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Controlling Nonpoint Sources

Background

Nonpoint source pollution generally results from land runoff, atmospheric deposition, drainage, or seepage of contaminants. Major sources of nonpoint source pollution include agricultural runoff, runoff from urban areas, and runoff from silvicultural operations. Siltation and nutrients are the pollutants responsible for most of the nonpoint source impacts to the nation's surface waters. These diffuse sources are often harder to identify, isolate, and control than traditional point sources. As a result, from 1972 to 1987, EPA and the states focused primarily on addressing the obvious problems resulting from municipal and industrial discharges: issuing permits for point source discharges, then inspecting, monitoring, and enforcing those permits to ensure that point sources met the Clean Water Act requirements.

Sections 208 and 303(e) of the Clean Water Act of 1972 established the framework to address nonpoint sources of pollution. States and local planning agencies analyzed the extent of NPS pollution and developed water quality management programs to control it with funds provided by EPA under Section 208. Best management practices were evaluated, assessment models and methods were developed, and other types of technical assistance were made available to state and local water quality managers.

The National Section 319 Program

In 1987, Congress enacted Section 319 of the Clean Water Act, which established a more concentrated national program specifically to control nonpoint sources of water pollution. Section 319 created a three-stage national program to be implemented by the states with federal approval and assistance. States were to address nonpoint source pollution by: (1) developing nonpoint source assessment reports, (2) adopting nonpoint source management programs, and (3) implementing the management programs over a multiyear time frame.

All states and territories and 20 American Indian tribes now have EPA-approved nonpoint source assessments. EPA has also approved 56 state and territorial nonpoint source management programs and 20 tribal nonpoint source management programs.

Section 319 also authorizes EPA to issue annual grants to states, territories, and tribes to assist them in implementing their EPA-approved programs, for which the states provide at least a 40% nonfederal dollar match. From FY 1990 through FY 1999, Congress appropriated and EPA awarded approximately $877 million for Section 319 assistance. Funds available for grants in FY 1999 alone have increased to $200 million,

which nearly doubled from FY 1998 appropriations.

In 1995, recognizing the growing experience of states, tribes, and localities in addressing nonpoint source pollution and the fact that state, tribal, and local nonpoint source programs had matured considerably since enactment of Section 319 in 1987, representatives of EPA Headquarters, Regions, and the states, under the auspices of the Association of State and Interstate Water Pollution Control Administrators (ASIWPCA), initiated joint discussions to develop a new framework for further strengthening state and local nonpoint source programs. These discussions continued for more than a year, spanning fiscal years 1995 and 1996, and resulted in new national Section 319 program and grant guidance jointly signed by EPA and ASIWPCA and issued by EPA on May 16, 1996. This guidance reflects a joint commitment to upgrade state nonpoint source management programs to incorporate nine key program elements designed to achieve and maintain beneficial uses of water. The guidance also provides for

- Discontinuance of competitive award of a portion of each state's annual Section 319 grant award, thereby assuring each state and territory of a firm annual planning target at the outset of each annual award cycle

- Reduction in the amount and frequency of administrative oversight and reporting

- Greater flexibility for the states, territories, and tribes in establishing priorities for the use of these funds.

The nine key elements that form the core of the new approach are

- The state program contains explicit short- and long-term goals, objectives, and strategies to protect surface and ground waters.

- The state strengthens its working partnerships and linkages to appropriate state, interstate, tribal, regional, and local entities; private sector groups; citizens groups; and federal agencies.

- The state uses a balanced approach that emphasizes both statewide nonpoint source programs and on-the-ground management of individual watersheds where waters are impaired or threatened.

- The state program (1) abates known water quality impairments from nonpoint source pollution and (2) prevents significant threats to water quality from present and future nonpoint source activities.

- The state program identifies water/watersheds impaired by nonpoint source pollution and important unimpaired waters that are threatened or otherwise at risk and establishes a process to progressively address these identified waters by developing and implementing watershed implementation plans.

- The state reviews, upgrades, and implements all program components required by the Clean Water Act and establishes flexible, targeted, and iterative approaches to achieve and maintain beneficial uses of water as expeditiously as practicable.

■ The state identifies federal lands and activities that are not managed consistently with state nonpoint source program objectives and, where appropriate, seeks EPA assistance to help resolve issues.

■ The state manages and implements its nonpoint source program efficiently and effectively, including necessary financial management.

■ The state periodically reviews and evaluates its nonpoint source management program using environmental and functional measures of success and revises its nonpoint source assessment and its management program at least every 5 years.

The guidance also includes a new section on lake protection and restoration activities that encourages the use of Section 319 funds for eligible activities that might have been funded in previous years under Section 314 (the Clean Lakes Program).

Roughly half of each state's annual award supports statewide program activity (staffing, public education and outreach, technical assistance) and half supports specific projects to prevent or reduce nonpoint source pollution at the watershed level.

Funding under Section 319 is also available to American Indian tribes with approved nonpoint source assessment and management programs. Tribal grants are provided under a separate statutory set-aside of the annual Section 319 national appropriation. Because these funds are limited, tribal grants are awarded by EPA Regions but administered by EPA Headquarters. EPA also provides special 319 grant guidance and workshops and consultation to assist tribes in preventing and reducing nonpoint source pollution on their lands.

Clean Water Action Plan Key Actions for Nonpoint Source Pollution

The President's Clean Water Action Plan (February 1998) recognized the need to expedite the effectiveness of state nonpoint source management programs. In so doing, it was announced that "beginning in FY 2000, EPA will award any Section 319 monies exceeding the $100 million authorized level only to those states and tribes that have incorporated all nine key elements (established in the May 1996 guidance) into an approved Section 319 Nonpoint Source Management Program." This means that only approved, upgraded state nonpoint source management programs are eligible to receive the incremental $100 million requested for this program in the President's FY 2000 budget.

As a result, throughout FY 1998 and 1999, EPA has worked closely with the states, territories, and tribes to help upgrade polluted runoff programs to incorporate the nine key elements established in the national guidance.

Section 319 National Monitoring Program

EPA developed the Section 319 National Monitoring Program to improve technical understanding of nonpoint source pollution and the

effectiveness of various nonpoint source control technologies. This program selects watershed projects that consistently monitor water quality and land management with standardized protocols for 6 to 10 years. As of April 1999, EPA has approved and funded 22 projects in 18 states. Several of these projects are summarized here.

The **Long Creek** watershed in North Carolina, located 30 miles west of Charlotte, plays host to a mixture of agricultural and urban/industrial land uses, including three dairy operations and several beef and horse farms. High suspended sediment loads, nutrients, and bacteria have impaired sections of the creek, with crop and dairy production believed to be major contributors of nonpoint source pollutants to the creek. One component of the Long Creek project employs an upstream/downstream monitoring design located in a tributary that drains the largest dairy farm in the watershed. Best management practices (BMPs) were installed between the two sites, including livestock exclusion fencing, an alternative water system, improved stock trails, heavy-use-area stabilization, riparian area establishment, and waste storage and handling. Analysis of 80 weeks of data collected since the installation of BMPs documents significant decreases in nitrogen, phosphorus, sediment loads, and bacterial counts. With an 80% decrease in pollutant loads and concentrations, results have thus far exceeded expectations. The Long Creek project will continue until 2001, with plans for additional BMP installations and continued post-BMP monitoring.

The purpose of the **Waukegan River** project was to reduce the sediment load discharge to Lake Michigan from streambank erosion of the Waukegan River. Erosion was caused by increased urban runoff and channelization, problems common in many urban streams. Utilizing Section 319 funds, innovative streambank restoration techniques were implemented to demonstrate how water quality can be improved by stabilizing eroding streambanks and creating stable stream habitat (combining riparian vegetation with structural elements). Effectiveness of the techniques is being documented through EPA's National Nonpoint Source Monitoring Program. This effort incorporates three biological elements—fisheries, benthos, and in-stream habitats—with monitoring stations located both in the downstream treatment reach and on the upstream control reaches. A geographic information system is also being used in the Waukegan River to spatially characterize many of the physical and hydrologic features of the watershed. The physical changes occurring are being correlated with the water quality and biological changes taking place within the watershed. The biological sampling results indicate that the number of fish species and their abundance has more than doubled with the implementation of the chosen techniques.

Otter Creek, one of the Section 319 National Monitoring Program projects, is within the Sheboygan River Priority Watershed, 15 miles west of Lake Michigan, in east-central Wisconsin. Land use in the watershed is 67%

agricultural, with the site of study encompassing a barnyard on Otter Creek with a dairy operation of approximately 50 cows. The stream is typified by reduced aquatic habitat due to excessive sediment and nutrient loading from nonpoint sources—mainly cropland and dairy operations—and recreation is limited by degraded fisheries and high fecal coliform counts. Barnyard BMPs implemented at the site include rainwater diversion and distribution to a grass filter strip, livestock exclusion fencing, and development of a gravel-lined channel crossing that now allows access to the stream. Sampling stations were established on Otter Creek, with one station upstream from a single barnyard-runoff source and the other downstream from that same source (with the intention of minimizing inflows other than runoff from the barnyard). Post-BMP sampling indicated that implementation of barnyard BMPs has reduced the loads of suspended solids by 81%, total phosphorus by 88%, ammonia nitrogen by 97%, BOD by 80%, and microbial loads of fecal coliform bacteria by 84%.

Reports on Section 319 Activities

In 1994, EPA published its first volume of *Section 319(h) Success Stories*, which provided examples of successful solutions to nonpoint source pollution problems in states, territories, and tribes. In 1997, *Section 319(h) Success Stories: Volume II* was published. This second volume demonstrates the maturation of the state programs, replete with many examples of documented water quality improvements, improved fisheries, reduced loadings, and increased public awareness that are a result of the many projects that have received Section 319 funding. The reductions in phosphorus, nitrates, and a lowered fecal coliform count in the lakes, rivers, and streams are successes of the 319 program.

Nonpoint Source Management Programs and Implementation

States, local governments, farmers, community groups, and EPA Regions have initiated many innovative projects across the United States to manage nonpoint source pollution in their waters. The projects described in this section have been published in *Section 319(h) Success Stories: Volume II*. They exemplify the diversity of approaches and settings of Section 319 projects.

Bad River Watershed Project, South Dakota

The Bad River watershed, 3,172 square miles that drain into the Missouri River at Ft. Pierre, South Dakota, consists primarily of highly erodible shallow and dense clays. The river does not support its assigned beneficial uses primarily because its sediment load is 3.25 million tons per year, which also

severely impacts the Lake Sharpe impoundment of the Missouri River.

In response, the Bad River watershed steering committee, composed of local residents and government officials, selected a watershed management approach. The first step taken by the steering committee was to conduct a monitoring and assessment program, which revealed that the lower third of the watershed produces two-thirds of the sediment—primarily from gully erosion on grazing lands and streambank scour. The next step toward a solution was to begin a demonstration project in the 250-square-mile Plum Creek subwatershed to illustrate the feasibility of pollution controls. In the Bad River watershed, an array of practices were recommended, including planned grazing systems, proper grazing use, erosion control structures, riparian revegetation, range seedings, water spreader systems, and alternative stock watering facilities.

The results of the demonstration project exceeded expectations and achieved a significant reduction in erosion and sediment delivered to the Bad River. In 1990, Plum Creek delivered 82.7 tons of sediment per acre/foot of runoff. The average annual sediment delivery during 1993 was 10.2 tons of sediment per acre/foot of runoff. The project also achieved substantial landowner participation, with approximately 90% participating in the Plum Creek watershed and approximately 95% of the land under some type of intense management. The watershed residents have supported expansion of the project to the rest of the basin, and demands for technical and financial assistance are about four times the expected levels.

Wetlands to the Rescue – Sprague Cove Stormwater Remediation Project, Massachusetts

In June 1995, Marion, Massachusetts, completed construction of a wetlands system designed to reduce stormwater pollutant discharges that were adversely affecting Sprague Cove. Elevated levels of fecal coliform bacteria were the primary concern; before the wetlands system was built, they had contributed to the closure of shellfish beds in the cove and threatened nearby swimming beaches.

The town joined the Buzzards Bay Project of the National Estuary Program to obtain financial and technical assistance to help build the constructed wetlands system. The wetlands system comprises a sediment basin, two shallow marshes located on both sides of a deep pool, and a stone-lined channel. The project was designed to store 1 inch of runoff with an average detention time of 14 days.

Prior to construction of the wetlands system, fecal coliform counts as high as 20,000 organisms per 100 milliliters were recorded. The latest data now indicate fecal coliform counts of 10 organisms per 100 milliliters in Sprague Cove. In Massachusetts, the Water Quality Standard for shellfish harvesting without depuration is 14 organisms

per 100 milliliters. At this time, it appears that the wetlands system has successfully reduced the stormwater pollutant loadings to levels that permit the valuable shellfish beds of Sprague Cove to be open for harvesting.

Protecting the Edwards Aquifer – Urban Development BMPs in Central Texas

Aquatic environments as far downstream as the Gulf Coast (about 150 miles) depend on springs that discharge from the Edwards Aquifer. The aquifer runs under nine counties and serves as the public water supply for numerous communities. Because of the importance of the Edwards Aquifer to the population of central Texas, in 1990 the state initiated formal regulation of nonpoint source pollution in the recharge zone with a revision to the Texas Administrative Code. Under the revised rules, individuals, developers, their agents, or government agencies seeking to develop property in the recharge zone must submit Water Pollution Abatement Plans for approval by the Texas Natural Resource Conservation Commission (TNRCC).

The plans must include descriptions of proposed site disturbance and development, erosion and sediment control plans, a geologic assessment including recharge features, a stormwater pollution mitigation plan, and other site-specific provisions as deemed necessary. This process is supported by Section 319 funding and carried out by the TNRCC's regional offices.

Through the permitting process, developers, construction staff, engineers, and water quality specialists are educated in the application of BMPs for prevention of nonpoint source pollution. As a result, there have been several positive changes in development activities over the recharge zone in recent years and some innovative solutions to satisfy the requirements of Water Pollution Abatement Plan permits.

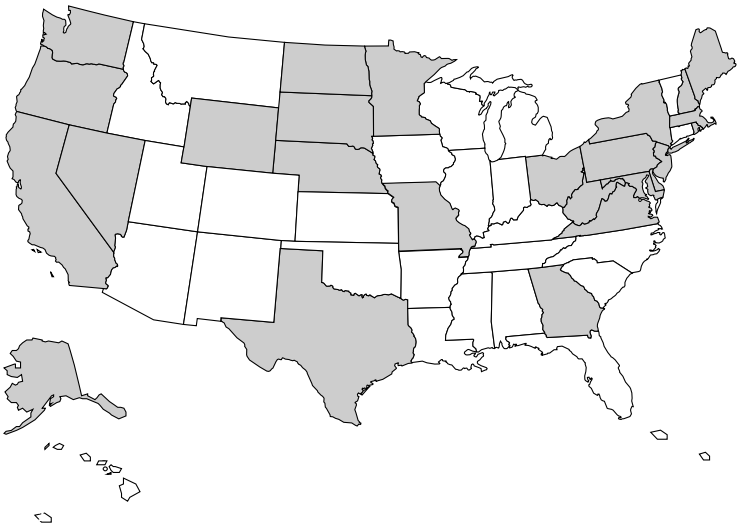
Funding for Nonpoint Source Control

Clean Water State Revolving Fund

In addition to Section 319 funds, many states have taken advantage of the Clean Water State

Figure 10-1

States Using SRF Loans for NPS Programs



Revolving Fund (CWSRF) to provide loans to finance nonpoint source and other water pollution control programs (Figure 10-1). The 1987 Amendments to the Clean Water Act provide states with the opportunity to use these funds for nonpoint source implementation projects and to develop and implement actions under the National Estuary Program.

As of June 1998, CWSRF has provided over $848 million worth of loans toward nonpoint source projects and over $5 million toward estuary projects. Twenty-five states are using CWSRF loans to fund a wide variety of nonpoint source and estuary management projects. CWSRF loans are well suited to funding these types of projects for several reasons: the low-interest nature of the CWSRF program translates into substantial savings—a CWSRF loan can provide up to a 50% or more savings compared with financing at market rates; CWSRF loans can be used to cover 100% of the project costs, including planning and design with loan repayments beginning 1 year after the project is completed; and CWSRF loans carry fewer federal requirements than most federal grants. These advantages can make a CWSRF loan a more appropriate mechanism for funding certain types of nonpoint source controls than a grant, especially one with a high cost-share requirement.

CWSRF may be used to fund implementation of any nonpoint source project eligible for funding under a state's approved Nonpoint Source Management Program. Examples of nonpoint source projects that CWSRF can fund include: agricultural BMPs such as manure storage facilities, no/low-till farm equipment, erosion control, and stream bank buffers; urban and forestry BMPs; wetlands restoration and preservation; ground water, source water, and wellhead protection measures; cleanup of brownfields; repair and replacement of septic tanks; and stormwater controls, among others.

CWSRF funds may be used to develop a Comprehensive Conservation and Management Plan (CCMP) for an estuary and implement any estuary projects that are part of an estuary's CCMP. Such projects may include nonpoint source controls, habitat restoration, and other actions to protect endangered species. (For more information, see *The Clean Water State Revolving Fund; How to Fund Nonpoint Source and Estuary Enhancement Projects*, EPA909-K-97-001, July 1997.)

Coastal Nonpoint Pollution Control Program

Shifts in population toward the coasts, associated development pressures, and other factors moved Congress to provide states with new information and tools to achieve more effective protection of coastal waters from nonpoint pollutants. Congress enacted the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA), which established under Section 6217 a new coastal NPS pollution control program to be incorporated into both state Section 319 CWA programs and state Coastal Zone Management Act (CZMA) programs. NOAA administers the

CZMA and EPA administers Section 319, and the two agencies were jointly charged with implementing Section 6217.

Section 6217 requires that states with federally approved coastal zone management programs develop and implement coastal nonpoint pollution control programs to ensure protection and restoration of coastal waters. Thirty states and territories currently have approved coastal zone management programs.

Under CZARA, state Coastal Nonpoint Pollution Control Programs must provide for implementation of: (1) management measures in conformance with measures published by EPA in national technical guidance, and (2) additional management measures as necessary to attain and maintain state water quality standards where the baseline measures do not accomplish this objective. The CZARA further provides that states' Coastal Zone Management Programs must contain enforceable policies and mechanisms to ensure implementation of the management measures.

EPA issued final technical guidance in January 1993 titled *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*. This guidance specifies management measures for five major categories of nonpoint pollution: agricultural runoff, urban runoff, silvicultural runoff, hydromodification, and marinas and recreational boating. The guidance also describes specific practices that may be used to achieve the level of prevention or control specified in the management measures.

EPA and NOAA issued administrative changes to the program guidance in October 1998 to assist the states in developing and implementing final coastal nonpoint pollution control programs. These actions provided greater flexibility to states in prioritizing their activities, extended the implementation period for management measures to 15 years, and clarified a range of enforceable policies and mechanisms that could be used by states to implement their programs.

All states with federally approved Coastal Zone Management Programs submitted nonpoint source programs for EPA and NOAA approval. By the end of FY 98, all of the submitted programs were conditionally approved by EPA and NOAA, requiring states to submit additional information to obtain final program approval. States were allowed up to 5 years after conditional approval to meet the conditions.

The President's Clean Water Action Plan (February 1998) recognized the need to expedite the final approval of state coastal polluted runoff control programs. In so doing, the CWAP established a goal that all programs will be fully approved by December 1999. The recent administrative changes mutually agreed to by states, territories, EPA, and NOAA are also expected to expedite the final approval process. In some cases, the administrative changes may impact previous findings and conditions on state coastal nonpoint programs.