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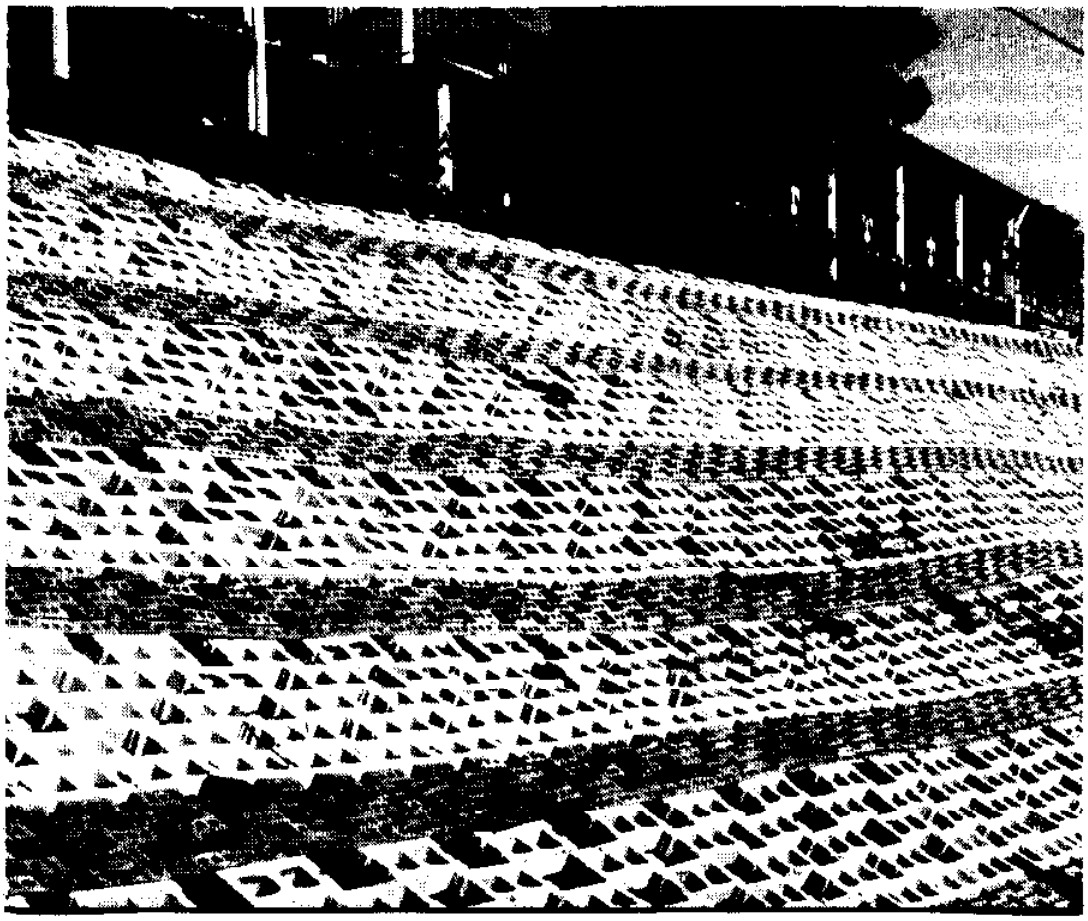
# Creating Successful Nonpoint Source Programs:

# The Innovative Touch



# Contents



*Cover: an innovative way of controlling erosion on steep slopes—vegetation can be planted in open blocks.*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# Concepts Behind Creative Programs

Innovation has always been necessary in the nonpoint source management field. Resources have been chronically limited; standard methods of monitoring and problem identification show only part of the picture; results can be hard to demonstrate. And yet, program managers and staff have found ways to solve the problems and get the programs moving.

Solving problems often depends on leaving no stone unturned – letting no idea go unconsidered. Even ideas that seem impossible can work.

By reviewing the circumstances and approaches of several innovative programs, we can distill certain concepts and characteristics that seem to be key to their success and creativity. These concepts are presented in the pages that follow with the goal of helping managers of newer state and local programs save time, money, and energy in solving their own problems, as well as giving a boost to programs that may be in need of a new direction or approach. Following each program description is the telephone number of the responsible department or agency.

## Documenting New Program Approaches

The examples included here are a starting point for an effort to gather new examples of creative programs. EPA and states are moving into a new phase of the nonpoint source control effort with the initiatives created by the 1987 Water Quality Act, and new approaches will be needed to solve the current generation of problems. This information transfer is vital to our ability to meet the goals Congress has set.

There is no need to write a 30-page report. Just list the points that are key to understanding what you are doing and how it is succeeding. Some of the questions that you should consider are:

- Who's been involved? (lead and support roles, coordination, institutional issues, etc.) And who's been missed? Who should be involved?
- What problems have you encountered and how did you overcome them?
- How did you define the program scope or identify the specific problem to be studied or attacked?
- What sources and amounts of funds were considered, located, developed, chosen? (Why and how?)
- What factors do you consider as key to the success of the program?
- What have been the results to date?
- How has progress been assessed?
- What would you do differently the next time?

Send information on your program or a program you think is innovative or creative to EPA's Nonpoint Sources Branch at WH-585, 401 M St., SW, Washington, DC 20460. Or call us at (202) 382-7085.

# Unusual Alliances Can Get Creative Results

It's simple and often very productive to go directly to the source of the problem, using time-honored cooperative mechanisms like USDA's Soil Conservation Service network. Incentives and enforcement clearly work, but continually using the same network can mean business as usual and missed opportunities for creativity.

Involvement by outside interests can provide a spark. Perhaps the best way to obtain such involvement is to appeal to the self-interest of those who are part of or affected by the problem: Develop a sense of ownership of the problem. People who feel responsible are easy to mobilize; they're energetic and tenacious about problem solving. Who is adversely affected by nonpoint source (NPS) pollution in your program area? Are they aware of the problem and its economic consequences for them? For example:

## Oystermen and Farmers Unite to Save Tillamook Bay

When oystermen in Oregon's Tillamook Bay saw their livelihood threatened by large-scale NPS pollution, they united to tackle the problem. Fishermen aided state agencies and local citizens, who began to track down the source of fecal contamination in their shellfish beds. Dairy cattle were identified as the culprits: 19,000 of them on 118 dairy farms.

The oystermen approached the Tillamook Creamery Association for help. Together, these two interest groups sought solutions. By 1980, an EPA grant had yielded a plan for abatement of agricultural NPS pollution. In 1981, USDA funded a Rural Clean Water Project that cost shared best management practices (BMPs). Farmers began a massive reform of their waste handling practices. By 1985, sampling in streams feeding Tillamook Bay showed that fecal bacteria levels were down 15-50 percent in various areas. Further improvements are expected.

"While credit belongs to several government agencies for getting things started, it has been the Tillamook Creamery Association and individual dairymen who have actually been getting things done," said EPA's Region 10 Administrator.

Local pride in Tillamook oysters and Tillamook cheese may have had something to do with it, too. These oystermen and dairymen have shown an enlightened understanding of the interdependence of interests necessary to an area's economic health.

*Oregon Department of Environmental Quality—(503) 229-6035*

## City Aids Farmers in Fighting Pollution

Springfield, Illinois is another place where people concerned about NPS pollution tackled the problem from outside the traditional network of cooperation. Lake Springfield was filling in with sediment, threatening even the normal water supply needs of the City in times of drought. The citizens were worried about the future of the lake as a water supply, as well as a fishery.

Representing the City's self-interest, the water department went right to the source of the problem: local farming practices. A $10,000 grant from the City of Springfield bought the county soil and water conservation district a no-till planter. Farmers began to use it and demonstrate the benefits of preventive soil conservation measures.

The City went on to cost share other BMPs for NPS pollution control. The program was run without federal cost-share money and was administered by the county soil and water conservation district. Projections indicate that these preventive methods will save about 20 percent of the price tag of dredging uncontrolled sedimentation over the next decade.

*Soybeans in no-till wheat straw. Photo by Soil Conservation Service.*

The cooperative relationship among City government, the soil and water conservation district, and local farmers has proved highly effective both in Springfield and in other areas of Illinois.

*City of Springfield – (217) 786-4093*

# Funding Often Must Be Creative, Too

The traditional funding source for NPS programs has been appropriations for both program administration and incentives or cost sharing. Clearly, the need has grown far faster than the political will to appropriate general revenues for these programs, so nontraditional sources of funding are needed. Some of the programs that have developed a new approach to funding include:

## Loans Replace Grants for Cost Sharing

State revolving loan funds (SRFs) are now being established to replace the wastewater construction grant program. Under SRFs, states may also provide financial assistance to nonpoint source, groundwater, and estuary activities. In addition to SRFs, some states have other loan programs that may be available for nonpoint source activities. Many people are not aware that this funding method can be used for leveraging state money in other programs. In contrast to the cost-sharing approach other states are applying to NPS pollution control, Utah has initiated the Agricultural Resource Development Loan Fund. The program has grown from $250,000 in 1976 to $14.4 million in 1988. Once interest-free, the loans are still affordable at only 3 percent. Furthermore, repayment does not begin until the improved land is ready for use. These features remove many of the financial barriers that can discourage individuals from making abatement improvements.

The program's success is due in large part to Utah's soil conservation districts, which process applications, approve plans, and monitor projects. The conservation districts make sure the BMPs are practical and reasonable. Loan payments and interest replenish the state fund. Administrative fees are divided among the various state and local agencies involved in the program.

*Utah Department of Agriculture – (801) 533-5918*

## Community Forms Utility District to Fund Stormwater Control

Bellevue, Washington needed to improve its management of stormwater as the City grew. Residents saw the salmon dying and pristine areas disappearing and wanted to preserve local streams as viable natural environments. Grassroots support was easy to garner because many residents had moved to Bellevue for its natural beauty and accessibility to recreation. Local involvement was key to obtaining approval of a comprehensive stormwater management plan to aid in improving water quality (an advisory vote was held before sale of revenue bonds).

Funding for the drainage program is based on the "polluter pays" principle; all developed property has some impervious surface, so everyone contributes. Other funding sources include permit fees, buy-in charges, developer extensions, and late-comer agreements. These last two items result in system ex-

pansion at no charge to the utility. Funding is stable because the utility does not have to compete with other public services for budget appropriations.

The program centers on source controls, such as oil-water separators where spills are likely, vegetation clearing limits, and public education. Public education is designed to develop a feeling of "ownership" of the problem and show how individuals can be part of the solution; common problems and practical solutions are emphasized.

*Bellevue, WA Storm and Surface Water Utility—(206) 451-4476*

## Industry Funds Enforcement Program

In an interesting twist on the "polluter pays" principle, Idaho's forest products industry lobbied the state legislature to have themselves taxed to support five forestry agency positions to enforce the State Forest Products Act, which regulates erosion control by forestry operations. Forestry, like many industries, has had a negative public image and is often subject to calls for stricter regulation and stiffer penalties for violations. Now, Idaho foresters pay five cents per acre into a fund for staffing in the Department of Lands. The program is expected to generate about $150,000 per year. The increased staffing level will allow the agency to increase its inspection and enforcement activity, as well as improve its educational efforts. For example, a series of 15 workshops for forest operators has been held around the state. Careful homework before the legislation was introduced ensured its passage with little opposition.

*Idaho Department of Lands—(208) 334-3280*

*Sides and ditches of logging road seeded to control erosion. Photo by Soil Conservation Service.*

# The Program that Plans for Results Can Show Results

Successful NPS programs are efficient and cost effective. They use available resources and expertise and build on the experiences of others. In addition, they consider the long-term costs and benefits of the program—it may be necessary to spend a little in the near term to gain a lot in the long term.

The most effective demonstration projects focus on demonstrating clear results, rather than just showing how to implement a project. This is something that requires a talent for detailed foresight and skillful planning. Simply stated, a program needs reliable feedback:

- What's working, and what isn't?
- Is the strategy cost effective?
- Who's being convinced?
- Is water quality improving?
- How could the next project be improved?

It can be difficult to answer these questions, but it is possible, even with large, complex projects.

## Monitoring Provides the Needed Connection

Iowa's Big Spring Demonstration Project was planned carefully to show results. Nitrates and pesticides are creeping into ground water in Iowa, where 80 percent of the citizens depend on it for drinking water. Big Spring Basin had experienced ground-water contamination from these sources, so it was an excellent choice for a demonstration project. Almost all of the basin's ground water discharges at Big Spring, so chemicals that leach into the ground water eventually show up there. Furthermore, the background data needed to reveal water quality changes are already available; intensive water monitoring has been conducted in the basin since 1981.

Finally, Big Spring Basin is a perfect test ground for abating NPS pollution from agriculture. There are no municipal or industrial wastewater sources that could confuse monitoring results.

Big Spring provides a huge, relatively undisturbed laboratory for making NPS tests. Project personnel are educating farmers on ground-water quality problems and the use of fertilizers and pesticides and good agricultural practices. BMPs are being installed and displayed on experimental farm plots. And ground-water results are being

monitored. Early data show a relationship between fertilizer nitrogen applied in the Big Spring Basin and nitrate levels in the ground water there. Nitrate level declined in response to the reduction in fertilizer use associated with the Payment-in-Kind (PIK) program, for example. It will be a few years, however, before clear relationships can be defined, since year-to-year variation can mask long term trends. The excellent planning choices made in targeting Big Spring Basin will assure that these results will be possible.

*Iowa Department of Natural Resources, Geological Survey Bureau – (319) 335-1575*

## Programs Can Pay Multiple Dividends

In Queen Anne's County, Maryland, state officials constructed an artificial marsh at a local high school. In developing this project, they not only built a control mechanism to solve a problem, but also provided a teaching tool. Students and teachers learned about NPS pollution and the natural cleansing power of wetlands while doing part of the planting. Thus, Maryland cut costs of creating the wetland while demonstrating the efficacy of cooperative efforts and effectiveness of natural systems in reducing NPS pollution.

*Maryland Department of the Environment – (301) 974-2224*

# Target Your Most Productive Problem

The diffuse nature of NPS pollution makes it particularly difficult to grapple with: the problem presents few clear "handholds." Many program managers have responded to this situation by dispersing abatement funds uniformly across the state or on a first-come, first-served basis. Others, however, have thrown a spotlight on troublesome areas through an approach popularly called "targeting." Targeting can make it much easier to show results, because it focuses control activities on a problem watershed, a specific industry, or a particular facet of the problem.

## Local Interest Leads to Willingness to Assume Problem Ownership

Wisconsin carefully targets areas with serious NPS problems and provides assistance only where localities want help. This skillful, two-pronged approach maximizes the efficacy of limited funds. Wisconsin uses the following criteria to select target watersheds *before* committing resources:

1. severity of the pollution problems;
2. the potential for pollution reduction;
3. willingness of landowners to participate in the cleanup effort;
4. potential benefits as a result of the program;
5. ability of local authorities to carry out their roles; and
6. the willingness and ability of local agencies and other governmental units to control other sources of pollution.

Federal, state, and local agencies are all actively involved in targeting watersheds. Development of abatement plans is also a cooperative effort, with responsibilities for action and funding clearly detailed. The unique feature of this program is the targeting of watersheds where communities have convinced the state that they want to solve their NPS pollution problems. The local government monitors the projects and is accountable to the state for their implementation.

*Wisconsin Department of Natural Resources – (608) 266-1956*

## Pennsylvania Focuses on Nutrient Management

Pennsylvania targeted its Susquehanna River basin as a major focus of agricultural pollution control based on EPA's study on Chesapeake Bay pollution. The Susquehanna contributes about half the fresh water flowing into the Bay and carries with it 21 percent of the phosphorus and 40 percent of the nitrogen polluting Bay waters. The sources: excessive cropland soil erosion and a dense livestock population. An earlier study by the state showed that counties in the lower Susquehanna basin were responsible for the bulk of

the pollution, so the control program was targeted to those areas. In addition, nutrient management was identified as the most productive approach to pollution control, leading to design of a cost-sharing program around this concept. A nutrient management plan must be in place before a farm is eligible for BMP cost-share funds. Assistance to farmers includes a mobile nutrient laboratory, which helps farmers limit nutrient applications (including manure) to the level needed by crops.

*Pennsylvania Bureau of Soil and Water Conservation – (717) 787-5267*

## Maryland Protects Critical Area

Maryland has created a special zone to protect the Chesapeake Bay from NPS pollution. The Critical Area Program is a means of implementing NPS efforts along shoreline areas adjacent to the Bay through controls on development in a 1000-foot strip. A state and local commission developed program criteria, which are being used in developing local protection programs. Local governments assign critical areas under their jurisdiction into one of three categories and regulate development accordingly. In "Limited Development Areas" the goal is to preserve existing forest cover and minimize impervious surfaces. In "Resource Conservation Areas" development is discouraged in favor of agriculture and forestry. Pollutant reduction from existing development is the goal in "Intensely Developed Areas." Farmers in the critical areas must have soil and water management plans by May 13, 1991. Buffer strips of vegetation up to 100 feet wide are being planted along tidal waters and streams.

*Chesapeake Bay Critical Areas Commission – (301) 974-2426*

*Waste management for cattle operation, with settling basin on right. Photo by Soil Conservation Service.*

# Explore Modern Technologies

Recent advances in computer technology have made new tools available to program managers. Geographic information systems are new tools that can be used to define problems and target solutions. Two ways they have been used are described below.

## Virginia Locates Key Farmers with Computer

Virginia is now using a computer-based information system to identify farmland with a high erosion potential. VirGIS – the Virginia Geographic Information System – replaces a manual approach to the identification and targeting process. VirGIS is used as a screening tool to identify potential problem areas. State and local staff then visit farms to verify conditions and evaluate abatement techniques. This approach identifies the potentially most serious problem areas and allows staff to take the program to farmers who might not have requested assistance, rather than just allocating funds among farmers who come in voluntarily.

VirGIS combines a variety of data sources: topographic, soil, and surface water maps, and soil, watershed, and elevation information are integrated with factors for rainfall, vegetative cover, and land use practices. The one-hectare cell that is the geographic unit allows targeting of priority areas on individual farms. In the long term, staff expect to be able to use the system to assist with priority setting and critical area determination for programs such as the Conservation Reserve, forestry management, and assessment of site suitability for on-site waste management.

*Virginia Division of Soil and Water Conservation – (804) 786-8173*

## Minnesota Assessed Ground-water Sensitivity

A key receptor for pollution is ground water. However, the potential for ground-water contamination varies from place to place. In southeastern Minnesota, karst topography (limestone caves, sinkholes, etc.) leads to high pollution potential, but available monitoring data were not organized so that trends could be identified easily. Analysis of local well monitoring data in conjunction with state well location information in the Minnesota Land Information System has allowed correlation of test data with aquifer data. Hydrogeologic sensitivity maps produced by the state show how susceptible various areas are to ground-water contamination. These substantiate the relationship between land use and ground-water quality. Results are being used to educate local officials and residents and have led to development of ground-water protection ordinances and the use of local water planning legislation to develop aquifer protection plans for each county.

*Minnesota Environmental Quality Board – (612) 296-0676*

# Self-regulation May Be Easier to Sell

By developing consensus on the need for regulation, the regulated community may find it easier to comply without complaint. Similarly, self policing by a regulated group may be more effective than government intervention: The penalties may more closely fit the "crime."

## Dairy Farmers Fine Association Member

As part of the effort to clean up Tillamook Bay (described earlier), dairy association members fined one of their fellow members for violating required BMPs. That farmer's milk price was reduced until the violation ceased, and to help ensure future compliance, the reduction was continued for an additional six months.

## Illinois Farmers Write Farm Plans

In Illinois, the Soil Conservation Service has begun a program to train farmers to write their own farm plans. These plans are the basis for conservation and erosion improvements through implementation of BMPs and are required for continued eligibility for federal assistance. Accelerating development of the plans will increase the pace of BMP installation and thus result in more water quality benefits. In other areas, most farm plans are developed by governmental agencies, which limits the number that can be developed each year. Helping farmers write their own plans will also help ensure their implementation, since the farmers will feel a greater degree of responsibility for them and the results, as well as feeling that they are realistic. Farmers also are taught key concepts about erosion, which are then related to recommended control practices. Farmers have always recognized their role in land stewardship, and this understanding of causes and effects of erosion provides good reasons for controlling erosion by reinforcing this feeling.

The Soil Conservation Service and the Cooperative Extension Service together have developed an instructor's manual, five slide shows, and a videotape to be used in an 18-hour course. The material was tested and revised over a one-year period and is now available for distribution. Several states have already used the materials, which are designed to be modified easily to include locally relevant information.

## Idaho's Foresters Believe in Effective Enforcement

As mentioned earlier, Idaho's forest products industry lobbied for a tax to support state enforcement of the Forest Products Act. Clearly, foresters believe that their interests are served better if the law is enforced; they are less likely to receive adverse publicity and complaints if all affected companies know they must comply. Peer pressure is also an effective tool to increase compliance; forestry associations are cosponsoring workshops and other educational efforts.

# Recast the Problem Creatively

Some innovative program managers have gone to the heart of the NPS problem – and transformed it! Such an approach calls for an almost forced detachment from usual ways of viewing the situation, coupled with some very creative brainstorming.

## When is a Nonpoint Source a Point Source?

Florida managers decided that it would be easier to control some nonpoint sources if they could be viewed as point sources, tractable to point source solutions. BMPs provided the inspiration: stormwater runoff is now being captured in retention basins or detention facilities in urban areas across the state. Developers are required to implement the concept. To release stormwater to a surface water body, developers must apply for a state discharge permit. The applicant must assure the state that the proposed discharge will not cause a violation of water quality standards. Performance standards are used to achieve this goal. For example, for a project occupying less than 100 acres, the standards require that the runoff from the first inch of rainfall or the first half inch of runoff be captured either in a retention basin or in a filtering detention facility.

Although some problems have surfaced in implementing the program, it has been widely accepted by the construction industry. In its first four years of existence, the Florida Stormwater Rule has stimulated the development of thousands of detention and retention systems. Current issues to be addressed include the potential for ground-water contamination and the need for a regional or watershed approach to controls in some areas.

*Florida Department of Environmental Regulation – (904) 488-0782*

# Bibliography


Cooperating for Clean Water (case studies and three briefing papers related to agricultural nonpoint source pollution control, published by the Farmland Project of the National Association of State Departments of Agriculture Research Foundation), 1986.

The Model Implementation Program: Lessons Learned from Agricultural Water Quality Projects (prepared by the National Water Quality Evaluation Project at North Carolina State University and Harbridge House, Inc.) February 28, 1983.

Chesapeake Bay Nonpoint Source Programs, U.S. Environmental Protection Agency, Region 3, Chesapeake Bay Liaison Office, January 1988.

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