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## State Nonpoint Source Programs

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# State Nonpoint Source Programs

## FUNDING NONPOINT CONTROL PROJECTS IN MISSOURI

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On June 15, 1983, the Missouri General Assembly approved House Joint Resolution No. 21. This measure, called Constitutional Amendment No. 2, was passed by public vote in the November 1984 general election. This amendment increased the State sales tax by 0.1 percent. Taxation begins July 1, 1985, and will be in effect for five years. The sales tax will generate approximately \$30.5 million annually, to be divided equally between State parks and historic sites, and soil conservation.

Missouri's Constitutional Amendment No. 2 is a partial answer to solving the problem with funding nonpoint controls related to soil conservation.

The Soil and Water Districts Commission proposed to use 77 percent of its \$15 million annual share for direct financial assistance to landowners; 19.7 percent for technical planning and clerical expenses at the county level; and 3.3 percent for program administration and State office personnel. This paper describes how the soil protection revenues will be used.

### MISSOURI SOIL AND WATER CONSERVATION COST-SHARE PROGRAM

The Missouri cost share program equals 50.8 percent of amendment revenues for soils.

Farmers realize the long-term benefits of soil and water conservation. In the short term, however, the costs outweigh the profits. Through the cost-share program, the public directly assists the farmer and his conservation efforts. The long-term benefit for the public is plentiful food at reasonable prices.

It has been estimated that \$250,000,000 of cost-sharing funds are needed by the end of the century to protect Missouri's topsoil. The U.S. Department of Agriculture's Agricultural Stabilization and Conservation Service (ASCS), through its agricultural conservation program, supplies approximately \$8 million annually to its cost-

share program. In addition, State funding of at least \$8 million per year is needed for an effective operation. The amendment will fund the state's cost-share program at approximately this level for 5 years.

Through the cost-share program, the farmer pays approximately half of the installation costs and the state pays the rest. Conservation programs eligible under the cost-share program include terracing, conservation tillage, strip cropping, and other proven soil and water conservation techniques. The intent of this portion of amendment revenues is to make more funds available to the farmer as an incentive to install soil and water conservation practices.

### SMALL WATERSHED PROTECTION AND FLOOD PREVENTION PROGRAM

This program equals 13.3 percent of amendment revenues for soils.

Water that does not evaporate or soak into the soil usually drains off the land into ditches, streams, marshes, or lakes. The area drained by a stream makes up a watershed. Watersheds sometimes can be complex, such as when land is drained by small streams that flow into a larger stream. Because several different properties may be involved, a cooperative watershed program among neighbors is very important for soil and water conservation. This also explains why more than one conservation measure within a watershed is necessary for best results. More than 100 such watersheds have been designated for planning in Missouri.

The watershed protection and flood prevention program does more than conserve soil and water. It also keeps sediment from entering streams and lakes; this sediment can reduce the volume of the lake or interfere with fishing. New revenues will be used to accelerate the watershed program by funding several completed watershed plans. Money will be available for cost-sharing assistance to

landowners for soil and water conservation projects within selected watersheds. These projects include terraces and strip cropping to help water soak into the soil instead of running off, and small dams to hold back runoff water that otherwise would cause flooding.

### **MISSOURI SOIL AND WATER CONSERVATION LOAN INTEREST-SHARE PROGRAM**

This program equals 13.3 percent of amendment revenues for soils.

Many farmers feel they cannot install conservation practices because of cash-flow problems, and they cannot borrow money because of high interest rates. The interest-share program provides financial incentives to landowners who are conserving soil without the benefit of other available programs.

Amendment No. 2 establishes a permanent fund to serve as a financial base for reduced-interest loans. It provides further incentive to landowners to install soil and water conservation measures.

### **WATER QUALITY ASPECTS OF AMENDMENT NO. 2**

While 77 percent of the anticipated \$15 million will be for direct assistance to landowners, only 13.3 percent (about

\$2 million per year) will be available for water quality related land treatments through the small watershed protection and flood prevention program. This situation makes targeting extremely important if the State wishes to achieve measurable water quality improvements.

Therefore, applications will be requested from watershed districts and evaluated on the basis of percent landowner participation, likelihood of success, potential for water quality improvement or protection and other factors. One key drawback may involve lack of interest in areas that have good potential for environmental improvement. While Missouri DNR's Water Pollution Control Program has identified numerous areas where protection or improvement is desired, the watershed districts are governed by a board of supervisors who operate independently. Similarly, problem areas may exist because landowners want to operate independently of government assistance programs.

Initial watershed protection areas will be identified in the spring of 1985 and land treatment will begin shortly thereafter. Project monitoring will be conducted prior to, during, and following land treatment. Because of the difficulties associated with quantifying runoff-transported pollutants, monitoring efforts will focus on habitat quality index changes and alterations in fish community structure. This study should contribute to the not-well-understood relations between stream biota and land use activities.

# STATE OF MARYLAND NONPOINT SOURCE CONTROL IMPLEMENTATION PROGRAM

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## ABSTRACT

The State of Maryland has had a number of nonpoint source control implementation programs dating back to the late 60's and early 70's. Beginning in 1982, the research findings of the Chesapeake Bay Program added momentum. In January 1984, the General Assembly added a great many new programs and modified some existing programs. Not all these programs are outgrowths of the Chesapeake Bay emphasis. Many of them preceded that event. Each program has a different political and institutional situation from which it has been derived. These 12 different programs will indicate the variety of political situations in which support can be built for new programs. This paper covers each program, how it came into being, how it is institutionally implemented, what the responsibilities at the Federal or State or local level are, how it is financed, and what the State of Maryland has done to date in implementing the program.

## SEDIMENT CONTROL

The first program I would like to cover is sediment control. Roy Benner of the State's Water Resources Administration has written a very lengthy article, "Urban Sediment and Stormwater Control: the Maryland Experience," published in the February 1985 Journal of Soil and Water Conservation and from which much of this information comes. The Maryland Attorney General's Office declared sediment a pollutant on July 31, 1961. That ruling stated that silt discharged into the waters of the State resulting from stormwater runoff over land areas exposed from land clearing or development operations was legally subject to regulatory control by the State agency. It was largely the result of this decision, and subsequent analysis of the extent to which sediment contributed to the State's water pollution problems, that led Maryland to enact the first statewide erosion and sediment control legislation on Earth Day, April 22, 1970. (Nat. Resour. Article, Title 8, Subtitle 11, Annotated Code of Maryland.)

The major features of the 1970 sediment control legislation are:

1. No clearing, grading, or transporting of soil can take place until the developer submits an erosion and sediment control plan to the local soil conservation district for approval. The developer must specify that he will carry out the plan. Only then is he granted a local grading or building permit.
2. Maryland's 23 counties and 151 municipalities are required to adopt grading and sediment control ordinances acceptable to the Water Resources Administration. These ordinances include the necessary procedures and provisions needed to implement and enforce the local sediment control programs.
3. Exemptions from the law include agricultural land management practices and, in some counties, construction of single family homes on lots larger than 2 acres.
4. The Water Resources Administration has leadership for assisting local governments in conservation districts in

carrying out their responsibilities under the law. Moreover, the Administration must review and approve all land clearing or construction projects conducted on any State or Federal property.

5. Penalties for not carrying out the provisions of the law are deemed a criminal misdemeanor. Conviction subjects one to a \$5,000 fine, 1-year in prison, or both, for each violation.

This understanding of the basis of the program is essential to understand the changes made to it since 1970. The State implemented the program with plan review and enforcement at the local level, but provided no local funding. Primary emphasis was placed on the training and effective use of existing agencies and staff.

After 10 years of experience with the program, three deficiencies appeared to be at the root of most of the inadequacies: lack of an administrative commitment to the program, inadequate field inspection, and an inadequate enforcement process.

Many local jurisdictions failed to commit themselves to developing an effective erosion and sediment control program for several reasons. Most of them do not have the financial resources or personnel to administer the program effectively. This is particularly true of small municipal governments which are often run by an administrator or a small clerical staff. Other local governments may have had the financial resources to develop an effective program but for various reasons did not devote sufficient effort to their erosion and sediment control program. When local administrators failed to commit themselves to developing an effective program, the inspection and enforcement efforts generally proved ineffective as well.

Evaluations of local program effectiveness throughout the State have consistently indicated that erosion and sedimentation caused by mankind's activities are not being effectively controlled, and that the best practical combination of procedures and people may not always be at the local level. For this reason, in 1978, the General Assembly amended the sediment control law to require that applicants for erosion and sediment control plans certify that any project engineer, superintendent, or foreman in charge of on-site clearing must have attended a State training program. This had been done previously on a voluntary basis only.

The law was also amended in 1984 to add a civil penalty as an alternative to a criminal sanction. The civil penalty is a fine that is double the cost of installing or maintaining the controls as shown in the approved plan.

The most significant change made in 1984, however, was to provide that, as of April 1, 1985, the State will assume all inspection and enforcement of local erosion and sediment control programs. A local jurisdiction may request and be granted delegation of enforcement authority by the State. In keeping with this shift in authority, about 20 new inspectors were added to the State staff of 14 inspectors. In March 1985, the Department of Natural Resources granted sediment control inspection and enforcement authority to eight counties and Baltimore City. The

authority was denied to eight other counties and the Washington Suburban Sanitary Commission, which operates outside of Washington, D.C.

Although it is obviously too soon to predict the effectiveness of the amended sediment control program, we are hopeful that it will achieve its original goals and we will have it very much back on track. It is an example of a delegation to a local government which did not work and, therefore, was taken back with more control and oversight at the State level.

## STORMWATER CONTROL

Maryland has two stormwater programs. One is a regulatory program requiring that a stormwater management ordinance be adopted at the local level subject to State criteria (Nat. Resour. Article, Title 8, Subtitle 11A, Annotated Code of Maryland). The second stormwater program is an incentive grants program for demonstration projects to show the effectiveness of urban stormwater practices.

In 1980, it became obvious to the State that 11 of our 23 counties had stormwater management ordinances that contained many different provisions. We were concerned about this not only from the developer's perspective of having to comply with different requirements, but also from the perspective of determining the most desirable provisions to be put into regulations. Of particular concern to us was the issue of whether or not to maintain as nearly as possible natural runoff characteristics. This could be accomplished by augmenting infiltration, by controlling the release of development-related stormflow increases, or both.

In 1981, regulating stormwater and its downstream impacts was the subject of extensive oversight hearings by a joint committee of our General Assembly. That committee's efforts led to the passage, in 1982, of the State stormwater management law. The State's stormwater management regulations represent a diversified approach to controlling the hydrologic consequences of urban development rather than simply focusing on controlling peak flow. Consideration is given to volume reduction, low flow augmentation, water quality control, and ecological protection.

Having learned from our sediment control experience, the State enacted in 1984 a new grant program of \$1.7 million to make startup money available to local jurisdictions to implement their local stormwater management programs. Local stormwater programs were to be in effect by July 1, 1984. With the threat of a building permit ban, most counties and about two-thirds of the municipalities had adopted ordinances and received State approval by that date.

As of January 1985, grant agreements for local stormwater program development have been executed and funds awarded in 13 counties and four municipalities. The total amount of funds awarded out of the \$1.7 million was \$870,000. The State's regulatory requirements for local stormwater management programs are contained in the Code of Maryland Regulations 08.05.05.

The second State program having to do with stormwater-management provides State bond funds as an incentive for demonstration projects using best management practices in existing urban areas. These grants are provided as 75% State/25% local grants to local governments to ascertain the cost and effectiveness of methods of solving stormwater runoff problems created by existing development. New development is covered by the regulatory program previously described.

In 1984, the State authorized \$1 million for grants to local governments for demonstration projects. In addition, the State authorized \$750,000 of General Construction

Loan funds for retrofitting stormwater best management practices at State facilities. In the first quarter of FY '85, preliminary proposals were received from 12 local governments for demonstration stormwater control projects in existing developed areas. Standards and criteria were completed for the demonstration grant program and regulations were promulgated, effective April 8, 1985. Eight potential State projects have also been identified.

It is important to note that this program, in part, addresses a loophole in the overall abatement of stormwater pollution. Although the new regulatory program will deal with new development, thousands of acres of the State that require best management practices are not subject to a regulatory program. We are hopeful that the National Urban Runoff Project reports prepared for the Washington Metropolitan area and for the Baltimore Metropolitan area will be of value to us in deciding the types of demonstration projects to fund. We are also hopeful that this financial commitment of \$1 million at the State level will encourage local governments in the State to implement similar projects.

Finally, we have received \$875,000 from the Federal government for nonpoint source abatement projects in the Chesapeake Bay drainage area in Maryland. Several of these projects involve retrofitting stormwater facilities on highways and in existing developed areas. This combination of a variety of funding sources with regulatory and incentive programs allows us to more fully address control of stormwater pollution from existing developed areas.

## AGRICULTURAL RUNOFF CONTROL

One of our agricultural nonpoint source control programs is agricultural cost-sharing. The history of how this program came into being is interesting. In 1979, as an option provided under section 208 of the Clean Water Act, the State formulated, adopted, and submitted to the U.S. Environmental Protection Agency a Water Quality Management Program for the Control of Sediment and Animal Waste from agricultural lands. This was adopted and approved by EPA as an applicable statewide nonpoint control program pursuant to section 208 (b)(4)(A).

We persuaded the agricultural community to support this program, although not all of the cause and effect relationships of agricultural runoff affecting water quality and living resources were well defined. Several decisions were instrumental in gaining agriculture's support. First, we asked the agricultural community to write the 208 agricultural control plan. We provided the EPA and State program format, and they provided the technical and institutional details pertaining to determining priority problem areas, best management practices, and implementation. Second, we made a commitment to work with them to secure funding for cost-sharing.

We began to succeed with our funding commitment when, in what we believe to be a unique move, we secured approval from our 1982 General Assembly to reallocate \$5 million of State sewerage facilities construction grant bond funds to agricultural cost-sharing. In 1984, we secured another \$2 million of State bond funds for agricultural cost-sharing. Also, in 1984, we secured approval of an additional \$1.4 million in State general funds to hire 42 new people to work in soil conservation districts to implement agricultural cost-sharing. With these approvals, we felt we had kept our 1979 promise to the agricultural community to get funds to implement the agricultural 208 plan.

The purpose of our agricultural cost-sharing program is to implement best management practices within priority watershed areas that contribute the greatest amounts of pollution. Our goal is to have conservation plans in place

for the farms in these priority watershed areas within 5 years.

For FY '86, we received from the General Assembly an additional appropriation of \$5 million in bond funds for cost-sharing. So, to date, we have secured approval of a total of \$12 million in State funds for agricultural cost-sharing. Of this amount, we have obligated all of the initial \$5 million for 2,000 projects, of which 628 are now completed. We have estimated the total cost of installing best management practices on all agricultural lands in the State by the end of the century to be \$90 million.

We are also proposing to use some of the Federal Chesapeake Bay implementation funds for FY '85 to install agricultural BMP's in priority watersheds. So it is really a combination of State bond funds and Federal funds that we are using for agricultural cost-sharing.

In 1984, the Maryland Department of Agriculture, in cooperation with our Office of Environmental Programs, developed and approved a report entitled Statewide Priority Watersheds for the Potential Release of Agricultural Nonpoint Phosphorus and Nitrogen. The report ranked all watershed segments that drain to the Chesapeake Bay in order of their relative potential to release phosphorus and nitrogen as a result of agricultural activities. Factors included in the ranking of the watersheds were: (1) the intensity of agricultural land use; (2) intensity of agricultural cropping; (3) the amount of cropland under conventional tillage; (4) the fraction of cropland on steep and erodable or, for nitrogen, highly permeable soil; (5) the potential intensity of animal waste application to cropland; and (6) an estimate of the influence of topography upon phosphorus movement. In setting priorities, we met with our Department of Natural Resources to learn where stressed aquatic areas corresponded with critical agricultural areas.

The 42 new State-funded positions have been assigned as technical teams to work in the soil conservation districts serving the priority watersheds. These technical teams in the districts are being supported by the University of Maryland for educational and demonstration activities.

In summary, at the present time, thousands of farmers in Maryland are applying for available cost-sharing funds. We are seeing a harmonious coming together of the Federal agricultural community, our State Soil Conservation Committee, soil conservation districts, and water quality agency staff, to get best management practices on farms.

An additional agricultural nonpoint source program provides for enforcement in problem areas. Enforcement actions are taken against landowners when water pollution standards are clearly being violated and landowners refuse to install best management practices. In these instances, we work through the appropriate soil conservation district to try to get BMP's on the land as a voluntary action. If the district runs into resistance, then the case is referred to the water quality agency. We exercise our water quality authority to bring the landowner into compliance. This approach has been supported by our agricultural community. They are making the utmost effort to achieve voluntary compliance. We estimate taking approximately 30 enforcement actions in FY'86 and 80 in each succeeding year with new staff.

## AGRICULTURAL DRAINAGE CONTROL

Prior to 1984, the EPA Chesapeake Bay Study had documented agricultural runoff as one of the major sources of nutrient and sediment inputs to the Bay. It was also observed that several large agricultural drainage projects were being planned, financed, and constructed by the U.S. Soil Conservation Service and local public drainage

associations with little or no opportunity for State regulation. We felt this process was not adequately protecting the State's natural resources and water quality. Inspection during project construction, as well as for periodic channel maintenance, has traditionally been the responsibility of the U.S. Soil Conservation Service.

For all of these reasons, we prepared legislation which was enacted in 1984 to require that, prior to constructing or reconstructing an agricultural drainage project, a local public drainage association must develop a construction operation and maintenance plan for approval by our Department of Agriculture, with concurrent review by our Departments of Health and Mental Hygiene, and Natural Resources. The statute also requires the three Departments to jointly establish criteria for plan approval, including standards for design, construction, operation and maintenance of agricultural drainage projects. To protect against sedimentation, flooding, nutrient runoff, and habitat loss, inspection and enforcement of plan compliance is carried out by the State. The legislation also provides a civil sanction for violations. Regulations to implement the statute are undergoing final review now. We are hoping to add additional staff to implement this program in future years.

## SHORELINE EROSION CONTROL

The next program provides for the abatement of shoreline erosion around the Chesapeake Bay and its tributaries. The shoreline erosion control program in the State before 1984 addressed only critical eroding areas and promoted structural controls such as bulkheads and riprap. Less critically eroding areas can be stabilized through less expensive vegetative means, using, wherever possible, clean spoil from maintenance dredging of channels to reduce annual dredging costs. Maryland has 376 miles of critically eroding areas (more than 2 feet per year of bank loss) and 965 miles where erosion is less critical. In 1984, we expanded the program to triple the current level of abatement in critical areas. We established a two-pronged nonstructural approach. One prong gave financial assistance to private landowners in the form of 50/50 matching grants. The second provided for State planning in conjunction with dredging projects. In addition, the Shore Erosion Control Loan of 1984 authorized \$3 million for loans to property owners to continue structural shore erosion control.

To implement the program, operating funds of \$300,000 were approved with a staff of five. The program is now operating with projects being actively designed and constructed. To facilitate implementation of the program, a number of workshops were held in the first year with the State Soil Conservation Committee, Federal soil conservation officials, and various county and regional agencies. Some of the FY'84 Chesapeake Bay implementation funds are also being used for nonstructural vegetative measures to reduce shoreline erosion.

## CRITICAL AREAS COMMISSION

The next nonpoint source program involved the creation of the Chesapeake Bay Critical Area Commission pursuant to legislation enacted by the 1984 General Assembly. The purpose of creating the Commission was to establish a State policy of protection, restoration, and enhancement of the critical shoreline area surrounding the Bay and its tributaries, to the head of tide. Through a State/local partnership, the Commission works to develop and adopt protection plans for the critical shoreline area. The ultimate goal is to foster more sensitive development activities to minimize damage to water quality, natural habitat, and scenic values.

The shoreline areas of the Bay system are particularly fragile environments very susceptible to being adversely impacted by human activity. Pollutants associated with development in these areas may reach waters of the Bay and its tributaries in greater amounts than those associated with development in more inland areas. Before the existence of the Commission, some local governments in the State had established protection programs. However, as of 1984, there was no uniform protection program along the shoreline area. The Commission is now fully operational. Regional public hearings have solicited public comments on criteria for managing activities within the critical area. The Commission operates with approximately \$500,000 per year of State general funds. We have high hopes that this nonpoint source program will be extremely effective over the long run in seeing that land in the critical area around the Chesapeake Bay will be used and managed to minimize water pollution. It has succeeded in raising the consciousness of many of our State's citizens to the important role their land plays in the overall ecological cycle.

## RETENTION OF EXISTING FORESTLAND

The purpose of the retention of the existing forestland program is to maintain existing forest buffer areas around the Bay and its tributaries to intercept surface runoff and to infiltrate it to the forest soil profile before reaching the water. The program consists of several stages: (1) defining and mapping the critical land areas currently forested adjacent to the Bay and its tributaries; (2) providing technical assistance to landowners including the preparation of forest management plans; and (3) cooperating with local soil conservation districts in developing forested buffers as best management practices for agricultural land.

Approximately one-third of the land in Maryland's portion of the Chesapeake Bay basin is currently forested. In most cases, this land is subject to conversion to other less protective land uses. Program implementation involves foresters working with landowners in targeted areas around the Bay and its tributaries.

No new legislation was required to implement this program. Approximately \$100,000 of State operating funds is being used for four forester positions. In the first half of FY '85, the new foresters developed five forest management plans covering 365 acres. They are also using student volunteers to compile the names and addresses of people owning forestland within the critical areas.

## CONSERVATION EASEMENTS

The State program of acquiring conservation easements encourages private landowners to preserve and protect undeveloped or low density areas along the shoreline of the Chesapeake Bay and tributaries by executing easements pursuant to the existing Maryland Environmental Trust Easement Program. Easements offer landowners the opportunity to make an individual contribution to protecting the Bay. Because they are permanent, the total number of easements increases the amount of long-term protection.

The Maryland Environmental Trust program was started in 1974 to substantially increase the acreage placed under easements through cooperative efforts of the Chesapeake Bay Foundation. It was modified in 1984 to assist easement owners in identifying and putting into use conservation practices appropriate for their properties. A staff of three and operating funds of \$60,000 per year were appropriated for this program. Easements so far in 1985 amount to about 2,000 acres, covering 3 miles of shoreline.

## DREDGE AND FILL PROJECTS

Another nonpoint source initiative approved in 1984 was an expansion of the State water quality certification program pursuant to sections 401 and 404 of the Clean Water Act. The Office of Environmental Programs is expected to review approximately 2,000 construction projects each year for which water quality certificates are required by section 401. The Corps of Engineers may not issue a section 404 dredge or fill permit unless a State water quality certificate is issued. Certification is a process through which the State may ensure that certain conditions are attached to 404 permits. The increased staff will be able to review 250 to 300 permits per year and conduct 350 to 425 site visits per year related to these permits. This is an example of using an existing Federal program and the interest in the Chesapeake Bay to acquire the political support and resources to perform the job more effectively.

## NONTIDAL WETLANDS

A cooperative program is designed to protect non-tidal wetlands with responsibilities shared by the State and county governments. Maryland's non-tidal wetlands are transitional environments existing as isolated entities or between open waters and dry land. These wetlands possess many of the same values as tidal wetlands. They have complex and extensive root systems that stabilize stream banks, reduce the velocity of sediment laden water, and trap sediments and pollutants contained in these waters. They also provide wildlife habitat and food, particularly to waterfowl and fur-bearing animals. However, current State law directly protects only tidal wetlands. Since 1973, Maryland has lost 14,150 acres of non-tidal wetlands. By comparison, only 250 acres of vegetated tidal wetlands were filled with dredge material from 1971 to 1983.

The initiative relating to non-tidal wetlands did not involve new legislation. Rather, it created funding of approximately \$150,000 to: (1) encourage and assist local governments with the design and implementation of locally administered non-tidal wetlands management programs; (2) initiate a non-tidal wetlands resource assessment and monitoring system that will provide for a quantitative analysis of wetlands types; and (3) establish criteria for soil and water conservation plans to help maintain the integrity of non-tidal wetlands systems.

The new State staff has prepared a handbook regarding non-tidal wetlands protection and is preparing maps in cooperation with the U.S. Fish and Wildlife Service. The staff is expanding training programs and utilization of educational materials for the protection of non-tidal wetlands. Staff members organized and recently conducted a Chesapeake Wetlands Conference.

## MINING (NONCOAL)

Another nonpoint source program regulates surface mining in the State. In 1975, the Maryland Surface Mining Act (Nat. Resour. Article, Section 7-6A-01) was passed. This law requires mitigation of the effects of land disturbance, elimination of hazards to public safety, and prevention of the waste of mineral resources. The law and regulations allow only licensed operators to obtain surface mining permits. To obtain a permit for a specific site, a detailed mining and reclamation plan is required, indicating the steps to be taken to minimize adverse environmental effects and to restore the landscape. The law also requires that a performance bond be deposited by the permittee. This bond is released only after satisfactory fulfillment of all permit conditions and completion of reclamation. In gen-

eral, industry compliance with this program has been good.

A related program, funded by the Surface Mined Land Reclamation Fund (Nat. Resour. Article, Section 7-6A-04), provides for reclamation of existing abandoned mines and pits. The fund receives money from surface mine permit fees, forfeited bonds, and fines. In June 1981, we completed an inventory of abandoned mines. Priority sites are now being reclaimed using the current accumulated fund of approximately \$800,000.

### **Failing Septic Systems**

Maryland also controls on-site waste disposal systems. State regulations specify that domestic sewage or sewage effluent may not be disposed of in any manner that will cause pollution of the ground surface, ground water, bathing area, lake, pond, watercourse, or tidewater, or create a nuisance (Comar 10.17.02). A permit must be obtained from local health departments to on-site disposal systems.

In addition, a second regulation provides that subdivision development may not be allowed where infiltration of individual sewage system wastes might result in ground water contamination (Comar 10.17.03). Violation of either regulation brings a \$100 fine each day on which a violation occurs.

Presently, the State is considering adopting new regulations that would greatly facilitate the use of innovative on-site disposal systems. A demonstration project, using 201 construction grant funds, is testing a clustered mound system on Maryland's Eastern Shore. This innovative system is designed to serve more than one dwelling unit in a part of the State in which conventional septic systems frequently fail.

### **COAL MINING**

The State created a Land Reclamation Committee (Nat. Resour. Article, Annotated Code of Maryland) some years ago to regulate strip mining for coal in the western portion of the State.



# THE WISCONSIN NONPOINT SOURCE PROGRAM

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Nonpoint sources are land areas where activities, including land management, result in the transport of pollutants or contaminants, generally by runoff water, to lakes, streams, or ground water. Pollutants from point sources usually are discharged directly to waterbodies in fairly constant concentrations and amounts, whereas pollutants from nonpoint sources may follow transport paths which partially deposit them before they reach receiving waters. The concentrations and volumes vary greatly by season and year; therefore, nonpoint sources are usually more difficult to identify, and produce chronic degradation of water quality. Nonpoint source pollution problems also vary greatly between geographic regions of the United States and between individual States.

Water quality problems associated with organic and nutrient loads as well as sediment exist in areas of the United States where livestock-based agriculture is prevalent. In the Upper Midwest, nonpoint source pollutants from both croplands and livestock operations have degraded many surface water resources.

Since major portions of Wisconsin are in this critical area, officials recognized years ago that fishable and swimmable water quality will not be reached in many lakes and streams unless an aggressive program for controlling urban and rural nonpoint sources is pursued. The degradation of smallmouth bass and trout fisheries, accelerated eutrophication of inland lakes, and impaired water quality of the nearshore waters of Lake Michigan are examples of the water quality problems that require the control of both point and nonpoint sources. Water resources such as these are vital to Wisconsin's economy because of their important recreational use.

The Wisconsin legislature recognized this need and responded in 1978 by creating and funding the Wisconsin Nonpoint Source Water Pollution Abatement Program. The program was tailored to the nonpoint source needs in urban and rural areas of Wisconsin by incorporating aspects of various existing programs as well as devising new approaches.

Overall responsibility for the Wisconsin nonpoint source control program is assigned to the Wisconsin Department of Natural Resources, which administers both resource management and environmental protection (including water quality) programs. Cities, villages, and counties are assigned the responsibility for local implementation in project areas. In rural areas, this framework is designed to maximize local agency contact with individual landowners and is based as much as possible on existing agencies and institutions. In urban areas, this framework is designed to maximize city and village involvement.

## PROGRAM PURPOSE AND OBJECTIVES

The basic purpose of the program is to systematically control nonpoint source pollution so surface water and ground water quality goals can be met within a reasonable time-frame. The program is designed to deal with the varying nature of nonpoint sources throughout the State. This includes sediments from croplands, construction sites, streambanks and grazed woodlots, and nutrient loads from barnyard runoff, cropland erosion, manure spread on croplands, and runoff from city lawns and streets.

The three major program objectives are: (1) to identify

the most effective approach for achieving specific water quality objectives, and to provide adequate financial and technical assistance to landowners and operators to assist in installing of approved nonpoint source control practices; (2) to coordinate nonpoint source pollution control with other elements of the State's water quality program; and (3) to focus limited technical and financial resources in critical geographic areas.

The third objective warrants specific attention. Unlike many erosion control programs, the Wisconsin program (1) concentrates on entire hydrologic units rather than on random or political boundaries; (2) deals with all urban and rural categories of nonpoint sources rather than selected categories; and (3) relies on systematic processes to identify, rank, and select critical watersheds and portions of watersheds to receive comprehensive attention.

Single source management programs will achieve many onsite land management objectives and may achieve some pollution control. However, these programs often are of limited value in solving pollution problems arising in larger hydrologic units because of their scattered installation. The Wisconsin program concentrates available funds for technical and educational support into selected hydrologic units where maximum comprehensive improvements in water quality can be achieved.

This hydrologic unit approach, called the Priority Watershed Approach, allows all categories of urban and rural nonpoint sources within specific critical areas of a watershed to be identified and controlled through the installation of management practices. Specific areas within a watershed that contribute pollutants to lakes and streams are collectively called Priority Management Areas.

In addition to identifying problems and sources, the priority watershed approach has proven an effective framework for project implementation. Through Priority Watershed Projects, this approach concentrates available educational, financial and technical resources in those critical watersheds where maximum water quality benefits will result from investing money and personnel. To date, there are 26 Priority Watershed Projects in varying stages from project development to final implementation. Each project requires 1 year for identifying critical problem areas, 3 years for landowner sign-up, and 5 more years for installing control practices.

## PRIORITY WATERSHED PROJECT OBJECTIVES AND CRITICAL SOURCE IDENTIFICATION

Selection of a Priority Watershed Project is followed by an 8- to 9-year planning and implementation process. An implementation plan is prepared based on a detailed inventory and assessment of critical source areas in the watershed and the project's water quality objectives. Generally, about 1 year is required to complete the assessment and prepare the plan. The Priority Watershed Plan consolidates water quality and land use information so the specific causes and critical areas contributing to the water quality problem can be identified and the most practical means of controlling the pollution can be developed. The plan guides the Priority Watershed Project and details procedures and responsibilities to help local staff work more

effectively. It can also be important educationally by showing the cause and effect relationship between land management and water quality.

Central to each Priority Watershed Project are the water quality objectives identified for its lakes and streams. The determination of critical pollutants, significant sources, the level of desired nonpoint source pollutant load reduction, and the measurement of accomplishments are all based on these specific water quality objectives. In addition, the severity of water quality problems and the attainability of water quality objectives are primary factors in selecting projects.

Pollutant impacts on water resources must be understood to determine water quality objectives. The objectives must be based on potential use. However, with objectives related to nonpoint sources, the type of impairment rather than the numerical criteria commonly used for in-stream standards is more important. Impairments such as degraded fish habitat caused by sedimentation of the bottom substrate, which commonly occurs in many of Wisconsin's trout streams, do not relate well to numerical standards. Identifying water quality problems and objectives in Wisconsin depends, to a large degree, on biological and physical techniques that relate to the type of impairment and use. Reliance on chemical parameters alone could easily result in many impaired uses being overlooked. Biological indicators often integrate fluctuations in chemical parameters and retain an overall measure of water quality impacts for a long period of time. Identifying water quality objectives in this manner requires the efforts of aquatic biologists and fish managers.

In Wisconsin, some of the water quality objectives identified for Priority Watershed Projects are: (1) protection of the nearshore waters of Lake Michigan, (2) rehabilitation of a warmwater fishery, (3) rehabilitation of a coldwater fishery such as the upgrading of a trout stream through habitat improvement, (4) protection of a desired warmwater fishery, (5) protection of a desired coldwater fishery, (6) rehabilitation of an inland lake, and (7) protection of an inland lake.

With the variety of dairy and cash crop farming and urban land uses in Wisconsin, water quality problems are seldom caused by a single type of nonpoint source. Thus, a categorical approach, one that deals just with one category of sources, such as eroding croplands, will not be effective in controlling nonpoint source pollution. Conversely, involving all landowners is inefficient and not cost effective because not all land management activities contribute significantly to the water quality problems.

A comprehensive assessment of all nonpoint sources is conducted prior to implementing a Priority Watershed Project. Barnyards, fields where manure is spread, eroding streambanks, eroding croplands, construction sites, and existing urban areas are all inventoried. These inventories enable more efficient use of time and money during implementation. For example, 25 to 50 barnyards can be inventoried in the time required to design and install barnyard runoff controls on one or two barnyards. Thus, substantial time and money are saved by not designing and installing practices for barnyards that might have been considered significant using less detailed or more subjective inventories.

## DEVELOPMENT OF IMPLEMENTATION STRATEGIES

An equally important and potentially overlooked program aspect is design of the project and the detailed strategies for implementation. Currently, implementation strategies include detailed landowner contact lists based on the

results of watershed inventories. These lists are accompanied by a preliminary assessment of the severity and extent of nonpoint sources for each operation on the lists. Project implementation strategies also identify and schedule educational activities, outline fiscal management procedures, discuss preliminary project budgets, and estimate staff needs.

## STATE BUDGET SUPPORT

Wisconsin provides financial support in three major categories: (1) cost-share funds for landowners and municipalities to install management practices; (2) aids for local governments to fund additional technical assistance, education and information, and financial and project management; and (3) administrative and planning funds for State administration and preparation of Priority Watershed Plans.

Individual management practices are cost shared at 50 to 70 percent of the installation cost. Higher cost-share rates are used for practices where the capital costs for installation are high and the offsite water quality benefits exceed the landowner's onsite benefits. Since 1978, the State has appropriated over \$23 million to implement the nonpoint source program. Over 80 percent of these funds have been used to help landowners install control practices.

## MANAGEMENT PRACTICE PACKAGE APPROACH

Since effective management practices must operate as systems, the Wisconsin cost-share agreements must contain all management practices necessary to control nonpoint sources on each participating farm or municipality. The landowner or land manager may not limit participation to the practices most directly useful. This approach is similar to the Experimental Rural Clean Water Program, but is quite different from that of the traditional Agricultural Conservation Program. Many installed practices and non-structural controls would not be applied without the systems package requirement.

## ACCOMPLISHMENT TRACKING

Wisconsin's program also includes progress or accomplishment tracking. Accomplishment indicators have been used to some degree in all projects and are being used to a greater degree in new projects. The accomplishment indicators used: (1) relate directly to the water quality objectives and the pollutants causing the problems, (2) relate to the type and significance of the sources to be controlled, so that pollutant load reductions can be calculated, (3) provide feedback to the implementing governmental unit so progress can be determined on a frequent basis, and (4) provide sufficient detail on the location and level of control to guide and interpret monitoring results.

## SUMMARY

Although participation by landowners and operators is voluntary in this State funded program, substantial pollutant load reductions have been achieved in Priority Watershed Projects. However, no voluntary program will achieve the desired levels of control in all situations. In those cases, regulatory mechanisms must be considered.

The elements of the Wisconsin program are designed to effectively and efficiently achieve water quality objectives impaired by nonpoint source pollutants. These program

elements, along with the experiences gained during the past 6 years, have resulted in a program structure that is well defined and adaptable to changing needs. Different areas have different needs and existing institutional struc-

tures. However, the principles used as the foundation for the Wisconsin nonpoint source control program can be applied to developing effective programs to control a variety of nonpoint source problems in any State.