

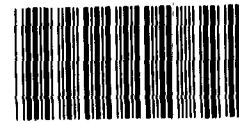
GAO

Report to the Chairman and Ranking
Minority Member, Subcommittee on
Investigations and Oversight, Committee
on Public Works and Transportation,
House of Representatives

October 1990

WATER POLLUTION

Greater EPA Leadership Needed to Reduce Nonpoint Source Pollution



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**Resources, Community, and
Economic Development Division**

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October 15, 1990

The Honorable Glenn M. Anderson
Chairman, Subcommittee on Investigations
and Oversight
Committee on Public Works and Transportation
House of Representatives

The Honorable Bob McEwen
Ranking Minority Member, Subcommittee on
Investigations and Oversight
Committee on Public Works and Transportation
House of Representatives

As requested by the former Chairman and former Ranking Minority Member, we have reviewed whether federal programs and activities are inhibiting state and local efforts to control nonpoint source pollution. Specifically, this report discusses (1) the barriers that may be inhibiting state and local nonpoint control efforts, noting in particular federal programs that may be contributing to the problem, and (2) what actions EPA can take to better focus federal efforts on reducing nonpoint source pollution.

As arranged with your offices, unless you publicly announce its contents earlier, we will make no further distribution of this report until 30 days after the date of this letter. At that time, we will send copies to other appropriate congressional committees; the Administrator, EPA; and the Director, Office of Management and Budget. We will also make copies available to other interested parties.

This work was performed under the direction of Richard L. Hembra, Director, Environmental Protection Issues, who may be reached at (202) 275-6111. Other major contributors to this report are listed in appendix I.



J. Dexter Peach
Assistant Comptroller General

Executive Summary

Purpose

Although significant efforts have been made to restore the quality of the nation's waters since the Clean Water Act's passage in 1972, many are still heavily polluted. Moreover, increased concern has developed in recent years over the toxicity and potential health effects of many of the contaminants being detected in these waters. According to the Environmental Protection Agency (EPA), the nation's remaining water quality problems are largely attributable to pollution from "nonpoint" sources—diffuse sources of pollution rather than pollutants discharged from a single, specific "point" source.

Concerned about the impacts of nonpoint source pollution and the prospect that federal programs may be inadvertently exacerbating the problem, the former Chairman and former Ranking Minority Member of the Subcommittee on Investigations and Oversight, House Committee on Public Works and Transportation, asked GAO to determine (1) what barriers may be inhibiting state and local efforts to control nonpoint source pollution, noting in particular federal programs that may be contributing to the problem, and (2) what actions EPA can take to improve the focus of federal efforts on reducing nonpoint source pollution problems.

Background

Nonpoint source pollution is the by-product of a variety of land use practices, including farming, timber harvesting, mining, and construction. It also results when rain washes pollutants in urban areas into sewer systems and storm drains (urban runoff). Agriculture accounts for the largest share of the nation's nonpoint source pollution, affecting about 50 to 70 percent of assessed waters (evaluated for water quality) through soil erosion from croplands and overgrazing, and runoff of pesticides and fertilizers.

Given the diversity of nonpoint source pollution and its relationship to local land uses, the Congress historically has been reluctant to allow EPA to deal directly with the problem. While the Water Quality Act of 1987 left primary responsibility for nonpoint source pollution control with the states, it expanded EPA's role by requiring the agency to review and approve (1) state assessments of the extent to which nonpoint sources cause water quality problems and (2) state programs designed to address these problems. In addition, EPA has acknowledged its own responsibility in its 1989 Nonpoint Sources: Agenda for the Future "to provide strong leadership for the national nonpoint source pollution control program and help states and local governments overcome barriers to successful implementation of nonpoint source measures."

Results in Brief

Among the problems GAO identified as significantly affecting state and local efforts to control nonpoint source pollution are the inherent conflicts between some federal agencies' policies and states' water quality goals. A prime example of the problem is the U.S. Department of Agriculture's (USDA) farm commodity programs, which indirectly contribute to nonpoint source water pollution through policies that encourage use of chemicals and pesticides. Among the other problems confronting state and local efforts to control nonpoint source pollution are (1) insufficient monitoring data on both the scope and impacts of the problem and on the effectiveness of potential solutions and (2) political sensitivities in controlling local land uses that indirectly cause water pollution.

In 1989, EPA outlined an ambitious 5-year agenda to focus the agency's efforts to deal with many of these problems. The agenda identified, for example, ways to improve federal coordination, help meet state and local information needs, and help state and local governments deal with sensitive land use issues. Nevertheless, GAO concludes that EPA's agenda will remain largely unfulfilled if the agency stays on its present course. Resource constraints are an underlying problem, as they are in many environmental programs. However, in the case of nonpoint source pollution, resource constraints may also reflect inappropriate allocation of available funds among the agency's point source and nonpoint source pollution control programs.

Principal Findings

Barriers to Controlling Nonpoint Source Pollution

In its report on alternative agriculture (GAO/PEMD-90-12, Feb. 16, 1990), GAO found that USDA's farm programs reinforce the use of conventional farming practices and that many of these practices contribute to soil erosion and water pollution. A major problem involves the specialization in program crops year after year, which the farm programs encourage by basing program benefits on historical crop production levels. Over time, this practice depletes the soil and leads to pest problems which, in turn, may lead to a greater need for agricultural chemicals. USDA recently undertook a Water Quality Initiative to better understand the water quality impacts of some of its farm programs, but, as reported in a 1990 GAO report on USDA's water quality program (GAO/RCED-90-162, July 23, 1990), further efforts are needed to integrate water quality concerns into agency operations.

GAO found that other key barriers impeding state and local efforts to control nonpoint source pollution may not be directly attributable to federal activities. For example, vital monitoring data are missing on both the scope and impacts of the problem, and on the effectiveness of potential solutions. Without sufficient information on scope and impacts, it may be difficult for public officials to convince landowners of the need for action and to target resources toward the most serious problems.

Although regulatory restrictions are often needed against harmful land use practices to effectively cope with the problem, GAO found that political sensitivity over land use regulation remains a formidable barrier to dealing with nonpoint source pollution. Nevertheless, an increased openness has emerged at all levels of government to confront such issues. GAO identified a number of innovative land use programs and activities to address nonpoint source pollution, particularly at the state and local levels. For example, Wisconsin's "Bad Actors" law allows the state to regulate polluting farms when owners refuse to cooperate with voluntary programs. GAO noted that land use requirements are more likely to be successfully applied when the public is better educated about the risks the problem poses to their health and the environment.

Shift in Priorities Could Help EPA Implement Its Agenda

EPA's Nonpoint Sources: Agenda for the Future acknowledged the seriousness of these barriers in coping with nonpoint source pollution and presented an ambitious plan for EPA to deal with them in fiscal years 1989 through 1993. It calls for EPA to (1) work with USDA and other agencies to better integrate water quality concerns into USDA's and other agencies' programs, (2) develop the technical information states need to conduct monitoring programs and develop water quality standards, and (3) conduct activities to raise public awareness about nonpoint source pollution and thereby garner public support for land use regulations. In each case, however, EPA officials told GAO that resource constraints have significantly inhibited the agency's progress in implementing its agenda. For example, EPA officials told GAO that an EPA-sponsored interagency task force on nonpoint source pollution has not met since October 1988 because EPA's limited nonpoint source pollution staff have had to devote their attention largely to reviewing state assessments and management plans and nonpoint source pollution grant applications.

A key contributing factor to these resource constraints is that available funds are overwhelmingly oriented toward point source control activities rather than nonpoint source. However, the agency's own analysis of

comparative risks posed by alternative pollution problems suggests that nonpoint source water pollution poses a level of health risk comparable with that presented by point sources and substantially more serious ecological risks. The Director, EPA's Office of Water Regulations and Standards, explained that, among other factors, the agency's budgetary priorities reflect statutory mandates that place greater emphasis on programs to control point source pollution rather than nonpoint source pollution.

GAO believes that while EPA cannot set its own priorities without regard to congressional mandates, it is incumbent upon EPA, as the nation's lead environmental organization, to try to influence its priorities according to its assessment of relative environmental risk. Such a reorientation need not result in a "wholesale revision" of the agency's budget in line with perceived environmental risk. Some shift in priorities, however, could go a long way toward allowing EPA to implement its agenda and thereby assist state and local nonpoint source pollution control programs.

Recommendations

GAO recommends that the Administrator, EPA, establish funding priorities among its water quality programs that will allow the agency to pursue key objectives of an effective nonpoint source agenda that have heretofore made little progress under existing funding constraints. Other recommendations to further EPA's chances of success in implementing its nonpoint source pollution agenda are included in chapter 4.

Matter for Congressional Consideration

In light of (1) the importance of nonpoint source pollution as a primary cause of the nation's remaining water quality problems and (2) the overwhelming emphasis of EPA resources devoted to point source programs, the Congress may wish to consider allocating EPA's water quality funding during the fiscal year 1992 budget process to provide greater emphasis on controlling nonpoint source pollution.

Agency Comments

GAO discussed its findings with EPA officials, who generally agreed with the information presented, and has included their comments where appropriate. However, as agreed, GAO did not obtain official EPA comments on a draft of this report.

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Abbreviations

CRP	Conservation Reserve Program
EPA	Environmental Protection Agency
USDA	U.S. Department of Agriculture

Introduction

Significant efforts have been made to clean up the nation's waters since the Congress enacted the Federal Water Pollution Control Act Amendments of 1972, known as the Clean Water Act.¹ For example, through 1988 the federal government had spent about \$48 billion to assist in constructing municipal sewage treatment plants under the Environmental Protection Agency's (EPA) Construction Grants Program. While EPA reports that these investments and other programs have made progress in achieving the goals of the act, states continue to identify significant portions of waterways that are still not fit for designated uses such as fishing and swimming. Moreover, concern has increased in recent years over the toxicity and potential health effects of many of the pollutants being detected in these waters.

According to EPA's National Water Quality Inventory: 1986 Report to Congress, the nation's remaining water quality problems are largely attributable to pollution from nonpoint sources. EPA defines nonpoint source water pollution as diffuse pollution resulting from land runoff, precipitation, atmospheric deposition, drainage, or seepage, rather than a pollutant discharge from a specific, single location. It notes that 76 percent of impaired acres of lake water, 65 percent of impaired stream miles, and 45 percent of impaired estuarine square miles are affected by nonpoint source pollution.

Types of Nonpoint Sources of Pollution

EPA groups the primary sources of nonpoint source pollution into the following categories: agriculture, urban runoff, hydromodification, resource extraction, silviculture, construction, and land disposal.

- Agriculture. About 50 to 70 percent of the assessed surface waters² are adversely affected by agricultural nonpoint source pollution, which stems from soil erosion from cropland and overgrazing, and from pesticide and fertilizer application.
- Urban runoff. About 5 to 15 percent of assessed surface waters are harmed by pollution from streets, residential neighborhoods, industrial sites, and parking lots. Urban runoff often contains nutrients and toxic and oxygen-demanding materials, and causes a higher-than-normal water temperature.
- Hydromodification. About 5 to 15 percent of assessed surface waters are impacted when the drainage, flow, or quantity of available water is

¹The Clean Water Act was subsequently amended in 1977, 1981, and 1987.

²Assessed surface waters are those that have been monitored or otherwise evaluated for impacts of nonpoint source pollution.

changed by stream channelization, reservoir construction, flood prevention, or lake drainage. When water flow patterns are changed, sediment deposits increase and habitat is altered.

- Resource extraction. About 1 to 10 percent of assessed surface waters are affected by pollution from past practices such as abandoned mines, improperly sealed wells, and mining waste piles.³
- Silviculture. About 1 to 5 percent of assessed surface waters are affected by pollution from forestry operations, such as timber cutting. Problems include sedimentation and habitat alteration. Logging roads were identified as being a particular concern.
- Construction. About 1 to 5 percent of assessed surface waters are harmed by construction practices. Pollution from construction activities is localized and periodic. Land development and highway construction can cause sediment and toxic material to enter surface water and alter habitats.
- Land disposal. About 1 to 5 percent of assessed surface waters are impacted by land disposal activities—leakage from septic tanks and land application of sewage sludge.

In addition to the initial contamination, nonpoint source pollution can have longer-lasting impacts. For example, a heavy rain can wash tons of soil off a field, and the material can either scour out a stream bed or settle out and cover the gravel used by fish to spawn. Long after the water clears up, use of the stream for fish production may be reduced. Similarly, when trees and bushes are cut next to stream banks, the debris falling into the stream or washing into the water will initially degrade the water. A longer-term problem, however, may be caused by the higher water temperatures resulting from a lack of shade. In time, these temperatures can make the stream a less desirable habitat for fish and other animals, or may make it totally uninhabitable.

The Link Between Nonpoint Source Pollution and Alternative Land Uses

The way individuals use land can substantially affect the amount of nonpoint source pollution runoff. For example, even though some soil naturally erodes from undisturbed land, the amount of erosion can increase manyfold if the trees are cut or the land is farmed. In addition, if the land is used for housing or urban development, erosion from land clearing and excavation during construction can increase tremendously. Table 1.1 shows the variation in how different land uses can affect sediment runoff.

³Water pollution from active mines is considered point source pollution and is controlled under EPA's National Pollutant Discharge Elimination System.

Table 1.1: Impacts of Alternative Land Uses on Soil Erosion Rates

Type of activity	Tons of soil eroded per acre per year
Mature, undisturbed forest	<1
Farming	5–14
Intensive logging	>100
Construction	50–1,400

Source: Report to the Congress: Nonpoint Source Pollution in the U.S. (Washington, D.C.: EPA, Jan. 1984)

Land use actions can also cause toxic pollution. For example, heavy pesticide use in farming has resulted in the runoff of toxic pollutants, and mining in sensitive land areas has produced leaching of heavy metals and acid mine drainage. These problems have resulted in substantial degradation of some streams, rivers, lakes, estuaries and groundwater.

To control such excessive sediment and toxic runoff, government can take a variety of measures—from voluntary efforts to encourage environmentally sound land use practices among private individuals and organizations to regulatory restrictions on harmful activities. However, land use restrictions and controls are sensitive political issues. Although states have authority to control land use, land use controls tend to be considered a local government tool. The federal government has used a voluntary cost-sharing approach to encourage improved land use actions, particularly with regard to federal efforts to control soil erosion.

Because of this political sensitivity, coupled with the decentralized nature of the problem, the Congress has been reluctant to allow the federal government to deal with nonpoint source pollution. The 1972 Clean Water Act, for example, required state and local agencies with jurisdiction in areas having severe water quality problems to identify the nature, scope, and extent of nonpoint source pollution, as well as ways to control it. However, the act did not provide any funds for implementing nonpoint source controls, comprehensive requirements for their use, or direct authority for EPA to regulate nonpoint sources.

States Retain Primary Role for Nonpoint Source Pollution Under Water Quality Act of 1987

The Congress expanded EPA's role somewhat through the Water Quality Act of 1987 but still leaves primary responsibility for nonpoint source pollution with the states. The Water Quality Act amends the Clean Water Act and requires states to develop nonpoint source control programs and activities. Section 319 requires states to (1) assess the extent to which nonpoint sources cause water quality problems and (2) develop programs for addressing these problems.

EPA is charged with reviewing and approving the state assessments and management program plans. EPA is also required to prepare an annual report to the Congress on the status of activities and programs implemented to control nonpoint source pollution and the progress made in reducing nonpoint source pollution.

Sections 319(b)(2)(F) and 319(k) of the act acknowledge that certain federal programs or activities may have an effect on state efforts to control nonpoint source pollution by authorizing states to review certain federal projects and activities under the procedures in Executive Order 12372 to determine whether they conflict with the states' nonpoint source management programs. Under the executive order, if a state determines a proposed federal activity or project is not "consistent" with its management program, the federal agency must accommodate the state's concerns or explain in a timely manner why it cannot do so.⁴

Objectives, Scope, and Methodology

On January 4, 1989, the former Chairman and former Ranking Minority Member, Subcommittee on Investigations and Oversight, House Committee on Public Works and Transportation, asked us to determine whether federal programs and activities were inhibiting state efforts to control nonpoint sources of pollution. On the basis of subsequent discussions with Subcommittee staff, we agreed to answer the following questions:

- What barriers are inhibiting state and local nonpoint pollution control efforts; in particular, what federal programs are causing or contributing to state and local problems in controlling nonpoint sources of pollution?
- What actions can EPA take to help better focus federal efforts on reducing nonpoint pollution?

⁴As explained in ch. 4, however, if the federal agency chooses not to make changes in its program, the state cannot force the agency to do so.

The barriers inhibiting nonpoint source pollution control efforts are discussed in chapters 2 and 3. The actions we believe EPA should take to improve nonpoint source pollution control efforts are discussed in chapter 4.

Our work in addressing these issues largely consisted of (1) examining studies of the nonpoint source pollution problem and (2) interviewing a variety of federal and state officials in selected states and federal regions. Among the key studies examined were (1) America's Clean Water, the States' Nonpoint Source Assessment 1985, by the Association of State and Interstate Water Pollution Control Administrators, (2) Results of the Nationwide Urban Runoff Program, issued in 1983 by EPA, and (3) A Report to the Congress: Activities and Programs Implemented Under Section 319 of the Clean Water Act—Fiscal Year 1988, EPA's latest nonpoint source report. In addition, we relied upon recent GAO work examining specific aspects of the nonpoint source pollution problem. This work included, for example, analysis of the U.S. Department of Agriculture's (USDA) management of its water quality activities. We also reviewed some states' nonpoint source assessment reports on file at EPA headquarters.

During the review we obtained information on the following key questions concerning specific sources of nonpoint source pollution: (1) What is the environmental problem; (2) What federal policies, programs, and activities contribute to it; (3) What are EPA and other cognizant federal agencies doing to help deal with it; (4) What are states and/or local governments doing to resolve it; and (5) What remaining problems need to be addressed.

Interviews and fieldwork included contacts with officials at EPA headquarters, four EPA regions, and several states within the regions. The regions we visited—Philadelphia, Chicago, San Francisco, and Seattle—were selected to obtain insights into a variety of pollution sources, including urban runoff, resource extraction, silviculture, and agriculture. To obtain additional insights into specific issues regarding these pollution sources, we visited six states within these regions—California (agriculture), Maryland (urban runoff), Minnesota (agriculture), Oregon (agriculture, particularly grazing issues), Pennsylvania (resource extraction), and Washington (silviculture).

We also contacted officials at USDA and the Department of the Interior's Office of Surface Mining Reclamation and Enforcement at their headquarters and field offices. In addition, we contacted several other organizations, such as the Puget Sound Water Quality Authority, EPA's Chesapeake Bay Program Office, the Columbia River Intertribal Fisheries Commission, and the Association of State and Interstate Water Pollution Control Administrators. We also contacted representatives of a variety of environmental groups including the Sierra Club, Wilderness Society, Resources for the Future, Natural Resources Defense Council, and the Oregon and Washington Environmental Councils.

Our review work was conducted from May 1989 through July 1990 and was performed in accordance with generally accepted government auditing standards. The views of EPA and state officials responsible for the programs discussed in this report were sought during our review, and we have incorporated their comments where appropriate. In accordance with the wishes of the requesters' offices, however, we did not solicit formal comments from EPA on a draft of this report.

Barriers Impeding State Efforts to Control Nonpoint Source Pollution

The diversity and pervasiveness of the nation's nonpoint source pollution make it particularly difficult for the federal government to identify its causes and implement comprehensive solutions. Still, we found that certain federal policies and activities act as barriers to state and local efforts to deal with the problem. Removal of these barriers can go a long way toward helping to resolve the problem.

In other cases, we found that key barriers impeding state and local nonpoint source control efforts may not be directly attributable to federal activities. In a number of these instances, however, EPA and other agencies are missing opportunities to play a constructive role in helping state and local governments advance their control efforts. Of particular importance is the need for federal assistance in resolving data deficiencies and in developing necessary pollution criteria and standards.

Among the key barriers to state and local efforts to control nonpoint source pollution are the following:

- The way federal agencies pursue their primary missions can conflict with state water quality goals. The problem is most evident at USDA. Among the USDA programs that have inadvertently affected water quality are its crop price and income support programs and its timber programs.
- Vital monitoring data are missing on both the scope and impact of the problem and on the effectiveness of potential solutions. Without sufficient scope and impact information it would be difficult for public officials to reallocate resources towards the most serious problems and to convince landowners of the need for action. Without information on the effectiveness of corrective actions, it has been difficult to ensure that scarce resources are used in the most cost-effective manner.
- "Criteria documents" and other technical information are not available to states to enable them to set water quality standards for nonpoint source pollution. Such standards would allow states to identify (1) the level at which a pollution problem requires attention and (2) whether corrective actions are having their intended effect. State and federal officials told us that existing state water quality standards need to be supplemented because they were developed primarily to address point source problems and consequently have limited applicability in controlling nonpoint source pollution.
- The sheer magnitude of nonpoint source pollution dwarfs the resources available to deal with it, even with the best control efforts by federal, state, and local government. While available federal and state funding is on the order of millions of dollars, serious efforts to correct the

problem—even specific problems in limited geographical areas—would cost billions.

Agency Policies Conflict With Water Quality Goals

How federal agencies pursue their primary missions can inadvertently conflict with the Clean Water Act's objective to protect and restore the quality of the nation's waters. The conflict is especially true for USDA because some of its most significant programs and activities involve—and even promote—activities that can lead to increased nonpoint source pollution. Chief among these programs are the Department's farm commodity price and income support programs and timber harvesting programs.

Policies for Agricultural Commodity Programs Contribute to Water Pollution

USDA's commodity programs stabilize, support, and protect crop prices and farmer income.¹ Commodity programs are a dominant force in agriculture, with more than two-thirds of all U.S. cropland enrolled in these programs. All farmers growing eligible crops are entitled to participate in the farm programs. All crop price and income support programs rely on the concept of an acreage base planted with a given commodity and a proven program yield for those base acres.² The acreage base is the average of the acreage that is planted, or "considered planted,"³ in the program crop during the previous 5 years. The program yield is the average crop yield for the 5-year period from 1981 to 1985, dropping the highest and lowest yields. Farmers are not allowed to plant more than their base acreage in a program crop as long as they are participating in the farm program. Farmers for some program crops may opt to plant less of a program crop, but they will receive reduced payments. Land not planted must be devoted to conservation uses that involve measures to protect land from weeds and erosion. Common measures include growing grass and leaving crop residue on the ground.

The crop acreage base system gives participants limited flexibility to grow other program or nonprogram crops. A farmer growing a program crop cannot plant any other program crop unless that farmer also has a crop acreage base for that crop (the "cross-compliance" provision). For

¹Program-supported commodities include feed grains, wheat, soybeans, cotton, tobacco, peanuts, rye, rice, sugar, wool, mohair, honey, and dairy products.

²See "Impact of Commodity Policy on Alternative Agriculture" in the National Research Council, *Alternative Agriculture* (Washington, D.C.: National Academy Press, 1989), page 69.

³Land is "considered planted" if it is taken out of production to comply with program requirements or if it could not be planted because of weather or other conditions.

example, a participating farmer growing corn would lose benefits for the corn program if the farmer also grows wheat on those acres but does not have an established wheat acreage base.

In a February 1990 report,⁴ we noted that such requirements reinforce farmers' use of conventional farming practices and that many of these practices contribute to soil erosion and water pollution. A major problem involves the specialization in program crops year after year, which the program encourages by basing benefits on historical crop production levels. This practice depletes the soil and leads to pest problems, which, in turn, may lead to a greater need for agrichemicals, including synthetic fertilizers and pesticides. By the same token, these program provisions make it economically difficult for farmers to adopt alternative practices (i.e., crop rotation, maintaining protective soil cover, and use of resistant crops) that would reduce agrichemical use and soil erosion.

USDA has recognized that the existing commodity programs tend to discourage adoption of crop rotation that would reduce the use of fertilizers, pesticides, and other chemicals. The Department has proposed changes to the 1990 farm bill to allow farmers to plant and harvest any combination of program crops or to plant but not harvest legumes, grasses, and other soil-building crops without loss of benefits.

USDA has also acknowledged that its programs affect water quality and has initiated, in recent years, several measures to deal with the problem. In its January 1989 report, A National Program for Soil and Water Conservation: The 1988-1997 Update, USDA established water quality as its second priority, behind controlling soil erosion on rural lands, giving it greater attention in a variety of agency programs such as research, education, and technical and financial assistance.

USDA subsequently began its Water Quality Initiative, which is designed to determine the relationship between agricultural activities and groundwater quality and to develop and encourage the adoption of economically effective agricultural and agrichemical management practices that protect water quality. To accomplish these goals, USDA plans to operate programs in three areas: (1) research and development, (2) data base development and evaluation, and (3) education and technical assistance.

⁴Alternative Agriculture: Federal Incentives and Farmers' Opinions (GAO/PEMD-90-12, Feb. 16, 1990).

USDA expects its Water Quality Initiative to be more comprehensive than prior water quality efforts. Whereas previous programs historically focused on the effects of soil runoff on surface waters, the initiative addresses agricultural chemicals and groundwater contamination, in addition to general concerns about agricultural nonpoint source pollution.

The initiative is also expected to be better coordinated than prior water quality efforts, which were managed using a decentralized, agency-by-agency approach. For this initiative, USDA developed a 5-year Water Quality Program Plan. Many of the initiative's activities will be joint efforts among a number of USDA agencies, and involve EPA, the U.S. Geological Survey, and state and local entities as well. In addition, intradepartmental committees are responsible for the ongoing coordination of each of the initiative's activities. All the agencies involved in the initiative will participate in coordinated evaluations of their respective activities.

While these steps signify that the Department is beginning to better manage and coordinate its water quality activities, we concluded in a previous report that USDA needs to improve its focus on water quality responsibilities if it is to achieve its water quality goals.⁵ We noted that the major portion of USDA's water quality activities are still being planned and implemented at the Under and Assistant Secretary level, agency-by-agency, providing limited interaction between agencies' program planning or implementation. Although USDA has established a Working Group on Water Quality, it does not have authority to monitor overall water quality progress and to change the direction of programs, if necessary. Also, it is unclear who is responsible for coordinating with other departments and agencies. To deal with these problems, we recommended that USDA establish a permanent, full-time, departmentwide, focal point to oversee the planning, implementation, and evaluation of all its water quality programs and activities.

⁵Agriculture: USDA Needs to Better Focus Its Water Quality Responsibilities (GAO/RCED-90-162, July 23, 1990).

**Forest Service Policies
Have Traditionally
Emphasized Timber
Production Over
Environmental Protection**

Silviculture, the management of forest land for timber, can affect water quality in several ways. For example, erosion and mud slides can occur when soils and hillsides are disturbed by falling timber, logging machinery, towed logs, and logging road construction and use; streams may be polluted by waste timber and brush; shading vegetation may be removed, resulting in increased water temperatures and injury to cold water gamefish; and water quality may also be degraded by applications of pesticides, fertilizers, and fire retardants to forest lands.

The Forest Service, part of USDA, is one of the nation's largest land managers and timber producers. The Forest Service reported that, as of September 1989, it managed and protected a 191-million acre National Forest System—an area nearly as large as the 14 eastern states from North Carolina through New England. (See fig. 2.1., pg. 20-21.) In 1982 the Forest Service reported that in the western states, approximately 56 percent of all commercial timber land was under federal control. These lands contain not only timber but also much of the spawning and rearing habitat for the nation's fisheries. The national forests in California, Idaho, Oregon, and Washington contain about 50 percent of these states' salmon and steelhead trout spawning and rearing habitat.

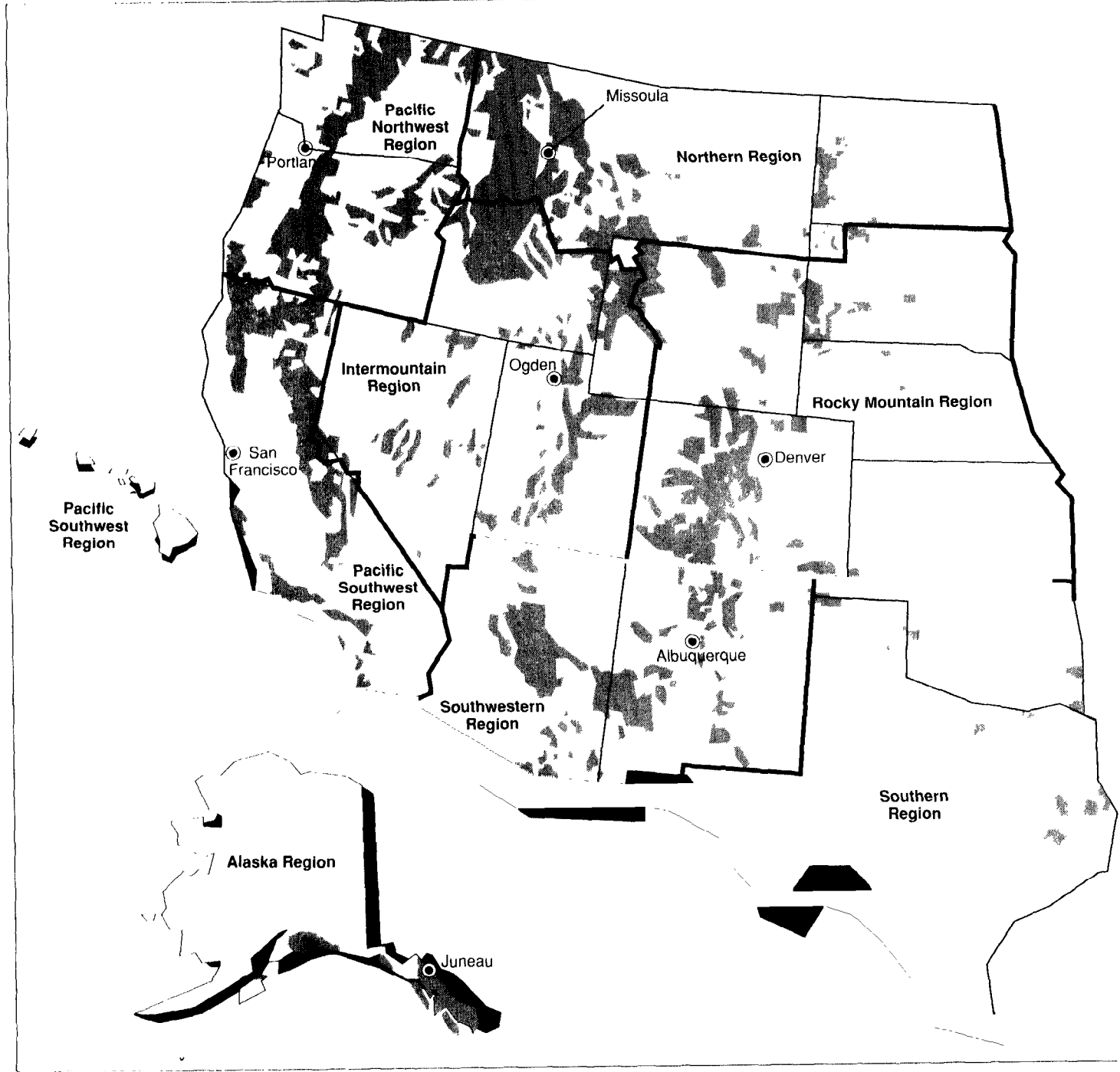
The Forest Service is responsible for balancing the potentially conflicting objectives of harvesting timber while protecting the water quality on these lands. On one hand, the Service is required to provide a steady flow of timber to help meet the nation's need for wood products. On the other hand, it is required to protect and develop the national forests' other resources such as soil and water, and fish and wildlife. The protection of fishery resources from the potentially harmful impacts of timber harvesting is accomplished primarily through the restriction of timber activities in and around streams.

Environmental groups have consistently maintained that the Service has emphasized timber production at the expense of protecting water quality and other environmental goals, and they cite as evidence the way the Forest Service allocated its resources, with most of the agency's budget devoted to timber harvesting, and only a small amount to its fish and wildlife, and soil and watershed management programs. Forest Service officials acknowledge this historical funding emphasis. The Budget Coordinator on the Headquarters' Fisheries and Wildlife staff estimated that the agency's timber program has traditionally been funded at 85 to 90 percent of its requirements while the programs that protect and develop the forests' other resources have generally received 60 to 65 percent of their funding requests. Other Forest Service officials also told

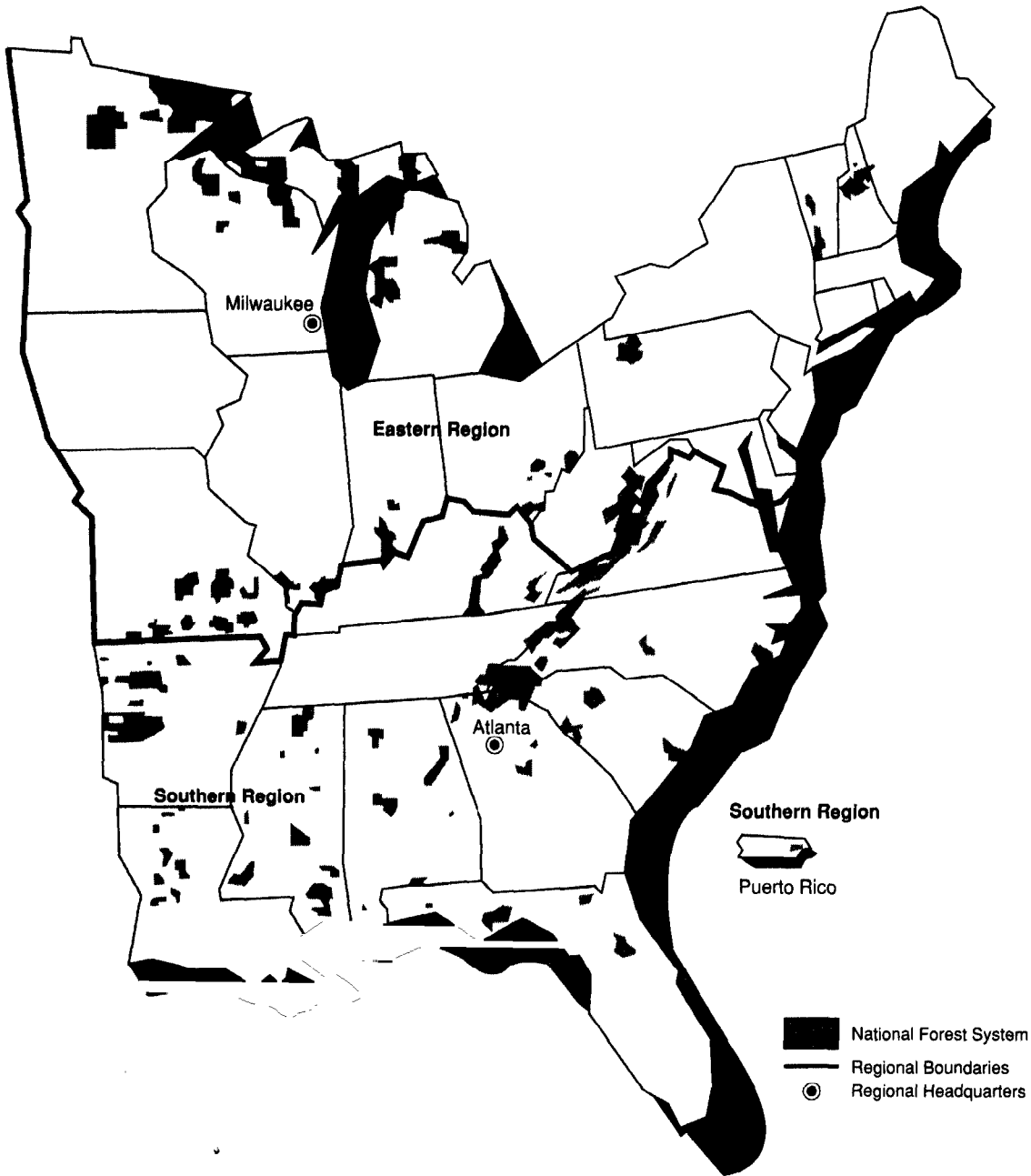
us that meeting timber harvest quotas has been a very high-priority activity for forest supervisors. They said these quotas have previously sent a message throughout the agency that timber production is more important than the protection of other resources such as water quality or fisheries.

Nevertheless, the Forest Service may be lessening its traditional bias towards timber production. For example, Forest Service officials told us that several actions have been taken in recent years, including reducing the size of clear cuts, implementing silvicultural best management practices, and using buffer strips along streams. Also, funding for the agency's watershed and air management, and wildlife and fisheries programs has been substantially increased in recent years. The watershed and air program increased 54 percent from fiscal year 1987 to fiscal year 1990, and the wildlife and fisheries program increased 98 percent for the same period. Forest Service officials acknowledged, however, that even with the increases in the fish and wildlife program, fish and wildlife activities are still underfunded.

Figure 2.1: National Forest System of the Forest Service



Chapter 2
Barriers Impeding State Efforts to Control
Nonpoint Source Pollution



Source: U.S. Forest Service, May 1988.

Information Deficiencies Restrict States' Ability to Deal With the Problem

Important monitoring data are missing on both the scope and impacts of nonpoint source pollution and on the effectiveness of potential solutions. State and local officials need information on the extent of the problems to educate landowners (and the public at large) on the impact of their activities and on the need to prevent such problems. Information on the effectiveness of corrective actions is needed to identify whether such actions are having their intended result or whether revised strategies are needed.

Extent of the Problem Is Not Known

We have identified data deficiencies on the extent of the nonpoint source pollution problem. In particular, we noted data deficiencies on (1) mining discharges from abandoned noncoal mines in Western states and (2) silvicultural activities in Washington State that illustrate the need for better information.

Abandoned and Inactive Noncoal Mines

In a 1976 study, an EPA contractor found that 80 percent of the nonpoint source pollution from inactive and abandoned ore and mineral mining areas was occurring in five states—California, Colorado, Idaho, Missouri, and Montana. These states' recent nonpoint source assessments and discussions with state officials confirm that inactive and abandoned noncoal mines and their associated wastes continue to pollute thousands of stream miles. The principal pollutants from these mines and mine waste piles were acid mine drainage, heavy metals, and sedimentation. According to state officials, however, the data upon which these determinations are based represent only a portion of the historic noncoal mining problems in these states. For example, a Colorado official said that the state had studied the environmental impact from about 8,000 abandoned noncoal mines but that the mines studied were only a small portion of the total estimated number of 50,000 abandoned/inactive mines in Colorado.

A task force of the Western Governors' Association recently identified abandoned/inactive noncoal mines as a major pollution problem but noted that data collection efforts are needed to better define the extent of the problem. In response to this concern, officials in EPA's Office of Solid Waste stated that EPA will provide funding to the states so they can identify available data on these mines.

The Congress has recognized the problem of abandoned noncoal mines and the need to develop data about it. In October 1989, the House of Representatives passed H.R. 2095, Abandoned Mine Reclamation Act of

1989. Among other things, H.R. 2095 would create a fund to be administered by the Department of the Interior. Federal grants from the fund would be used by the states to reclaim noncoal abandoned mines. To participate in funding, a state would be required to develop an inventory of land and water resources that have been harmed by past noncoal mining and are in need of reclamation.

Silviculture Impacts

Because Washington State does not have sufficient data, it may not know the extent of nonpoint source pollution from silviculture. In its August 1989 report, Nonpoint Source Pollution Assessment and Management Program Plan, the Washington State Department of Ecology stated that only 12 percent of the state's approximately 40,000 river miles and 26 percent of its 614,000 lake acres have been assessed. Furthermore, the Manager of the Nonpoint Source Unit of the Washington Department of Ecology told us that the state's assessment was not representative because the data base contains little information on small streams and remote lakes where silvicultural activity might be causing significant pollution problems. Also, he said that most of the information on the condition of the state's water bodies comes from ambient water quality monitoring stations, which are primarily located and operated to evaluate point sources of pollution and, as such, are of limited value in identifying nonpoint source pollution problems.

Also in its 1989 report, the state noted that there is an absence of adequate monitoring data and that silvicultural nonpoint source pollution problems are probably being underreported. It also states that silvicultural activity is affecting only 1 to 3 percent of the state's impaired rivers, yet in 1982 the Forest Service reported that commercial forest lands covered about 42 percent of Washington's land mass. State officials said their ability to develop specific corrective actions is limited because data are not adequate to identify and locate each pollution problem. Similarly, Forest Service officials are developing management plans for timber sales, grazing allotments, and other proposed activities on federal land within the state without comprehensive stream quantity and quality information.

Both Washington State and Forest Service officials acknowledge that limited data complicate decisions on whether forest operations will negatively impact water quality. However, they are implementing programs to augment the information they have. The Manager of the Nonpoint Source Unit of the State's Department of Ecology stated that he will use water quality data from field monitoring of silvicultural impacts on state and privately owned forests to build on the limited information

currently available from the fixed sampling stations. In addition, he stated that the Department is negotiating with the Pacific Northwest Region (Region 6) of the Forest Service to obtain more monitoring information on the condition of state waters located in the national forests.

The Forest Service plans to inventory the condition of a small part of the approximately 20,000 miles of rivers and streams in the region. The detailed river/stream inventory will cover approximately 10 percent of the region's miles of rivers and streams over the next 2 years. Forest Service Region 6 officials stated that this inventory will look at the waterways in relation to the state's water quality standards and at the general condition of the waters as fishery resources. It will note such things as the location and condition of spawning areas, the presence and size of pools, the existence and condition of habitat structures and obstructions to fish passage, and the location of places where sediment accumulation could become a problem. The Manager of Washington State's Nonpoint Source Unit stated that the Forest Service's inventory efforts have a long way to go but that its initial effort represents a reasonable start. It will take a lot of resources to inventory some 2,000 miles of waterways, particularly considering the extra efforts involved such as habitat evaluations that are more extensive than basic water monitoring. Forest Service officials told us that although better information will be helpful, the Forest Service does not have to wait for this information before taking action to control nonpoint source pollution. They are already implementing best management practices because prevention of problems is more productive than trying to clean up after damage has occurred.

Information on Effectiveness of Nonpoint Source Corrective Actions Is Often Missing

In our August 1988 report,⁶ we noted that to ensure that limited funds are being spent where they will have the greatest impact, information is needed to measure the effectiveness of EPA programs. We emphasized that the lack of such information was aggravated by reductions in environmental monitoring activities and problems with the quality of data that are collected. We maintained that these problems hamper EPA's ability to detect and assess changes in the environment.

Federal and state officials also told us that before necessary resource investments can be made to deal with nonpoint source pollution, they need some indication that the corrective actions planned will have their

⁶Environmental Protection Agency: Protecting Health and the Environment Through Improved Management (GAO/RCED 88-101, Aug. 16, 1988).

intended effect. To obtain such assurances, they maintain that they need basic monitoring data identifying the cause of the problem and the effectiveness of alternative actions to control it. However, such activities are generally not being undertaken.

Information Deficiencies Caused Largely by Inadequate Monitoring

The major cause of information deficiencies on both the extent of the nonpoint source problem and the effectiveness of corrective actions is the lack of monitoring data. According to EPA's National Water Quality Inventory: 1988 Report to Congress, for example, pollution levels have been assessed for only 20 percent of the nation's coastal miles, 29 percent of the stream miles, and 41 percent of the lake and reservoir acres. Moreover, the available data often focus on point sources of pollution rather than nonpoint sources. EPA acknowledged this problem in its August 1989 A Report to the Congress: Activities and Programs Implemented Under Section 319 of the Clean Water Act—Fiscal Year 1988, noting that the nation has focused largely on impacts caused by traditional point sources because these discharges were causing major, visible problems in our nation's waters.

EPA has also acknowledged that the absence of monitoring data on the effectiveness of corrective actions has been a major barrier to controlling nonpoint source pollution. For example, EPA's September 1987 report, Surface Water Monitoring: A Framework for Change, noted that information gaps preclude water quality managers from assessing the environmental benefits of nonpoint source management actions and point source controls. The EPA report further noted that the agency does little ambient (in stream) monitoring to determine if programs or "best management practices"⁷ are working as they were designed. It added that without data on the effectiveness of alternative actions, little incentive exists to make mid-course corrections to programs or policies that may not be working as originally planned.

Federal and state officials in some of the states we visited generally substantiated the lack of effectiveness monitoring. Without information on the effectiveness of corrective actions, these officials generally questioned whether implemented best management practices are as effective as they are thought to be. According to these officials, money is seldom available to carry out programs and to monitor for their effectiveness

⁷Best management practices are methods, measures, or practices to prevent or reduce water pollution, including but not limited to, structural and nonstructural controls, and operation and maintenance procedures.

but such monitoring is needed to ensure that actions taken will have their intended effect.

States Lack Technical Information Needed to Develop Water Quality Standards

State water quality standards are a key element of EPA's and the states' programs to control nonpoint source pollution because they are needed to identify at what level a pollutant concentration becomes a problem. They are also needed to measure the effectiveness of actions taken to control nonpoint source pollution. However, EPA has not developed technical information or "criteria" upon which standards to control nonpoint source pollution are based.⁸ EPA has issued some water quality criteria to guide states in developing surface water quality standards. However, current state standards are generally oriented towards point sources of water pollution and often do not adequately measure nonpoint source pollution impacts. EPA has not developed criteria for groundwater, and water quality standards do not exist at all for many pollutants in groundwater.

Current Standards Oriented Toward Point Source Problems

While state water quality standards for surface waters exist for many pollutants, Forest Service, Bureau of Land Management, Oregon, and Washington State water quality officials told us that these standards were generally developed for point source pollutants, and need to be modified and supplemented to deal with nonpoint source pollution. For example, Forest Service officials told us that their best management practices for dealing with silvicultural nonpoint pollution are measured against point-source oriented state standards for water temperature, turbidity (presence of suspended solids such as sediment), and dissolved oxygen. As such, these standards are usually established numeric thresholds that are applied uniformly. According to these officials, this approach should be modified for nonpoint source pollution because it does not allow for uniqueness in site-specific requirements, the influence of natural occurring conditions, natural variability, or pre-existing conditions.

Forest Service officials explained that important factors in identifying and delineating nonpoint source pollution impacts are not fully addressed in turbidity and water temperature standards. Pollution standards for surface waters do not address the impacts that certain nonpoint sources of pollution can have on the physical condition of a

⁸Criteria information is scientifically derived values that establish in-stream water quality conditions that protect the ecosystems. EPA develops criteria to protect aquatic life and human health.

stream and the aquatic community that inhabits it. For example, sediment can blanket the bottom of a stream and smother aquatic plants and fish eggs, and it could make site-feeding and breathing more difficult for resident fish and aquatic insects. Although they believe sediment needs to be controlled, Forest Service officials stated that it is hard to determine and set reasonable, numeric sediment thresholds because of naturally occurring conditions and differences between areas and over time. Also, they cannot guarantee that unusual storm events will not result in standard violations. In summary, they want EPA's existing standards modified and supplemented with additional standards that will improve nonpoint source pollution control for silviculture while at the same time allowing for reasonable timber operations.

According to Forest Service officials, nonpoint source pollution may also be controlled by limiting the extent of change made to the populations of aquatic insects and fish as a result of activities that produce nonpoint source pollution. Because different aquatic organisms react to various types of pollution in different ways, periodic surveys of a stream's organisms can indicate changes in the quality of the water and help to identify the probable nature and sources of pollution. To use this approach, biological standards are needed to indicate what aquatic populations would be in streams of good quality so they can be used as a frame of reference in determining if a stream's organisms are being degraded. Forest Service officials said few states have developed such standards to aid in the control of nonpoint source pollution.

EPA has known for some time that the control of nonpoint source pollution would require different approaches and tools than those used to address the nation's point source problems. It has also acknowledged that states would need help with the criteria upon which development of water quality standards is based. However, the agency has chosen not to emphasize development of water quality criteria that are specifically tailored to the needs of nonpoint source pollution control, focusing its efforts instead on point source pollution.

In April 1990, EPA published national guidance on developing biological standards that requires states to develop and establish these standards in the next 3 years. In addition to biological standards, EPA officials acknowledge that sediment standards and other nonpoint source-oriented standards need to be established. In its 1989 Nonpoint Sources: Agenda for the Future, EPA indicated that it will continue research on this problem and will issue additional criteria for selected waters within the next 3 years.

Groundwater Standards Are Often Missing or Inadequate

While standards for surface waters are needed to better measure the impacts of nonpoint source pollution, no federal program currently exists to develop groundwater criteria upon which standards are based. Such standards are important, however, because (1) nonpoint source pollution can contaminate groundwater as well as surface waters and (2) groundwater is the source of approximately half the nation's drinking water and accounts for almost all drinking water supplies in rural areas. Two of our recent reports have documented that, in the absence of technical EPA support in this area, many states lack information to develop adequate standards to protect groundwater from such problems.

In a 1988 report, we noted that state standard-setting activities were hampered by a lack of technical information from EPA.⁹ In addition to having inadequate information upon which to base adequate standards, states often duplicate one another's efforts in collecting and analyzing information. We concluded that additional information about contaminants should be developed and disseminated if state standards are to be developed in an efficient and technically sound fashion.¹⁰

In a subsequent report, we noted that in the absence of EPA groundwater criteria, many states rely on federal drinking water standards as groundwater standards.¹¹ However, we found that the appropriateness of doing so is debatable—in the large majority of the locations we examined, groundwater quality surpassed the drinking water standards for all substances measured. In such instances, the adoption of drinking water standards as groundwater protection standards would potentially allow degradation of a considerable amount of groundwater.

To assist state groundwater standard-setting activities, we recommended in our March 1988 report that EPA provide the needed technical information through a "criteria document program."¹² EPA maintained

⁹See Groundwater Standards: States Need More Information From EPA (GAO/PEMD-88-6, Mar. 16, 1988).

¹⁰A 1989 report by the National Governors' Association made similar observations, noting that while EPA had made some progress in providing health risk guidelines for some agricultural contaminants, the limited number of guidelines complicated the efforts of many states to protect their groundwater. See Managing Agricultural Contamination of Ground Water: State Strategies (Washington, D.C.: National Governors' Association, 1989), p. 18.

¹¹See Groundwater Protection: The Use of Drinking Water Standards by the States (GAO/PEMD-89-1, Dec. 20, 1988).

¹²A groundwater criteria document program is a uniform set of information documents that provides the states with a single, centralized reference source for groundwater contaminants.

that such an effort would be too costly and that the same need could be met by consolidating existing information on the health effects and environmental fate of specific substances found in groundwater. We responded at that time, and continue to believe, that without the expanded information base that would be available through such a program, states are left to develop groundwater standards without needed information.

Magnitude of the Problem Dwarfs Resources Available to Deal With It

Officials in five of the states we visited identified the lack of resources as a key barrier to controlling nonpoint source pollution. Although some states have or will allocate millions of dollars to deal with the problem, they maintain that it would require billions to correct.

Pennsylvania's efforts to clean up a single nonpoint source problem, for example, illustrates how the magnitude of the problem dwarfs resources. Pennsylvania established Operation Scarlift in 1967 to address the abandoned mine problem, including acid mine drainage pollution. According to a state official, Pennsylvania spent \$84.5 million on cleanup projects under this program and had only \$4.5 million available for new projects at the end of 1988. However, according to the state's nonpoint source assessment report, it has 1,701 stream miles polluted from acid mine drainage, and it will cost between \$3 billion and \$5 billion just to address acid mine drainage from these abandoned mines.¹³

Other states are attempting to set aside money to address nonpoint source pollution, but their funds are also limited in comparison to the magnitude of the problem. For example, the Manager of the Nonpoint Source Unit in Washington State's Department of Ecology stated that approximately \$8.3 million per year will be made available from state funds to address nonpoint source pollution, with an additional \$3.5 million annually from EPA funds. He also stated that an additional \$4.8 billion will be needed over the next 20 years to upgrade pollution control facilities and equipment and implement management practices to control nonpoint source pollution in Washington State. These funds are needed by state and local agencies to support the development of water quality management plans, information and education programs, and stormwater control, and to conduct monitoring needed to enforce the state's water quality regulations. According to the Assistant Director of

¹³The estimate includes only the cost to treat or otherwise abate polluted discharges originating from these mines. It does not include the cost of full reclamation of all abandoned mine sites in the state.

Water and Standards for the Washington Department of Ecology, state and local governments simply cannot absorb all these costs.

In 1987, the Minnesota Legislature established the Clean Water Partnership Program to protect and improve surface and groundwater in Minnesota. The legislature approved \$1.3 million for grants to local units of government. When this money is matched locally, approximately \$2.6 million will be available to complete studies and develop implementation plans for controlling nonpoint source pollution. The governor is requesting an additional \$4 million from the state legislature for project implementation in the 1990-91 biennium. However, according to the Director, Water Quality Division, Minnesota Pollution Control Agency, approximately \$1 billion will be needed to correct Minnesota's nonpoint source pollution problems through the year 2000. Without federal funds to help with this effort, he said that many priority surface waters polluted by nonpoint sources will not be cleaned up.

Conclusions

The diversity and pervasiveness of nonpoint source pollution presents an enormous technical and regulatory challenge to the states. We found that a number of federal policies, programs, and activities, however, have complicated the task. Chief among them are the policies of some USDA programs that have inadvertently conflicted with states' water quality goals, particularly the agency's commodity programs. As noted in this chapter, USDA's Water Quality Initiative will help deal with these problems but improved Department management will also be needed to be effective. Moreover, as we indicate in chapter 4, EPA can play a more constructive role to ensure that water quality concerns are appropriately integrated into national policies and programs.

In addition to the inadvertent impacts of some federal programs and activities, nonpoint source pollution presents data needs and other technical difficulties. These difficulties have impeded the states' ability to monitor and assess the extent of their problems and the effectiveness of potential solutions, as well as to set nonpoint source-oriented standards. Centralized development of the monitoring techniques and standard-setting information at the federal level would be more efficient than on a state-by-state basis. However, EPA has not fully addressed these issues because of resource constraints and its focus on point sources of pollution.

Finally, a fundamental factor underlying the barriers and inhibiting efforts to deal with nonpoint source pollution is the sheer magnitude of

the problem in comparison to the resources available to deal with it. While funds available to the states are on the order of millions of dollars, serious efforts to correct the problem—even specific problems in limited geographical areas—would cost billions.

Addressing Nonpoint Source Pollution by Coping With Sensitive Land Use Issues

One of the most difficult issues impeding efforts to control nonpoint source pollution is the political sensitivity associated with controlling land use practices that inadvertently cause nonpoint source pollution. Unlike point source discharges that can be more easily identified and regulated with pollutant discharge permits, nonpoint source pollution results from land use practices of millions of property owners and other individuals. In some cases, nonpoint source pollution can only be controlled by preventing certain land uses. In others, nonpoint source pollution can be controlled if land uses are practiced in an environmentally acceptable manner.

As noted in chapter 1, despite the states' authority to control land uses, land use controls tend to be considered a local community tool. As a result, any restrictions by the states, and the federal government in particular, tend to be controversial. Nevertheless, while political sensitivity over land use regulation remains a preeminent barrier in efforts to control nonpoint source pollution, an increased openness toward dealing with the issue is emerging as awareness of the seriousness of the problem has grown. We found a number of recent and innovative activities showing that (1) sensitive political land use issues are more likely to be confronted successfully when people are given good information about the risks nonpoint source pollution poses to their health and the environment and (2) controls required during development rather than after development are generally less expensive and politically more acceptable.

EPA recognizes in its Nonpoint Sources: Agenda for the Future that land use controls are a big hurdle to controlling nonpoint source pollution and that it needs to support state and local governments as they make difficult land use decisions. Chapter 4 discusses additional measures EPA should be taking to help regulators at all levels of government deal with land use issues associated with nonpoint source pollution.

Agriculture: Greater Reliance on Land Use Provisions to Protect Water Quality

Farm owners have traditionally resisted the idea of regulations governing whether or how to farm their lands. The agricultural community has long believed that pollution control can be done through various voluntary means. USDA has generally responded with a variety of programs that provide government funds, education, and technical assistance to farmers to encourage them to implement erosion controls that are consistent with environmental goals.

As indicated the 1989 National Governors' Association study, however, many people—including the general public—criticize voluntary programs as ineffective.¹ Farmers may favor regulatory controls over a voluntary program in some cases. For example, public attitude polls in Iowa during 1986, at a time when groundwater contamination was becoming a priority issue, showed that more than 75 percent of Iowa residents were in favor of regulatory limits on farm chemicals—a surprisingly large figure for a state with a large farm economy. Other studies also criticize voluntary programs as ineffective because of low participation, little incentive for farmer participation, and economic disincentive to participation. (Participation may be discouraged, for example, when a farmer's return on an investment in a best management practice is lower than his cost.)²

In recent years, however, an increasing awareness of agriculture's environmental impact has led the Congress to include more direct means of discouraging land uses considered detrimental to the environment. The Food Security Act of 1985, for example, authorized USDA to implement the Conservation Reserve Program (CRP), a program to remove up to 45 million acres of highly erodible cropland from production by 1990. Under this program, the Secretary of Agriculture can enter into contracts with producers to remove such cropland from production for 10 to 15 years in return for annual rental payments.

USDA originally implemented this program primarily for erosion control but modified it in 1988 to more directly address water quality concerns. At that time, the agency expanded the CRP eligibility criteria to include "filter strips"³ for cropland that pose a substantial threat to the degradation of water quality. Additional measures being considered in connection with the 1990 farm bill would expand use of the CRP to deal with water quality concerns.

In addition to CRP, other provisions of the Food Security Act made receipt of most federal farm benefits—commodity price supports, agricultural credit, and crop insurance—contingent on land stewardship practices. For example, under the conservation compliance provision,

¹Managing Agricultural Contamination of Ground Water: State Strategies, p. 6.

²For example, see Poison Runoff: A Guide to State and Local Control of Nonpoint Source Water Pollution, (New York: Natural Resources Defense Council, 1989) pp.45-50.

³Filter strips are 66- to 99-foot-wide fields located adjacent to streams and bodies of water, which when planted with grass, shrubs, or trees reduce the amount of sediment and chemicals entering surface waters.

producers with highly erodible lands that are not enrolled in CRP must develop certain conservation practices to reduce erosion on these acres to continue receiving federal farm benefits. However, in our March 1990 testimony before the House Agricultural Committee's Subcommittee on Department Operations, Research, and Foreign Agriculture,⁴ we concluded that USDA had relaxed the implementing regulations for the compliance provision and had thus reduced the incentive for producers to enroll their most highly erodible land in CRP. As a result, about 70 percent of the most highly erodible land eligible for CRP has not been enrolled through 1988.

Another key environmental provision of the act is the "swampbuster". Swampbuster attempts to protect the nation's wetlands by denying federal farm program benefits to producers who plant an agricultural commodity on wetlands converted to cropland after December 23, 1985.⁵ However, producers do not lose program benefits until they actually plant on the land they drained or modified. Thus, under the act, farmers can drain wetlands and receive benefits as long as they do not plant a crop. In our recent report,⁶ we suggested that the Congress consider amending the law that currently allows conversion of fragile lands without loss of benefits until an agricultural commodity is actually planted. Furthermore, we suggested that wetlands converted for planting be restored or the damage mitigated in order for participants to regain their eligibility for farm program payments.

Some States Have Enacted Their Own Agricultural Land Use Restrictions

In addition to this gradual acceptance of some form of agricultural land use regulation at the federal level, some states have enacted their own agricultural land use restrictions to control nonpoint source pollution. A clear motivating factor in these initiatives has been a recognition that a serious water quality problem exists for which voluntary actions alone are not sufficient.

One of the more innovative state land use statutes is Wisconsin's "Bad Actors" law. The statute was enacted with the strong support of farmers who had voluntarily invested in best management practices to

⁴General Accounting Office's View on Conservation Provisions of the 1990 Farm Bill (GAO/T-RCED-90-49, Mar. 15, 1990).

⁵Wetlands can improve water quality by trapping sediment and removing pollutants such as nutrients, pesticides and other toxic substances.

⁶Farm Programs: Conservation Compliance Provisions Could Be Made More Effective (GAO/RCED-90-206, Sept. 24, 1990).

control water pollution, but who had their efforts undermined by a few of their neighbors who had not cooperated. Under the law, a non-cooperating farmer may eventually be regulated more stringently as a "point source" discharger (i.e., subject to monitoring and discharge limits) if participation is not forthcoming. The Chief of the Nonpoint Source and Land Management Section of the Wisconsin Department of Natural Resources stated that the law has been primarily used thus far to control animal waste and construction runoff. He noted that the law focuses on the most severe situations because enforcement actions are time-consuming and staffing is limited.

The 1989 National Governors' Association study provides some additional examples of state land use restrictions to control agricultural water pollution, noting that such restrictions have generally arisen over concerns about contamination of drinking water supplies.⁷ The study describes a 1987 Maine statute to illustrate new state efforts to address agricultural pollution. The study states that the statute, prompted by numerous severe cases of pesticide contamination of both air and water, requires that land used for agriculture must be registered with the local authorities. The registration includes a statement of crops grown, chemicals used, and chemical application methods employed. Registration allows local authorities to enforce a 150-foot buffer zone around agricultural land, in which no new development may take place. The new law also requires that current neighbors be notified of the request for registration. The neighbors may appeal the eligibility of the land for registration.

Nevertheless, the study notes that while states have authority to control land use for groundwater protection purposes, land use controls, per se, tend to be considered a local matter. Consequently, many states have amended their zoning enabling legislation to authorize local governments to make groundwater protection a legitimate purpose of zoning. Significantly, the study notes that some states' zoning legislation "grandfathers" existing uses and therefore exempts them from regulatory changes. It therefore concludes that land use controls are of potentially greater use in controlling future land use patterns that may adversely affect groundwater than they are in controlling or limiting current land uses.

⁷See Managing Agricultural Contamination of Ground Water: State Strategies, pgs. 6, 8, and 23.

Resource Extraction: Preventing Long-Term Pollution Problems Through Early Consideration of Land Use Implications

Examination of the impacts of abandoned mines in Pennsylvania and the state's regulation of active mines as point sources reinforces the view that anticipating and preventing the effects of potentially harmful land uses is often far more effective than remediating these effects once they occur.

Coal mining activities occurred prior to the Surface Mining Control and Reclamation Act of 1977 and resulted in significant environmental degradation—scarred landscapes, abandoned mines, massive coal refuse piles, and streams polluted by acid mine drainage. In its recently completed nonpoint source assessment, Pennsylvania estimated that it would cost \$13 billion to \$15 billion to reclaim its coal mines abandoned prior to 1977 and correct the acid mine drainage from these mines.

Because states' mining laws afforded widely varying degrees of protection, the Congress enacted the Surface Mining Control and Reclamation Act of 1977 to better protect the environment from the adverse effects of coal mining. Under the act, a permitting program was created that required site evaluations, including examination of the hydrology of the site. The act prescribes uniform, minimum environmental protection standards and concurrent land reclamation requirements to control the surface effects of both underground and surface mining operations. Among its requirements, the act calls for the posting of a bond by the mine operator to ensure that funds will be available to reclaim a site when it becomes inactive.⁸ In addition, the act requires the establishment of a process to identify land areas of the state as unsuitable for all or certain types of surface coal mining operations.

Costly Water Quality Problems Not Considered in Early Permitting Decisions

As with other coal mining states, the full requirements of the 1977 act did not apply to Pennsylvania until the early 1980s, when the state obtained approval to operate its regulatory program ("primacy" program) from the Department of the Interior's Office of Surface Mining Reclamation and Enforcement. The period from 1977 to 1982 was Pennsylvania's "interim" program period, when the full requirements of the act were not yet in effect and reclamation standards were less stringent.

⁸We have reported, in a number of reports, deficiencies in the activities of the Department of the Interior and the states in implementing the act's requirements. These deficiencies included inadequate oversight by the Department of the states' primacy programs and inadequate state program activities in such areas as bonding, inspections, and enforcement.

In 1986,⁹ we reported that operators in Pennsylvania had forfeited bonds on mining sites primarily from the interim program and that the state had insufficient funds from the bonds for reclaiming these sites. At the time of that report, no reclamation had been performed by the state on about 15,000 acres with environmental problems, including water pollution and soil erosion. Since then, the state has reclaimed some sites with the assistance of funds provided from the state's general revenues and has provided remaining permits for other sites that will be reclaimed by new operators. However, as of October 1989, Pennsylvania still had about 15,000 acres with forfeited bonds in which no reclamation action had been performed by the state as a result of additional bond forfeitures occurring primarily in the interim program.

Moreover, in reclaiming these forfeited sites, Pennsylvania does not correct major water pollution problems that are occurring on some of them. According to an official of the state's Bureau of Abandoned Mine Reclamation, many significant acid mine drainage problems cannot be corrected because of the expense of building treatment facilities and providing perpetual maintenance of these facilities.

In addition to unreclaimed sites in which operators have forfeited bonds, the Director of the Pennsylvania Bureau of Mining and Reclamation expressed concern about a large number of additional inactive mines (in both the interim and primacy programs) that have discharges requiring treatment. In these cases, the operators have not yet forfeited their bonds and the state is holding the bonds to ensure that the owners will treat the discharges. However, according to the Director, the bonds held on these sites will not cover the cost of treating the discharges. The Bureau estimated that the total cost for treating all discharges from identified inactive surface and underground mines would be between \$38 million and \$52 million per year.¹⁰

⁹Surface Mining: Difficulties in Reclaiming Mined Lands in Pennsylvania and West Virginia (GAO/RCED-86-221, Sept. 22, 1986).

¹⁰Pennsylvania identified discharges from surface and underground mines as well as refuse disposal areas that require treatment to meet the state's effluent standards for coal mining. The annual costs are based on projections for amortizing the construction costs for treatment facilities and the annual maintenance costs over a 50-year period.

Land Use Decisions Are Crucial for Avoiding Future Environmental Damage

According to the Director of the Pennsylvania Bureau of Mining and Reclamation, acid mine drainage's potential burden on the state over the long term has led the Bureau to take a much harder look at each proposed mining site and the site's potential for future mine drainage problems. To approve a permit under the current primacy program, the state must conclude, on the basis of the applicant's hydrologic analysis of the site, that it will not generate post-mining discharges. The Director of the Bureau asserted that the state is doing a better job now of avoiding areas with potential acid mine drainage than it did several years ago, noting that the state was now denying many permits in areas with the potential to develop a discharge.

Urban Runoff: Building in Controls to Prevent Pollution in New Development Areas

The nation's urban runoff problems also illustrate the advantages of incorporating pollution control into the planning of new development rather than deferring controls until after the problem has occurred. Recent regulations proposed by EPA address urban runoff problems primarily in incorporated metropolitan areas. However, EPA and others agree that it is more cost-effective to undertake pre-development evaluations and to implement control measures during development.

Although urban runoff is a diffuse source of water pollution and is considered a nonpoint source, most is accumulated as stormwater and discharged through conveyances, such as stormwater sewers. Since the 1972 amendments to the Clean Water Act, EPA has been required to regulate municipal stormwater discharges as point sources by issuing permits under the National Pollutant Discharge Elimination System. Since 1973, EPA has issued various proposed and final regulations, but no comprehensive stormwater permit program has been implemented because of court challenges and other delays.

Under the 1987 amendments to the Clean Water Act, EPA is initially regulating municipal stormwater systems serving populations over 100,000.¹¹ In its December 1988 proposal, EPA laid out a number of options, but it indicated that it preferred to include only incorporated cities with populations of over 100,000, and to exclude counties from its definition. In doing so, EPA would exclude about 410 counties with populations over 100,000. According to EPA's proposal, most larger urbanized areas are comprised of one or more core cities surrounded by urbanized areas outside of city boundaries. Generally, the core areas are already

¹¹Under the 1987 amendments, all other stormwater discharges cannot be subject to regulation until Oct. 1, 1992.

developed and most new development is occurring outside the boundaries of the core cities.

For example, Fairfax County, Virginia, and Montgomery County, Maryland, have both been high-growth counties in the Washington, D.C., metropolitan area with 1988 Bureau of Census population estimates of 770,200 and 704,900, respectively. Both counties would be excluded from EPA's proposed regulations. EPA favors limiting coverage to incorporated municipalities to avoid the administrative complexities of dealing with (1) the thousands of municipal entities that exist within counties' boundaries and (2) the county governments. EPA points out that the legal authority, institutional mechanisms, and financial capability needed for a successful program do not exist in the case of all municipal entities, and that complex intergovernmental agreements would therefore be required.

The Natural Resources Defense Council criticized this approach, stating in its comments on EPA's proposal, that

"By delaying further the implementation of comprehensive stormwater programs in the areas of the country that are experiencing the most rapid growth, EPA is losing a valuable opportunity to prevent stormwater problems rather than rely on expensive structural controls after development has occurred."

The Council further stated that EPA's Nationwide Urban Runoff Program identified serious stormwater pollution in Nassau and Suffolk Counties on Long Island, New York, yet none of Long Island would be covered automatically under EPA's preferred approach. Finally, the Council pointed out that by justifying its approach entirely on the basis of administrative feasibility, EPA will minimize the number of permit applications during the first phase only to generate a massive influx of applications for all remaining stormwater in the second phase.

Although its preferred approach would apply only to discharges in incorporated municipalities, EPA acknowledges the advantages of expanding coverage to counties. According to EPA's proposal, most of the new development is occurring outside the incorporated cities, and these growth areas offer the most practical opportunities to reduce pollution. In its proposal, EPA stated that defining municipal systems on the basis of county boundaries "would allow municipalities flexibility to address stormwater concerns associated with many areas of rapid development, rather than relying more heavily on retrofitting controls in older urban

core areas defined by city limits.” EPA’s Nationwide Urban Runoff Program reported that requiring controls in areas under development is much more feasible and cost-effective than requiring controls in more fully developed areas.

Maryland’s Stormwater Control Program Focuses on New Development

Some states recognize the importance of implementing stormwater controls during land development. Maryland requires each county and municipality to adopt a stormwater management program designed to maintain the volume and quality of the runoff after development as it was before development.

Under Maryland’s legislation, a person is generally not allowed to develop any land for residential, commercial, industrial, or institutional use without submitting a stormwater management plan to the county or municipal jurisdiction. According to the Acting Director of Maryland’s Sediment and Stormwater Administration, each jurisdiction has established procedures for the review, approval, inspection, and enforcement of the plans. These program requirements apply only to new construction.¹²

Silviculture: Combining Mandatory and Voluntary Land Use Controls

Forest Service Region 6 officials and the Manager of the Nonpoint Source Unit for the Washington State Department of Ecology told us that Washington is a major timber-producing state and a key area for spawning fish, including various species of salmon. Headwaters are critical habitats for young game fish and the insects upon which they feed. They said that these headwaters can be degraded by heavy sedimentation from improper timber harvesting, which, in turn, can devastate fish’s spawning areas.

To protect water quality and fish, the Manager said Washington State has developed a coordinated approach to land use controls for nonpoint source pollution from silvicultural activities, which includes both regulatory and voluntary components. Using this program, the state, local, and industry officials believe they will be able to balance timber harvesting goals with water quality protection.

The Manager said the state’s Forest Practices Act, the Federal Water Pollution Control Act, and associated regulations set out silvicultural

¹²Also according to the Acting Director, the state appropriated \$2.5 million between 1984 and 1989 for grants to local communities to retrofit stormwater devices on developed sites.

best management practices and water quality conditions that must be adhered to. A voluntary Timber, Fish, and Wildlife Agreement negotiated between state agencies, Indian tribes, environmentalists, and timber industry representatives is the other component of the state program. Parties to this agreement promised to use a more flexible approach to improve the normally required best management practices. For example, they allowed more cutting of trees in a riparian zone because the plan provided for putting gravel in the stream bed, thus providing for greater fish enhancement.

Also, the members agreed to place additional land use restrictions on timber harvesting activities near the banks of streams, rivers, and lakes in order to better protect fishery habitat; to voluntarily preserve certain timber lands for upland wildlife management areas; to correct and restore previous habitat degradation; and to submit planned timber harvests for review and amendment to meet site-specific requirements for additional environmental protection measures. This agreement also established a framework for continued research, monitoring, and evaluation of whether implemented practices are protecting water quality.

Washington's silvicultural nonpoint source control approach shows how landowners, land users and government regulators can work cooperatively to balance the inherent conflict between timber production and environmental protection. As a result, Washington's approach has been cited as a model for other groups and states to consider in resolving their own land use conflicts.

Conclusions

Land use practices and patterns, so often at the root of nonpoint source pollution problems, have been among the most difficult barriers for states to overcome in dealing with nonpoint source pollution. Resolving these problems often requires developing technical solutions such as improved best management practices. Perhaps even more challenging, however, is the fact that solutions require a reorientation of basic values that have often placed private property rights above other considerations—such as the unintended water quality impacts of alternative land uses.

Political sensitivity over land use remains a formidable barrier to dealing with the nonpoint source problem. However, an increased openness has emerged at all levels of government to confront the issue as society has become increasingly aware of the extent of the nonpoint

source problem. Our review has identified a number of innovative programs and activities to address the problem, particularly at the state and local level.

These activities vary from one type of nonpoint source pollution problem to another, but they have at least two important traits in common. First, as illustrated in the discussions concerning agriculture, urban runoff, and resource extraction, it is both less expensive and politically more acceptable to build in appropriate land use controls as development takes place rather than after it has already occurred. Second, the public is much more likely to support such measures when they have better information about the risks that the problem poses to their health and environment. As we elaborate in the following chapter, we believe that short of imposing its own federal land use regulatory program, EPA can help state and local land use control efforts by more effectively identifying and publicizing the nature and extent of nonpoint source pollution problems, and by developing the standards and other technical information state and local regulators need to apply controls.

Strengthening EPA's Efforts to Control Nonpoint Source Pollution

EPA cannot be expected to solve the nonpoint source pollution problem alone, given the magnitude and diffuse nature of the problem. As previous chapters have noted, resolving this problem will depend on other federal agencies as well as EPA. State and local government and individual landowners also will have a significant role, particularly where land use issues are involved.

Still, as the nation's lead environmental organization for implementing the Clean Water Act, EPA is in a singular position to assume a principal role in coping with the problem. EPA acknowledges this responsibility in its *Nonpoint Sources: Agenda for the Future*, published in January 1989. That document presents an ambitious framework for EPA's efforts to deal with nonpoint source pollution for fiscal years 1989 through 1993. EPA declared that its agenda's goal is to provide strong leadership for the national nonpoint pollution control program and help states and local governments overcome barriers to successful implementation of nonpoint source measures.

Nevertheless, we believe EPA's agenda will remain largely unfulfilled if the agency remains on its present course. Resource constraints are an underlying problem, as they are in many environmental programs. However, in the case of nonpoint source pollution, the problem may reflect inappropriate funding priorities as well as shortages in absolute terms. EPA's budgetary priorities are overwhelmingly oriented toward controlling point sources of pollution despite the fact that (1) the agency identifies nonpoint source pollution as the primary cause of the nation's remaining water quality problems and (2) its own studies show that the comparative risks posed by nonpoint source pollution are at least as high (and are often higher) than the risks posed by point sources. We believe this imbalance needs to be addressed if many of the corrective actions discussed in this chapter are to be implemented.

In this chapter, we discuss EPA's plans for dealing with the key problems identified in this report, the problems likely to inhibit these efforts from succeeding, and our recommendations for developing an EPA agenda for the 1990s that will more effectively address nonpoint source pollution.

Resolving Conflicts Between Federal Agencies' Policies and Water Quality Goals

Policies of federal programs in pursuit of their primary missions conflict with water pollution control goals and are a major barrier to controlling nonpoint source pollution. We noted that the problem was of particular concern with USDA's commodities programs because agriculture is the primary contributor to the nation's nonpoint source pollution problems.

EPA acknowledges the problem in its Nonpoint Sources: Agenda for the Future but indicates that (1) the Water Quality Act provides states with the authority to help alleviate this problem through its "federal consistency provision" and (2) EPA is improving its coordination at the federal level with agencies whose activities affect water quality. Nevertheless, we found that several states in EPA's Regions 3 and 10 do not believe the federal consistency provision can realistically deal with the major water quality problems posed by federal activities. Moreover, while EPA has made some progress in coordinating with USDA, the problems posed by conflicting federal agency policies remains a formidable one for state nonpoint source pollution programs.

Federal Consistency Reviews Not a Serious Option for States in Resolving Conflicts With Federal Agencies

EPA's agenda points out that the federal consistency provision is a key tool for resolving conflicts between federal programs and state nonpoint source control activities. This provision is intended to help the states influence federal policies, projects, and activities that conflict with the policies, standards, and activities in their nonpoint source management programs. If the state determines that a proposed federal policy, activity or project is not "consistent" with its management program, the federal agency must accommodate the state's concerns or explain in a timely manner why it cannot do so.

However, state officials in EPA's Region 10 indicated that the consistency review process was of little use to them at this point. They noted that states have only just begun to implement their nonpoint source programs and that they do not wish to confront federal agencies. State officials in EPA's Regions 3 and 10 questioned whether individual states could effectively challenge the policies of major federal programs (e.g., USDA's commodity programs). Instead, the provisions may be useful only for questioning individual federal projects in a single watershed (i.e., the building of a new military base in an environmentally sensitive area). They maintained that broader issues are better handled by EPA at a national level.

The Chief of EPA's Nonpoint Source Control Branch acknowledged to us that the consistency provision in the Water Quality Act is somewhat limited in that it does not provide the states with a veto power over federal activities. He noted that the provision, in effect, acts as an informational requirement and basis for state-federal negotiation rather than a regulatory tool.

Improving EPA's Coordination With Federal Agencies Affecting Water Quality

EPA's agenda identifies the importance of EPA's role in developing a stronger partnership with other federal agencies and in ensuring that federal regulatory requirements are imposed in a way that aids states in implementing their nonpoint source control programs. EPA has made some progress in this respect with USDA—the agency whose activities probably have the greatest impact on water quality. For example, the Chief of EPA's Nonpoint Source Control Branch noted that EPA has been working with USDA agencies to ensure better coordination between the states' 319 programs and USDA water quality projects. State water quality managers are encouraged to propose USDA projects that will address state nonpoint source problems. In addition, EPA has developed personnel-sharing arrangements with some USDA agencies. Most EPA regions have had their single nonpoint source coordinator augmented by experienced Soil and Conservation Service staff members. The Forest Service has also provided a staff member in one EPA region. EPA officials have told us that these additional staff members have been able to provide program insights and have developed excellent nonpoint source materials.

While this effort helps to improve EPA-USDA coordination, EPA needs to encourage greater USDA consideration of nonpoint source pollution impacts in its policy development. To some extent, USDA has begun to address these issues through its Water Quality Initiative. However, as noted in chapter 2, it will take some time before the Department's initiative can resolve the fundamental water quality problems created by its programs. EPA officials have emphasized this point in our interviews and have acknowledged that they need to oversee USDA's performance and ensure that USDA's Water Quality Initiative has its intended effect.

Furthermore, while progress with USDA is important, it is only 1 of approximately 31 federal agencies with responsibilities for water-related activities. Some of these agencies' activities, such as highway projects sponsored by the Department of Transportation, also pose significant nonpoint source pollution problems. To deal with the federal establishment as a whole, EPA has led an intergovernmental nonpoint

source pollution task force that has brought together numerous agency officials to discuss nonpoint source conflicts and opportunities for inter-agency cooperation. However, the task force has not met since October 1988 because EPA wants to focus on a few key agencies. Also, the Chief of EPA's Nonpoint Source Control Branch stated that resource constraints have prevented the agency from pursuing the problem beyond the limited efforts underway to deal mainly with agriculture-related nonpoint source pollution. He noted that the limited EPA nonpoint pollution staff has had to devote most of its resources to developing program guidance and reviewing state assessments and management plans and section 319 grant proposals.

Developing Nonpoint Source Pollution Criteria and Standards

As indicated in chapter 2, a variety of federal and state officials have told us that they lack the technical "criteria" information needed to develop water quality standards. Such criteria are needed to identify at what concentration a pollutant becomes a problem and to measure the effectiveness of best management practices in controlling nonpoint source pollution.

The need for additional criteria has been recognized by EPA. Nonpoint Sources: Agenda for the Future acknowledges EPA's responsibility in this area, noting, for example, that "EPA needs to concentrate on providing states with sound information that allows them to develop and apply these new criteria." When asked why they were only now beginning to be developed, a Section Chief in EPA's Criteria and Standards Division told us that it was a matter of setting priorities. He explained that the Clean Water Act's initial requirements were oriented to controlling chemical pollutants from point sources, and, therefore, this is where the agency placed its initial emphasis. The next major effort was to get standards in place to control toxic pollutants. The last and current priority is to develop criteria for establishing water quality standards that better measure the impact of nonpoint source pollution.

An environmental scientist who formerly worked in EPA's Criteria and Standards Division added that it has taken considerable time to develop nonpoint source criteria and standards because an approach different from the one used for point sources is required. Point sources, for example, were easily identifiable pollution sources that were amenable to control through uniform limitations on their discharges. Additionally, the effectiveness of such controls could be easily measured; a limited number of entities were involved; and the cost of control measures was easily transferable to the public. In the nonpoint arena, he said, there

are innumerable sources that are not easily identifiable; the pollution is not as amenable to uniform control criteria; and the cost of control will not be easily transferable to the public.

Compounding these problems are continuing budgetary constraints and competing demands. The Chief of EPA's Monitoring Branch in its Assessment and Watershed Protection Division noted, for example, that EPA is trying to help states and agencies establish appropriate standards for nonpoint source pollution as well as monitoring techniques, but EPA has limited resources to do all the needed work. Faced with such constraints, the agency has not been able to do all it would have liked in developing monitoring techniques and nonpoint source criteria.

Monitoring Needed to Identify the Extent of Pollution and Effectiveness of Corrective Actions

EPA also acknowledges the importance of developing better information on both the extent of the nonpoint source problem and the effectiveness of actions needed to correct the problem. Without information on the effectiveness of corrective actions, we believe it is difficult for federal agencies to determine whether such actions are having their intended effect or whether revised strategies are needed. Without information on the extent of the problem, it is also difficult to convince people of the seriousness of the nonpoint source problems and actions needed to correct them.

EPA's Nonpoint Sources: Agenda for the Future acknowledges that a key part of the problem is the need for EPA to develop better monitoring techniques, or "protocols," for use by the states. These protocols would be specifically designed to evaluate nonpoint source impacts on the environment. This report and other EPA documents note that, not surprisingly, most of the monitoring performed has focused on point source data. EPA's 1988 National Water Quality Inventory, for example, notes that monitoring has historically been oriented towards detecting chemical pollutants from point sources by periodic samples at fixed stations. The Inventory notes that nonpoint source monitoring is more complex and costly because it is often episodic and unpredictable, varying from long-term, low-level inputs to high-level concentrated pulses. As noted above, an EPA official told us that limited resources are preventing EPA's Monitoring Branch from fully developing nonpoint source monitoring techniques.

Even though better criteria and monitoring information can help the nonpoint source control effort, EPA officials pointed out that control measures can and should be implemented before this information is

fully developed. This is especially important because it is easier to prevent nonpoint source pollution than it is to clean it up. Therefore, they said they will emphasize the implementation of best management practices as much as possible. But without statutory authority to require such practices, this approach will take time.

Public Education Efforts Need to Be Expanded

To persuade the public to support controversial land use decisions and make other sacrifices, a clearer connection must be made between individual activities, land use practices, and local water quality. However, while there are some notable exceptions, a lack of public understanding about the problem has been a major obstacle to dealing with nonpoint source pollution.

EPA plans to persuade the public about the need for action on nonpoint source pollution by encouraging states and local governments to adopt targeted watershed management approaches for specific rivers, streams, and drainage basins. On the basis of the experiences of special initiatives—the Chesapeake Bay, the Great Lakes, the Clean Lakes Program, and the National Estuary Program—EPA has found that it is much easier to build public consensus for action when people feel they are protecting a water resource that is of particular value to them.

Nevertheless, the agency recognizes that a broader public education effort would be needed to deal with nonpoint source pollution nationwide as opposed to solving the problem of a selected watershed. Its Nonpoint Sources: Agenda for the Future calls for the development of a detailed workplan for a program to help states and local governments develop public awareness programs. Among other things, it calls for EPA to

- identify and use other federal agencies' data bases/mapping capabilities/programs to assist EPA in developing materials (brochures, videos, public service announcements) that would describe the problem in everyday language;
- enlist other federal programs to communicate with specific audiences;
- enlist the cooperation of private sector parties involved in activities that prevent/contribute to nonpoint source pollution (i.e., agricultural associations, major trade associations, industry); and
- develop a children's education program to train teachers and provide educational materials in liaison with the federal Department of Education and the states.

Officials in EPA's Nonpoint Source Control Branch stated that public education is one of the highest priorities in their nonpoint source control efforts. They cited several examples of public awareness efforts including a newsletter, national posters, and an information clearinghouse. One official admitted, however, that only a small portion of the agenda had been implemented and much more needed to be done. For example, he noted that nothing has been done to enlist the help of private sector organizations or to develop an educational program. He cited resource constraints as the primary problem that has thus far inhibited EPA's efforts to increase public awareness about nonpoint source pollution.

Low Funding Priority for Nonpoint Source Pollution

As is evident from the discussion above, the major underlying barrier inhibiting EPA's nonpoint source control efforts is the low level of funding afforded nonpoint source pollution control. In an era of constrained budgetary resources, this problem is not unique to nonpoint source pollution—it is a problem shared by nearly all environmental programs. However, such constraints make it all the more important that the environmental risks posed by alternative pollution problems be considered in funding decisions. We acknowledge that risk should not be the only factor considered in allocating EPA's limited resources. For example, EPA's role in controlling point source pollution is inherently larger than it is in controlling nonpoint source pollution, and, therefore, its financial commitment to control of point source pollution is higher. Additionally, the resources needed to control nonpoint source pollution will need to come primarily from states and local communities. However, EPA has not allocated the amounts required to meet the most basic elements of its nonpoint source pollution agenda, such as coordination with other federal agencies. As discussed in this section, EPA's own analyses suggest that this situation inadequately reflects the risk the problem poses. Specifically:

- EPA's comparative risk study shows that nonpoint sources pose a more serious risk to the natural ecosystems than point source discharges.
- EPA's budget priorities in water pollution control are, nevertheless, oriented overwhelmingly toward point source pollution problems.
- EPA maintains that states have flexibility to support nonpoint source pollution control activities through various supplemental funding sources, even though most of these sources are, in fact, largely unavailable for nonpoint source funding.

EPA Studies Show Nonpoint Source Pollution Poses Serious Health and Environmental Risks

In an August 1989 report assessing the comparative risks posed by alternative pollution problems, EPA found that risks posed by nonpoint source pollution are generally more serious than those posed by pollution discharges from point sources.¹ The study, based on analyses by 3 of EPA's regions in conjunction with the agency's Office of Policy, Planning, and Evaluation, began with a list of 18 to 24 of the most important environmental problems facing each region. Each region then analyzed and ranked each problem in terms of its relative health and ecological risk.

The results of the assessment should be interpreted with caution since the risk posed by alternative problems cannot be quantified with precision. Nevertheless, the study's conclusions about the relative importance of nonpoint source pollution compared with point source pollution showed the following:

- **Health risk.** Point sources and nonpoint sources of water pollution appear to pose roughly comparable risks, with point source discharges indicated as a higher health risk in some instances and nonpoint source discharges as higher in other instances. Among the key health risks associated with nonpoint source pollution was bacteriological contamination of shellfish.
- **Ecological risk.** Nonpoint source pollution was clearly identified as a more serious problem by two of the three regions and a comparable risk by the third region. Regions cited data indicating that nonpoint sources degrade more water bodies than point sources. The study indicated that ecological risks from specific types of nonpoint source pollution vary considerably by region. For example, it noted that the effects from silviculture pollution were higher in the Northwest (Region 10) than in the Mid-Atlantic area (Region 3) but that the reverse was true for nonpoint source effects from mining.

The study identifies a number of reasons why such a discrepancy may exist. It notes, for example, that resource levels tend to be more closely aligned with how serious EPA perceived the problem to be in the past, rather than with the risks they pose now. Reflecting the political realities within which federal agencies must operate, it also notes that the agency's priorities tend "to align more closely with public opinion and its embodiment in legal mandates than with risk." The Director of EPA's Office of Regulations and Standards substantiated this observation, explaining that, among other factors, the agency's budgetary priorities

¹Comparing Risks and Setting Environmental Priorities (Washington, D.C.: EPA, Aug. 1989).

reflect statutory mandates that place greater emphasis on point source control programs rather than on its nonpoint source programs.

**EPA Devotes Water
Quality Funds Primarily
for Point Source Activities**

In commenting on the funding priority devoted by the three regions to these and other pollution problems, the EPA study noted that "The Regional rankings sometimes contrast very sharply with the relative levels of Regional resources devoted to these different problem areas." It cited the imbalance between point and nonpoint sources of pollution as an example, noting that

"In the water quality area, nonpoint sources and habitat modification cause the greatest problems. Yet the bulk of program resources are devoted to municipal and industrial point sources"

We found these observations to be consistent with the overall budgetary picture regarding EPA's funding of nonpoint source control activities. Although nonpoint sources of pollution are recognized as the leading reasons for polluted waterbodies, EPA continues to spend the vast proportion of its water pollution control funds on point source pollution. For example, less than 6 percent of fiscal year 1990 funding for the agency's point source- and nonpoint source-related water pollution control activities were devoted to nonpoint-related activities.² Moreover, as noted in table 4.1, EPA has requested only \$22 million out of the \$400 million authorized by the Water Quality Act for funding under section 319 for the period of fiscal years 1988 through 1991. As also noted in table 4.1, EPA's first request for section 319 funding was in fiscal year 1990, in which it requested \$7 million and the Congress appropriated \$38.9 million.

²Based on estimates provided by EPA officials. The funds included both EPA salaries and expenses and federal grants to states and local governments.

Table 4.1: Funding Under Section 319 of the Water Quality Act

Dollars in millions			
Fiscal year	Authorized	Requested	Appropriated
1988	\$70	\$0	\$0
1989	100	0	0
1990	100	7 ^a	38.9
1991	130	15	
Total	\$400	\$22	

^aIn fiscal year 1990, the President's budget requested \$7 million under another section of the act for the states to implement their management plans under section 319.

^bAs of Sept. 1990, fiscal year 1991 funds for EPA had not been appropriated.

Other Sources of Funding Cited by EPA May Not Be Available for Nonpoint Source Control Activities

EPA officials have explained their limited funding requests for the nonpoint source program by noting that sufficient funds were available under other sections of the act to fulfill section 319's requirements for developing nonpoint source pollution assessments and management programs. For example, in June 1989 testimony before the Subcommittee on Environmental Protection, Senate Committee on Environment and Public Works, EPA's Acting Assistant Administrator for Water stated that nonpoint source funding was allowable under the new State Revolving Loan Fund program. EPA is authorized to award grants to the states to capitalize their revolving funds to provide loans but not grants for the construction of wastewater treatment plants. Under that program, EPA maintained, states could structure their loan programs to fund nonpoint source controls and to finance implementation of the states' management programs.³

While these funds are nominally available to implement management plans, information from both EPA and the states we visited indicates that the funds will generally be needed by local communities for the construction or modification of wastewater treatment plants. In its recent nonpoint source annual report to the Congress, for example, EPA noted that states were unlikely to use such discretionary authority for nonpoint source management programs "largely because of the high priority accorded to construction of publicly owned treatment works." Indeed, according to EPA's 1988 Needs Survey Report to Congress, the capital investment or costs necessary to meet the nation's municipal wastewater treatment requirements under the Clean Water Act will exceed \$83 billion for the design year (2008) population. State and local

³State revolving funds will replace funding under EPA's Construction Grants program, which will not be funded after fiscal year 1990.

officials have expressed concern over whether state revolving loan funds will be sufficient to replace the existing construction grants.

Overall, most of the states in our review reported that construction grant allotments and the revolving funds will be largely unavailable to fund nonpoint source control activities because these funds will have to be devoted to construction of wastewater treatment plants.

Conclusions

The magnitude and diversity of nonpoint source pollution make it particularly difficult to control. Unless the problem is addressed, however, little progress will be made in attaining the nation's water quality goals.

This report has identified a number of problems at the federal level that inhibit state and local efforts to deal with nonpoint pollution. In certain instances, federal policies and activities act as unintended barriers to state and local efforts to deal with the problem. Removal of these barriers (e.g., reducing the incentives in USDA crop subsidy programs that encourage agrichemical use) can go a long way toward helping to resolve the problem. In other cases, EPA and other agencies may be missing opportunities to play a constructive role in helping states advance their nonpoint source pollution control efforts. Such cases involve assistance in resolving data deficiencies and in developing necessary pollution standards.

As the nation's environmental organization with primary responsibility for implementing the Clean Water Act, EPA should be taking a leading role in coping with nonpoint source pollution by working with other federal agencies and providing state and local governments with the vital information they need to pursue their nonpoint source control activities. While the agency has published an ambitious agenda to accomplish this objective, that agenda stands little chance of being fulfilled. Resource constraints are an underlying problem, as they are in many environmental programs. However, in the case of nonpoint source pollution, the agency's own analyses suggest that its resource problems may reflect inappropriate funding priorities: EPA's budgetary priorities are overwhelmingly oriented toward controlling point sources of pollution despite the fact that (1) the agency identifies nonpoint source pollution as the primary cause of the nation's remaining water quality problems and (2) its own studies show that the comparative risks posed by nonpoint source pollution are at least as high—and in some respects are clearly higher—than the risks posed by point sources.

We recognize that, in the past, point source pollution may have been the more significant problem and, accordingly, may have warranted substantially greater attention. However, point source pollution is now substantially regulated, and the impact of nonpoint source pollution is now better understood. We also recognize that the agency cannot identify its own priorities regardless of congressional mandates to address other environmental problems. However, we do believe that it is incumbent upon EPA, as the nation's lead environmental organization, to do more to influence its priorities, according to its assessment of relative environmental risk, than it has in the past. We are not suggesting that EPA funds be allocated among its point and nonpoint source programs on a strictly "dollar-for-dollar basis" with perceived risk. EPA's role in controlling point source pollution is larger than it is for nonpoint source pollution and, therefore, the federal financial commitment is higher. On the other hand, the resources to control nonpoint source pollution need to come largely from states and local communities.

We believe the agency needs to pursue its ongoing efforts to identify the relative risks of nonpoint source pollution with other environmental problems; identify funding levels that consider environmental risk; and work with cognizant congressional committees to establish funding priorities that will allow the agency to pursue a more effective nonpoint source agenda for the 1990s. In this connection, we also believe that the Congress should consider allocating greater water quality funding to the control of nonpoint source pollution to better reflect the importance of this problem to the goal of cleaning up the nation's polluted waterways.

Recommendations to the Administrator, EPA

To address the nation's water pollution problem in a manner that better reflects the risks posed by nonpoint source pollution, we recommend that the Administrator, EPA, identify appropriate funding levels that will allow the agency to pursue key objectives of an effective nonpoint source agenda that have heretofore made little progress under existing funding constraints. Specifically, the Administrator should set funding levels that will allow the agency to accelerate its efforts to

- resolve problems arising out of conflicts between the policies of federal agencies and water quality goals;
- develop nonpoint source pollution criteria so the states can develop and implement nonpoint source water quality standards;
- develop monitoring techniques to help states determine the extent of their nonpoint source pollution problems and the effectiveness of corrective actions; and

-
- develop its program to educate the public about the health and environmental impacts of nonpoint source pollution.

Matter for Consideration by the Congress

In light of (1) the importance of nonpoint source pollution as a primary cause of the nation's remaining water quality problems and (2) the overwhelming emphasis of EPA resources devoted to point source programs, the Congress may wish to consider allocating EPA's water quality funding during the fiscal year 1992 budget process to provide greater emphasis on controlling nonpoint source pollution.

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