section 404)
Rural Clean Water Program
Municipal Pollution Control Programs

- Identify sources of federal and other financial support for nonpoint-source control activities;
- Identify federal programs and projects that the state will review for consistency with the state nonpoint-source management program.

Other Programs

Clean Lakes Program. This program was created in 1976 to protect and restore publicly owned freshwater lakes. Clean Lakes Program regulations were issued in 1980, and more than 400 cooperative agreements have been awarded to states for the classification, assessment, study, and restoration of lakes. These agreements are subject to General Grant Regulations and Clean Lakes Regulations. Four types of cooperative agreements are available under the program. Under the regulations, all lake projects must be consistent with a state's water quality management plan to ensure that EPA and the states coordinate programs under the Clean Water Act, Resource Conservation and Recovery Act, Safe Drinking Water Act, and other EPA programs.

Clean Lakes Program guidance specifies that the watershed approach is the key element in successful management of nonpoint-source pollution, groundwater protection, water quality-based

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Mark Dennison is an attorney in private practice in Ridgewood, New Jersey. He is the author or coauthor of numerous books and articles on environmental, land-use, and zoning law issues.

permitting, stormwater permitting, estuarine protection and cleanup, and wetlands protection. Many states have used the Clean Lakes Program as a nonpoint-source management tool. A number of projects have included BMPs to prevent pollutants originating in the watershed from entering lakes.

NPDES Permit Program. The Clean Water Act requires that point-source discharges be authorized by a National Pollutant Discharge Elimination System (NPDES) permit. NPDES permits are generally issued by states with EPA-approved NPDES programs. Most states have approved programs, but in those without such authority, EPA regional offices oversee issuance of the permits. Due to limited resources, efforts to control point-source pollution through the NPDES permit program have focused primarily on controlling pollution discharges from publicly owned treatment works and industries. Under Clean Water Act Section 402(p), the NPDES permit program also addresses stormwater discharges (see "Ready or Not, Stormwater Deadlines Loom," May 1992).

Rural Clean Water Program. This program provides financial and technical assistance to agricultural landowners and operators to test policies and procedures for controlling agricultural nonpoint-source pollution in 21 project areas. To aid in the development of best management practices, the Agricultural Stabilization and Conservation Service uses Rural Clean Water Program water-quality data to evaluate the practices.

Wellhead Protection Program. The 1986 Amendments to the Safe Drinking Water Act established a Wellhead Protection Program to protect groundwaters that contribute to public drinking-water supplies. Under Section 1428 of this act, each state was required to prepare a Wellhead Protection Program for approval by EPA. To assist states, EPA has provided numerous technical assistance documents and has held national wellhead conferences and workshops. Those portions of the state wellhead-protection programs that are linked to state NPS management programs can be used to support Section 319 activities to protect groundwater. If properly targeted, control efforts to protect wellfields can complement nonpoint-source efforts to prevent surface water degradation.

Municipal Pollution Control Programs. These programs manage efforts to assist communities in constructing new or upgraded municipal wastewater facilities needed to comply with federal surface water discharge standards, as well as to protect groundwater. Under Title VI of the 1987 Clean Water Act Amendments, the State Revolving Fund program was developed to provide capitalization grants to states to establish such funds. States may then provide financial assistance to municipal wastewater facilities, as well as for "expanded uses," including nonpoint-source management. The EPA's Municipal Technology Branch, which operates these programs, has established the Expanded Uses Council to provide further guidance and coordination of assistance for expanded uses. For further information on Municipal Pollution Control Programs, contact the Municipal Technology Branch at 202-260-7356.

National Estuary Program. EPA administers the National Estuary Program under Clean Water Act Section 320 to assist state, regional, and local governments in developing comprehensive conservation and management plans for geographically targeted, high-priority estuarine waters. These plans recommend priority corrective actions to restore estuarine water quality, fish populations, and other designated uses of estuarine waters.

Pesticides Program. EPA hereby controls pesticides that may threaten ground and surface waters. EPA has developed a pesticides and groundwater strategy pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act, which requires states to implement EPA-approved plans to reduce and eliminate groundwater contamination from pesticide use.

Coastal NPS Pollution Control Programs. To combat nonpoint pollution of coastal waters, the Coastal Zone Act Reauthorization Amendments of 1990 require that each state with a federally approved Coastal Zone Management Program develop a Coastal Nonpoint Pollution Control Protection Program to implement coastal land-use management measures. EPA has published national guidelines on "management measures" to control coastal nonpoint sources (840-B-92-002, January 1993).

Management measures are "economically achievable measures" to control pollutants from new and existing nonpoint sources that reflect the "greatest degree of pollutant reduction achievable" through application of the best available NPS control measures and methods. States must submit their proposed programs to the Secretary of Commerce and the EPA administrator by July 1995. Following approval, the states must implement their programs through changes in approved Section 319 state management plans for controlling nonpoint-source pollution and in state coastal zone management programs. If a state fails to submit an approvable program, the Secretary of Commerce may withhold a percentage of any Coastal Zone Management Act Section 306 grant money, and

TABLE 2. EPA's WATERSHED MANAGEMENT CASE STUDIES

TMDL Case Study	Location	Feature
#1	Denver Metro—South Platte River Segment 15, Colorado	Revision of TMDLs to meet Water Quality Standards
#2	South Fork of the Salmon River, Idaho	A phased TMDL for clean sediment developed using quantified goals based on a narrative standard
#3	West Fork of Clear Creek, Colorado	A seasonal TMDL using narrative standards for certain parameters
#4	Nomini Creek Watershed, Virginia	Use of GIS and watershed models to identify areas of critical nonpoint pollution
#5	Albemarle/Pamlico Estuary, North Carolina	A nutrient screening approach that uses GIS technology to model watersheds within a large, multibasin area
#6	Lower Minnesota River, Minnesota	A TMDL undergoing assessment as part of a basinwide river assessment project
#7	Sycamore Creek, Michigan	A watershed analysis that links dissolved oxygen problems to sediment loads and established NPS load allocations

Because the Total Maximum Daily Load (TMDL) process is one of the most powerful tools available for doing comprehensive watershed management, the Watershed Management Section is making available a series of TMDL case studies. The case studies address a variety of watershed problems that are transferable to a number of regions. So far, seven TMDL case studies are available.

NPS Pollution Information Sources

Alliance for Environmental Education, *Compendium of Educational Materials on the Water Environment* ($9.95; call 703-253-5812).

Long Island Regional Planning Board, Hauppauge, New York, *Nonpoint Source Management Handbook.*

Metropolitan Washington Council of Governments, *Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs.*

Metropolitan Washington Council of Governments, *A Current Assessment of Urban Best Management Practices—Techniques for Reducing Non-Point Source Pollution in Coastal Areas* ($30; call 202-962-3200).

Nonpoint Source Electronic Bulletin Board System (free user's manual; fax your request to NPS News-Notes at 202-260-1517).

North Carolina State University Water Quality Group, Raleigh, *Summary Report: Evaluation of the Experimental Rural Clean Water Program* (call 919-515-3723).

Northeastern Illinois Planning Commission, Chicago, *Best Management Practice Handbook for Urban Development.*

Northern Virginia District Planning Commission, Annandale, *Northern Virginia BMP Handbook: A Guide to Planning and Designing Best Management Practices in Northern Virginia* ($30; call 703-642-0700).

Puget Sound Water Quality Authority, Seattle, *Managing Nonpoint Pollution—An Action Plan Handbook for Puget Sound Watersheds.*

Rutgers University, Cook College Department of Environmental Resources and New Jersey Agricultural Experiment Station, *Watershed Management Strategies for New Jersey.*

Tahoe Regional Planning Agency, Tahoe, Nevada, *Water Quality Management for the Lake Tahoe Region, Handbook for Best Management Practices.*

U.S. EPA, *Funding of Expanded Uses Activities by State Revolving Fund Programs: Examples and Program Recommendations.*

U.S. EPA, *Guide to Federal Water Quality Programs and Information* (U.S. EPA-230-B-93-001).

U.S. EPA, *NPS News-Notes* (free newsletter—to be put on the mailing list, fax request to 202-260-1517).

EPA may withhold portions of any Section 319 grant under the Clean Water Act.

Local planners and water-quality managers need to review the various regulatory programs and integrate these management measures into the local planning process. Measures implemented through local government ordinances can be a valuable way to manage nonpoint-source pollution. Public education and nonpoint-source pollution awareness programs can also help communities implement voluntary water-quality initiatives.

NPS Funding Sources

State and local governments that need money to implement NPS pollution control measures can tap into a variety of sources. The largest source of EPA funding for such measures comes from the Clean Water Act Title VI program, which provides grants for state water pollution control revolving funds. Under this program, EPA is empowered to make capitalization grants available to states to establish a revolving fund for a number of purposes, including Clean Water Act Section 319 NPS management programs. The most significant federal funding source for these state programs is the Section 319 appropriation. Several states have used this provision to fund NPS pollution-control programs. Local governments should contact state authorities to determine how they may use this available funding source.

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Clean Water Act Reauthorization

Planners need to follow the approaching reauthorization of the Clean Water Act—which is likely to occur before the end of this year—because proposed amendments would direct EPA to publish guidelines specifying minimum elements of state NPS pollution management programs. The environmental regulatory trend is clearly focused on control of nonpoint sources of pollution. In his Earth Day address in April, President Clinton presented several environmental initiatives that entailed substantial budget commitments, including allocation of funding for states and communities to restore and maintain clean water. His package of new environmental investments includes a Drinking Water State Revolving Fund ($599 million) and the new Clean Water State Revolving Fund ($1.2 billion) for fiscal year 1994. States and local governments can use such funding through sound environmental planning and nonpoint-source control mechanisms.

On June 15, 1993, Senators Max Baucus (D-Mont.) and John Chafee (R-R.I.) introduced S. 1114, the Water Pollution Prevention and Control Act of 1993, a bill to amend and reauthorize the Clean Water Act. Sen. Baucus told the Senate that the goal is "to restore the quality of all of our nation's waters. . . . We want to achieve environmental progress through the use of sound science and sound economics, and we want to give state and local governments the resources to match their responsibilities. . . . To accomplish this . . . [the bill] would establish new programs for controlling nonpoint-source pollution and watershed planning. It would improve programs for controlling municipal pollution from combined sewer overflows and stormwater discharges."

Several other bills with proposed amendments to the Clean Water Act were introduced this summer. Rep. James Oberstar (D-Minn.) introduced H.R. 2543, the Nonpoint Source Water Pollution Prevention Act of 1993, which would exclusively address improvements to the NPS pollution-control provisions contained in Section 319. On July 1, Sen. George Mitchell (D-Me.) introduced S. 1198, the Lakes Assessment and Protection Act of 1993, which aims to ensure that lakes enjoy the same water-quality protection as rivers and streams. Mitchell also introduced S. 1199, the Coastal Protection Act of 1993, which would amend the Clean Water Act to add certain new features to protect the marine environment.

Water-quality managers and environmental regulators must also keep a watchful eye on the reauthorization. The amendments to the act are certain to include new water-quality control mandates, as well as funding and guidance on nonpoint-source pollution controls.