

Introduction

The nation's aquatic resources are among its most valuable assets. While environmental protection programs in the United States have successfully improved water quality during the past 25 years, many challenges still remain. Although significant strides have been made in reducing the impacts of discrete pollutant sources, aquatic ecosystems remain impaired, primarily due to complex pollution problems caused by nonpoint source (NPS) pollution.

The most recent national water quality inventory shows that, as of 2000, 39% of assessed stream miles, 45% of assessed lake acres, and 51% of assessed estuary acres are impaired. The leading causes of impairment are nutrients, siltation, metals, and pathogens. State inventories indicate that agriculture, including crop production, animal operations, pastures, and rangeland, impacts 18% of the total river and stream miles assessed, or 48% of the river and streams identified as impaired (EPA, 2002).

The Purpose and Scope of this Guidance

This guidance document is intended to provide technical information to state program managers and others on the best available, economically achievable means of reducing NPS pollution of surface and ground water from agriculture. The guidance provides background information about agricultural NPS pollution, where it comes from and how it enters the nation's waters, discusses the broad concept of assessing and addressing water quality problems on a watershed level, and presents up-to-date technical information about how to reduce agricultural NPS pollution. This document is not intended to be a "how to" technical guide for natural resource assessment, planning, design, and implementation.

The causes of agricultural NPS pollution, specific pollutants of concern, and general approaches to reducing the impact of such pollutants on aquatic resources are discussed in the Overview (Chapter 2). A general discussion of best management practices (BMPs) and the use of combinations of individual practices (BMP systems) to protect surface and ground water is given in Chapter 3. Management measures for nutrient management; pesticide management; erosion and sediment control; managing facility wastewater, manure and runoff from animal feeding operations; grazing management; and irrigation water management are described in Chapter 4. Also in Chapter 4 are discussions of BMPs that can be used to achieve the management measures, including cost and effectiveness information. Chapter 5 summarizes watershed planning principles, and Chapters 6 and 7 give overviews of nonpoint source monitoring and pollutant load estimation, respectively.

While the scope of this guidance is broad, covering diverse agricultural NPS pollutants from a range of sources, there are a number of issues that are not covered. Such issues include nutrient transfer over long distances (e.g., the

Agriculture is listed as a source of pollution for 48% of the impaired river miles reported in the United States.

This guidance is designed to provide current information to state program managers on controlling agricultural nonpoint source pollution.

This document does not impose legally-binding requirements on EPA, the states, or the public.

This guidance does NOT replace the 1993 *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*.

shipping of feed from one state to another in which the resulting animal waste is then applied to fields), animal nutrition (e.g., changing the nutrient mix fed to livestock as an approach to managing nutrients in animal waste), alternatives for manure (such as composting or regional distribution of manure from farms that do not need it to farms that can use it), odor control, and methane production. Furthermore, because it is national in scope, this document cannot address all practices or techniques specific to local or regional soils, climate, or agronomic conditions. In addition, new BMPs are being developed as a result of ongoing agricultural research. Readers should consult with state or local agencies including the United States Department of Agriculture (USDA)–Natural Resources Conservation Service (NRCS), Cooperative Extension, land grant universities, conservation districts, and agricultural organizations for additional information on agricultural nonpoint source pollution controls applicable to their local area.

This document provides guidance to states, territories, authorized tribes, and the public regarding management measures that may be used to reduce nonpoint source pollution from agricultural activities. This document refers to statutory and regulatory provisions which contain legally binding requirements. This document does not substitute for those provisions or regulations, nor is it a regulation itself. Thus, it does not impose legally-binding requirements on EPA, states, territories, authorized tribes, or the public and may not apply to a particular situation based upon the circumstances. EPA, state, territory, and authorized tribe decision makers retain the discretion to adopt approaches on a case-by-case basis that differ from this guidance where appropriate. EPA may change this guidance in the future.

Readers should note that this guidance is entirely consistent with the *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters* (EPA, 1993a) published under Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA). This guidance, however, does not supplant or replace the 1993 coastal management measures guidance for the purpose of implementing programs under Section 6217.

Under CZARA, states that participate in the Coastal Zone Management Program under the Coastal Zone Management Act are required to develop coastal nonpoint pollution control programs that ensure the implementation of EPA's management measures in their coastal management area. The 1993 guidance continues to apply to that program.

This document modifies and expands upon supplementary technical information contained in the Coastal Management Measures Guidance both to reflect circumstances relevant to differing inland conditions and to provide current technical information. It does not set new or additional standards for either CZARA Section 6217 Coastal Nonpoint Pollution Control Programs or Clean Water Act Section 319 Nonpoint Source Management Programs. It does, however, provide information that can be used by government agencies, private sector groups, and individuals to understand and apply measures and practices to address agricultural sources of nonpoint source pollution.

What is Nonpoint Source Pollution?

Nonpoint source pollution generally results from precipitation, land runoff, infiltration, drainage, seepage, hydrologic modification, or atmospheric deposition. As runoff from rainfall or snowmelt moves, it picks up and transports natural pollutants and pollutants resulting from human activity, ultimately depositing them into rivers, lakes, wetlands, coastal waters, and ground water. Technically, the term *nonpoint source* is defined to mean any source of water pollution that does not meet the legal definition of *point source* in Section 502(14) of the Clean Water Act of 1987:

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

Although diffuse runoff is generally treated as nonpoint source pollution, runoff that enters and is discharged from conveyances such as those described above is treated as a point source discharge and hence is subject to the permit requirements of the Clean Water Act. In contrast, nonpoint sources are not subject to federal permit requirements. Point sources generally enter receiving water bodies at some identifiable site(s) and carry pollutants whose generation is controlled by some internal process or activity, rather than weather. Point source discharges such as municipal and industrial waste waters, runoff or leachate from solid waste disposal sites and concentrated animal feeding operations, and storm sewer outfalls from large urban centers are regulated and permitted under the Clean Water Act.

While it is imperative that water program managers understand and manage in accordance with legal definitions and requirements, the non-legal community often characterizes nonpoint sources in the following ways:

- Nonpoint source discharges enter surface and/or ground waters in a diffuse manner at intermittent intervals related mostly to meteorological events.
- Pollutant generation arises over an extensive land area and moves overland before it reaches surface waters or infiltrates into ground waters.
- The extent of NPS pollution is related to uncontrollable climatic events and to geographic and geologic conditions and varies greatly from place to place and from year to year.
- The extent of NPS pollution is often more difficult or expensive to monitor at the point(s) of origin, as compared to monitoring of point sources.

- Abatement of nonpoint sources is focused on land and runoff management practices, rather than on effluent treatment.
- Nonpoint source pollutants may be transported and/or deposited as airborne contaminants.

Nonpoint source pollutants that cause the greatest impacts are sediments, nutrients, toxic compounds, organic matter, and pathogens. Hydrologic modification can also cause adverse effects on the biological, physical, and chemical integrity of surface and ground waters.

Section 319 requires states to assess NPS pollution and implement management programs.

National Efforts to Address Nonpoint Source Pollution

Nonpoint Source Program — Section 319 of the Clean Water Act

During the first 15 years of the national program to abate and control water pollution (1972–1987), EPA and the states focused most of their water pollution control activities on traditional point sources. These point sources are regulated by EPA and the states through the National Pollutant Discharge Elimination System (NPDES) permit program established by Section 402 of the 1972 Federal Water Pollution Control Act (Clean Water Act). Discharges of dredged and fill materials into wetlands have also been regulated by the U.S. Army Corps of Engineers and EPA under Section 404 of the Clean Water Act.

As a result of the above activities, the nation has greatly reduced pollutant loads from point source discharges and has made considerable progress in restoring and maintaining water quality. However, the gains in controlling point sources have not solved all of the nation’s water quality problems. Recent studies and surveys by EPA and by states, tribes, territories, and other entities, indicate that the majority of the remaining water quality impairments in our nation’s rivers, streams, lakes, estuaries, coastal waters, and wetlands result from NPS pollution and other nontraditional sources, such as urban storm water discharges and combined sewer overflows.

In 1987, in view of the progress achieved in controlling point sources and the growing national awareness of the increasingly dominant influence of NPS pollution on water quality, Congress amended the Clean Water Act to provide a national framework to address nonpoint source pollution. Under this amended version, referred to as the 1987 Water Quality Act, Congress revised Section 101, “Declaration of Goals and Policy,” to add the following fundamental principle:

It is the national policy that programs for the control of nonpoint sources of pollution be developed and implemented in an expeditious manner so as to enable the goals of this Act to be met through the control of both point and nonpoint sources of pollution.

Section 319 authorizes EPA to provide grants to assist state NPS pollution control programs.

More importantly, Congress enacted Section 319 of the 1987 Water Quality Act, which established a national program to address nonpoint sources of water pollution. Under Section 319, states address NPS pollution by assessing NPS pollution problems and causes within the state and implementing management programs to control the NPS pollution. Section 319 authorizes EPA to issue grants to states to assist them in implementing management programs or portions of management programs which have been approved by EPA. For additional information and a list of state contacts, see www.epa.gov/owow/nps.

National Estuary Program

EPA also administers the National Estuary Program under Section 320 of the Clean Water Act. This program focuses on point and NPS pollution in geographically targeted, high-priority estuarine waters. In this program, EPA assists state, regional, and local governments in developing and implementing comprehensive conservation and management plans that recommend priority corrective actions to restore estuarine water quality, fish populations, and other designated uses of the waters.

Pesticides Program

Another program administered by EPA that controls some forms of NPS pollution is the pesticides program under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Among other provisions, this program authorizes EPA to control pesticides that may threaten ground and surface water. FIFRA provides for the registration of pesticides and enforceable label requirements, which may include maximum rates of application, restrictions on use practices, and classification of pesticides as “restricted use” pesticides (which restricts use to certified applicators trained to handle toxic chemicals).

Coastal Nonpoint Pollution Control Program

In November 1990, Congress enacted the Coastal Zone Act Reauthorization Amendments (CZARA). These amendments were intended to address several concerns, including the impact of NPS pollution on coastal waters.

To more specifically address the impacts of NPS pollution on coastal water quality, Congress enacted Section 6217, *Protecting Coastal Waters* (codified as 16 U.S.C. Section 1455b). Section 6217 provides that each state with an approved Coastal Zone Management Program must develop and submit to EPA and the National Oceanic and Atmospheric Administration (NOAA) for approval a Coastal Nonpoint Pollution Control Program. The purpose of the program “shall be to develop and implement management measures for nonpoint source pollution to restore and protect coastal waters, working in close conjunction with other state and local authorities.”

Coastal Nonpoint Pollution Control Programs are not intended to supplant existing coastal zone management programs and NPS management programs. Rather, they are intended to serve as an update and expansion of existing NPS

The Federal Coastal Nonpoint Pollution Control Program (6217) is designed to enhance state and local efforts to manage land use activities that degrade coastal habitats and waters.

management programs and are to be coordinated closely with the coastal zone management programs that states and territories are already implementing pursuant to the Coastal Zone Management Act of 1972. The legislative history indicates that the central purpose of Section 6217 is to strengthen the links between federal and state Coastal Zone Management and Water Quality Programs and to enhance state and local efforts to manage land use activities that degrade coastal waters and habitats.

Section 6217(g) of CZARA requires EPA to publish, in consultation with NOAA, the U.S. Fish and Wildlife Service, and other federal agencies, “guidance for specifying management measures for sources of nonpoint pollution in coastal waters.” Management measures are defined in Section 6217(g)(5) as:

economically achievable measures for the control of the addition of pollutants from existing and new categories and classes of nonpoint sources of pollution, which reflect the greatest degree of pollutant reduction achievable through the application of the best available nonpoint source control practices, technologies, processes, siting criteria, operating methods, or other alternatives.

EPA published *Guidance Specifying Management Measures for Sources of Nonpoint Source Pollution in Coastal Waters* (EPA, 1993a). In EPA’s (1993a) document, management measures for urban areas; agricultural sources; forestry; marinas and recreational boating; hydromodification (channelization and channel modification, dams, and streambank and shoreline erosion); and wetlands, riparian areas, and vegetated treatment systems were defined and described. The management measures for controlling agricultural NPS pollution discussed in Chapter 4 of this document are based on those outlined by EPA (1993a).

Source Water Protection Program

The 1996 Amendments to the Safe Drinking Water Act provided for source water assessment and protection programs to prevent drinking water contamination. States are required to develop comprehensive Source Water Assessment Programs (SWAPs) that will: identify the areas that supply public tap water; inventory contaminants and assess water system susceptibility to contamination and inform the public of the results. EPA is responsible for the review and approval of state SWAPs. Several programs specifically address ground water protection.

Rural Clean Water Program (RCWP)

The Rural Clean Water Program (RCWP), an NPS pollution control program implemented by USDA and EPA, was conducted from 1980 to 1990 as an experimental effort to address agricultural NPS pollution in watersheds across the country.

The objectives of the RCWP were to:

- Achieve improved water quality in the approved project area in the most cost-effective manner possible while providing food, fiber, and a quality environment;

In selected watersheds, the RCWP showed that implementation of agricultural BMPs improved water quality.

- ❑ Assist agricultural landowners and farm operators in reducing agricultural NPS water pollutants and improving water quality in rural areas to meet water quality standards or goals; and
- ❑ Develop and test programs, policies, and procedures for the control of agricultural NPS pollution.

Twenty-one experimental projects were funded across the United States. Each project included implementation of BMPs to reduce NPS pollution and water quality monitoring to evaluate the effects of BMPs. The BMPs were targeted to critical areas in each project — sources of NPS pollutants identified as having significant impacts on the impaired water resource. Landowner participation was voluntary, with cost-sharing and technical assistance offered as incentives for implementing BMPs.

The linkage of water quality monitoring to land treatment efforts in the RCWP helped improve targeting of BMPs to sources most in need of treatment. Water quality findings from the RCWP projects were also used to adjust and refine agricultural NPS programs and BMPs. Additional details are available in the project evaluation report (EPA, 1993c).

2002 Farm Bill Conservation Provisions

Technical and financial assistance for landowners seeking to conserve, improve, and sustain our soil and other natural resources is authorized by the federal government under provisions of the Food Security and Rural Investment Act (Farm Bill). The following sections summarize provisions in the 2002 Act relating directly to installation and maintenance of BMPs. For additional information, see the U.S. Department of Agriculture’s website at www.usda.gov.

Environmental Quality Incentives Program (EQIP) — The EQIP was established by the 1996 Farm Bill to provide a voluntary conservation program for farmers and ranchers who face serious threats to soil, water, and related natural resources. Funding increases are authorized from \$200 million to \$1.1 billion between 2002 and 2007. EQIP offers financial, technical, and educational help to install or implement structural, vegetative, and management practices designed to conserve soil and other natural resources. The law dictates that 60% of the available monies be directed to livestock-related concerns. Cost-sharing generally pays up to 75% of the costs for certain conservation practices. Incentive payments may be made to encourage producers to perform land management practices such as nutrient management, manure management, integrated pest management, irrigation water management, and wildlife habitat management. Cost-share for construction of animal waste management facilities is now allowed for livestock operations over 1,000 animal units.

Conservation Reserve Program (CRP) — First authorized by the Food Security Act of 1985 (Farm Bill), this is a voluntary program that offers annual rental payments, incentive payments, and cost-share assistance for establishing long-term, resource-conserving cover crops on highly erodible land. Conservation Reserve Program contracts are issued for a duration of 10 to 15 years for up to 39.2 million acres of cropland and marginal pasture. Land can be accepted into the CRP through a competitive bidding process where all offers are ranked using an environmental benefits index, or through continuous sign-up for

Many Farm Bill programs provide funds for land treatment. Please contact your state or local USDA office for details.

eligible lands where certain special conservation practices (e.g. filter strips and riparian buffers) will be implemented.

Conservation Security Program — This 2002 Farm Bill program provides incentive payments to producers who adopt or maintain existing conservation practices. Producers may receive up to 20,000, 35,000, or 45,000 dollars per year for practice falling into 3 tiers. The higher payments go to the more comprehensive sets of practices. The program contracts are for 5 to 10 years.

The Conservation Reserve Enhancement Program (CREP) is a 1996 initiative continued in the 2002 Farm Bill. CREP is a joint, state-federal program designed to meet specific conservation objectives. CREP targets state and federal funds to achieve shared environmental goals of national and state significance. The program uses financial incentives to encourage farmers and ranchers to voluntarily protect soil, water, and wildlife resources.

Wetlands Reserve Program (WRP) — The WRP is a voluntary program to restore and protect wetlands and associated lands. Participants may sell a permanent or 30-year conservation easement or enter into a 10-year cost-share agreement with USDA to restore and protect wetlands. The landowner voluntarily limits future use of the land, yet retains private ownership. The NRCS provides technical assistance in developing a plan for restoration and maintenance of the land. The landowner retains the right to control access to the land and may lease the land for hunting, fishing, and other undeveloped recreational activities. The acreage is expanded by 1.2 million acres to 2.275 million acres in 2002.

Wildlife Habitat Incentives Program (WHIP) — This program is designed for people who want to develop and improve wildlife habitat on private lands. Plans are developed in consultation with the NRCS and local Conservation District. USDA will provide technical assistance and cost-share up to 75% of the cost of installing the wildlife practices. Participants may get bonus payments for agreements over 15 years.

Forest Land Enhancement Program (FLEP) — Authorized in the 2002 Farm Bill, the FLEP creates a new title for Forestry. It replaces and expands the Stewardship Incentive program and Forestry program. The new Forest Land Enhancement program will provide up to \$100 million over six years to private, non-industrial Forest owners. The new title also provides \$210 million to help fight fire on private land and address prevention.

Grazing Reserve Program (GRP) — This 2002 provision will use 30 year easements and rental agreements to improve management of up to 2 million acres of private grazing land. 500,000 acres are to be reserved for protected tracts of 40 acres or less as native grasslands. Restoration costs may go as high as 75%.

Funding Sources

For information on sources of funding to address nonpoint source pollution, see EPA's Nonpoint Source website at www.epa.gov/owow/nps/funding.html.