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# Nonpoint Source EPA News-Notes

## A Commentary. . .

### A Ten Year Perspective - - Reflections on the Water Quality of Chesapeake Bay

*The following comments were made by Sandra S. Batie, Professor of Agricultural Economics, Virginia Polytechnic Institute and State University, during the opening morning session of the Chesapeake Bay Nonpoint Source Conference (see center section).*

The end of a decade is a time for reflection, a time for rededication, a time for redirection. When one considers that at the beginning of the 1980s the role of nonpoint sources in determining surface and groundwater quality was rarely recognized and poorly understood, then one can appreciate just how much progress toward improved bay water quality has occurred. *Ten years ago,* any of us interested in nonpoint pollution would begin with a definition; now, we have an entire conference dedicated to the subject. *Ten years ago,* the environmental community was discovering nonpoint pollution after a decade of attention almost exclusively to point sources; now, the control of nonpoint pollution is a top environmental priority. *Ten years ago,* the universities had very little research or extension addressing nonpoint pollution sources; now, the numbers of researchers has increased many fold, and the Extension Service now views water quality protection as an important part of it mission.

*Ten years ago,* the agencies most closely related to agriculture, a chief contributor to nonpoint pollution, were emphasizing the maintenance of soil productivity and the protection of farmers' incomes; now, water quality is an important concern of these agencies—Soil Conservation Service field guides now include pesticide management and water quality protection plans, and the Division of Soil and Water Conservation and the Soil Conservation Districts devote many hours to water quality improvement. *Ten years ago,* many farmers were unaware that either their farm or their practices were contributing to declining water quality; today, far fewer remain uninformed of their relationship to the bay. *Ten years ago,* the public's concern about the bay's quality rarely incorporated nonpoint sources; now, the word nonpoint is even known in our elementary schools, and the public has become far more sophisticated in its knowledge of the complexities associated with obtaining the environmental quality desired.

All these changes have meant that today the bay has better water quality than it would have without them. In this sense, much progress toward water quality has occurred in the 1980s.

As the 1990s unfurl, we can expect to see more progress, but probably not by doing more of what was done in the past. Rather, bay water quality management will enter a new maturity where techniques are sharpened and made more cost-effective—obtaining the most water quality improvement possible with our program resources.

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# Headquarters Notes

## EPA's Coastal NPS Policy Presented to Congress

On March 6, 1990, a team of senior program administrators from EPA's Office of Water testified on solutions needed to protect the nation's coastal waters and habitats. The testimony came before the Subcommittee on Fisheries and Wildlife Conservation and the Environment and the Subcommittee on Oceanography and the Great Lakes, both of the House Committee on Merchant Marine and Fisheries. This Committee is considering legislation to re-authorize the Coastal Zone Management Act.

The team presented a clarifying policy statement on the administration of the Clean Water Act's NPS control provisions and water quality standards during the course of its testimony.

Making the presentation on behalf of EPA was Tudor Davies, Director of the Office of Marine and Estuarine Protection. He was accompanied by Jim Elder, Director of the Office of Water Enforcement and Permits and Martha Prothro, Director of the Office of Water Regulations and Standards, which includes the Assessment and Watershed Protection Division's NPS program managers.

The policy statement follows:

> *In large measure, the focus of the water quality protection programs under the CWA has been on point source discharges. While significant results have been achieved, it is generally agreed that non-traditional sources, such as nonpoint sources, combined sewer overflows, and stormwater discharges account for a majority of the water quality problems in coastal areas.*
>
> *Most States are making a good effort to comply with the relatively recent nonpoint source control requirements of Section 319 of the CWA. Many States, however, currently lack the full scientific and technical expertise, resources, and institutional capability to implement and institutionalize nonpoint source controls and evaluate their effectiveness. States and local governments, with EPA's assistance, need to encourage management of soil resources and agricultural chemicals, implement cost-effective measures to reduce contaminated urban runoff where water quality is impaired, and work with local governments to institutionalize more environmentally sound land use management practices. These are some of the basic issues that must be included in our strategy to clean up and protect coastal areas.*
>
> *The immediate need is to implement those practicable control measures, including nonpoint source Best Management Practices (BMPs), in our most troubled or threatened watersheds, providing for a fairly consistent baseline of controls in those areas. Until we achieve this, we cannot judge whether or where further steps will be necessary. This approach has been quite successful in our point source program, and has been proven to produce significant water quality improvements. Once practicable controls are in place for nonpoint sources, if water quality standards are still not met in particular watersheds, additional controls can be developed using the calculated limits based on water quality standards. However, since calculating limits from standards can be a technically difficult and highly controversial process, it should be reserved for the highest priority areas where reasonable, available controls have been demonstrated to simply not suffice. We would like to see near term implementation of source controls that are practicable, while more advanced science and ecological work is developed, refined, and legally adopted for exceptionally difficult problem areas.*

*[For more information contact: Dov Weitman, Chief, Nonpoint Sources Control Branch (WH-553), U.S. EPA, 401 M St., SW, Washington, DC 20460. Phone: (FTS/202) 382-7085.]*

## *EPA Announces Initial FY 1990 319 Grant Awards*

On March 16, 1990, EPA announced its selection of 12 States to receive special recognition for leadership and long-term achievement in controlling and preventing NPS pollution of water resources. Four of the States—Idaho, Minnesota, North Carolina, and Virginia—were singled out for the highest awards, receiving $250,000 each for their commitments to and accomplishments in addressing this important water quality problem. Eight additional States—Arizona, Kentucky, Michigan, Montana, Rhode Island, South Dakota, Washington, and Wisconsin—also were recognized for their effective efforts to control NPS water pollution, receiving $100,000 each. The awards recognize States with both an outstanding, fully approved NPS Management Program and an historical commitment to comprehensive and effective NPS program implementation.

These national awards, totalling $1.8 million, are a part of the $37 million in Section 319 grants currently being awarded to States by EPA regional offices to assist them in implementing their approved NPS Management Programs. The national awards made to the 12 States named above will serve as bonus awards in addition to the grants those States will receive through the regular grant award process.

A major portion of the $37 million has already been awarded by EPA Regions through a process initiated in November 1989 after the President signed legislation appropriating funds for FY 1990 for State grants under Section 319 of the Clean Water Act. This process involved setting initial planning targets for the States based on estimated NPS management needs, receiving State applications and proposed work programs, and determining grant awards by EPA Regions based on past State NPS performance and the likelihood of proposed activities to result in early and sustained water quality improvement and protection. In cases where final awards have not yet been fully made, EPA Regions are working with States to clarify and strengthen work programs so that all final awards can be completed by June 1, 1990.

*[For more information contact: Stu Tuller, Nonpoint Source Control Branch, Assessment and Watershed Protection Division, 401 M Street, SW, Washington, DC 20460. Phone (FTS/202) 382-7085.]*

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# Notes from EPA's Regions

## *Quail Unlimited Experiences Rapid Growth*

EPA's Region VI NPS Coordinator, Susan Alexander, sent us a copy of the New Mexico Soil Conservation Service *Bulletin* containing an item on the activities of Quail Unlimited in New Mexico. Fascinated, we telephoned Joseph R. Evans, Executive Vice President of Quail Unlimited, at his headquarters office in Augusta, Georgia. We found out the following, which we now pass on to our readers.

Quail Unlimited, a young voluntary organization, is expanding rapidly. It started in 1981 with a major emphasis on establishing quail food and habitat strips. The organization is now experiencing an annual growth rate of 30 %, and currently comprises 324 chapters in 23 States.

According to Evans, local Quail Unlimited chapters pay farmers to plant and manage quail and upland game food and habitat strips. Quail food and habitat strips include native grasses, trees, shrubs, and food grains (i.e., corn, grain sorghum, millet, and wheat). An estimated 420,000 miles of these strips, based on 10 feet of width, resulted from their 1989 efforts.

*Quail Unlimited (Continued)*

Chapters raised $752,000 in 1988, of which 80 % was spent for local chapter area projects. Income is projected to reach $975,000 this year. Beside financing the strips, funds also are devoted to research and education programs and projects, including youth education. If a water shortage reaches a critical level for the bird and game population, chapters do fund water projects as well.

State NPS control managers and Quail Unlimited chapters may have an opportunity to cooperate for their mutual benefit. The establishment of food and habitat cover funded by Quail Unlimited chapters can decrease water runoff and increase infiltration to improve water quality in streams and bodies of water. Further, game food and habitat strips may be established on Conservation Reserve Program lands.

*[For more information on Quail Unlimited and its chapters contact: Joseph R. Evans, Executive Vice President, Quail Unlimited, Inc., P.O. Box 10041, Augusta, GA 30903. Phone: (803) 637-5731.]*

# Notes From The States

## Kentucky Initiates NPS Control Efforts in Mammoth Cave National Park Region

**Farmers, Citizens, and Local, State, and Federal Agencies Join Together**

The highlight of Kentucky's FY 1990 NPS control program undoubtedly is the Mammoth Cave Water Quality Project, whose objective is to reduce pollution in and around the Mammoth Cave National Park area and in the more than 240,000 acre drainage basin that flows through underground streams and caves before emerging as spring water in the Green River. The five county/conservation district project area includes Barren, Edmonson, Hart, Metcalfe, and Warren Counties in south-central Kentucky.

Seven Federal agencies are actively taking part. EPA, the Tennessee Valley Authority (TVA), and the U.S. Geological Survey (USGS) are represented on a multi-agency technical committee advising the project. Additionally, EPA provides Federal funds to the lead State water quality agency under Section 319 of the Clean Water Act, the NPS control section. Further, the National Park Service and the Department of Agriculture's Soil Conservation Service (SCS), Agricultural Stabilization and Conservation Service (ASCS), and the Farmers Home Administration (FHmA) fully participate as well. (Note: FHmA has been involved in the financing of the Caveland Sanitation Project.) All agencies are very interested in the project and are looking for ways that they can become more involved in the future.

Maureen D. Merkler, coordinator of Kentucky's NPS program, observed that the State and Federal agencies were in constant contact with each other. "We're seeing to it that what each of us does complements the other programs and contributes to our common goal of the control of nonpoint sources, removal of pollutants from ground and surface water, and the improvement of water quality within the five county region," she said.

Kentucky's Mammoth Cave National Park houses the world's longest cave through which flow and filter the ground-water tributaries of the Green River. This type of natural construction is typical of the karst geology predominating the area. A "karst" region is made up of porous limestone containing deep fissures and sinkholes and characterized by caves and underground streams. Data collected by the National Park Service indicate that approximately 2000 miles of underground streams exist in the area. At least 15,000 active sinkholes allow direct entry of water runoff into the ground-water system. Most of the contributing drainage area with its sinkholes is outside of the National Park boundaries, of course.

Aside from tourism, agriculture is the major economic activity of the region. Dairy goods, beef cattle, burley tobacco, and alfalfa hay are the leading agricultural products.

*Mammoth Cave (Continued)*

The National Park Service, in writing about the water quality problems of the area, has indicated that

> *[b]ecause large portions of the upper Green River watershed and the groundwater basins affecting Mammoth Cave National Park lie outside park boundaries, activities conducted in these areas greatly influence water quality within the park. The primary activities affecting the park's water quality include: disposal of domestic, municipal and industrial sewage, solid waste disposal, agricultural and forestry management practices, oil and gas exploration and production, urban land-use, and recreational activities. These practices could (and in some cases are believed to) be causing adverse impacts on park resources.*

**Solutions Sought**

Kentucky's lead water quality agency, the Department for Environmental Protection's Division of Water, reports that over $300,000 in FY 1990 EPA, State, and local funds has been committed to its NPS control program. EPA's NPS/319 grant is in the amount of $160,000. The balance is in State and local share/match dollars.

Funding will be targeted to the hiring of a project coordinator, applying BMPs on demonstration farms, guiding monitoring site selection through low altitude photography, monitoring water quality on demonstration farms, producing educational materials, and conducting project-related research and demonstrations by the University of Kentucky College of Agriculture.

At the same time, ASCS will provide cost-sharing for agricultural pollution control practices to farmers in the five conservation districts under an Agricultural Conservation Program Water Quality Special Project. This $400,000 in Federal funds will help to accelerate individual farmer participation.

The National Park Service's monitoring program, at a 1990 Federal cost of $140,000, is continuing to study the influences on water quality in the Mammoth Cave Park and will use this information to develop its own policies and programs. In addition, it will make the information available to the State, ASCS, and the local conservation districts to help in the evaluation of their individual efforts, where applicable. The Park Service described its work as follows:

> *This project will initiate a monitoring program, and thus lay the foundation for monitoring the park's water quality for the future. The objectives of this project are: (1) determine existing water quality of the Green River, its tributaries and the ground water basins affecting Mammoth Cave National Park; (2) monitor trends in base flow and event related water quality; (3) identify existing base flow (chronic) and event related (acute) water quality problems in the Green River, its tributaries and groundwater basins that affect the park; (4) identify potential pollution sources and problems; (5) determine compliance with federal and state water quality standards; (6) collect data that will help determine the impact(s) of existing water quality on biological, aesthetic and recreational resources and values.*

USDA's application to ASCS for Special Project designation commented on local efforts to treat domestic sewage for three small towns in the project area:

> *The project will complement the efforts of the Caveland Sanitation Commission's multi-million dollar project that is to control both point and non-point pollution of the ground water resources of the area. Segments 1 and 2 of 4 segments in a $10 million system for the collection and treatment of sewage for Park City (pop 614), Cave City (pop 2098), and Horse Cave (pop 2045) are now under construction. This project has received both EPA and FHmA financial assistance to protect these fragile underground water resources that flow from the area via cave passages into Mammoth Cave National Park.*

*Mammoth Cave (Continued)*

**Citizens' and Technical Coordinating Committees**

Increased public awareness of water quality problems in south-central Kentucky led to the formation of the Mammoth Cave Karst Area Water Quality Oversight Committee. The committee was formed for the purpose of achieving coordination among citizens, land users, and government agencies in monitoring and improving water quality in the karst area. Membership consists of the Conservation District and county government representatives from each of the five counties in the project area. They have reviewed and endorsed the programs of the agencies briefly outlined above and will continue in an oversight capacity as the projects get underway . "The Mammoth Cave project has widespread local support," said Felix Murray, chairperson of the Oversight Committee and the Barren County Conservation District. "People in this area realize the importance of Mammoth Cave to our local economy, and they realize that we all can lend a hand in protecting water quality in the cave."

A multi-agency Technical Committee consisting of representatives from local and State SCS offices, ASCS, the National Park Service, EPA, the Kentucky Division of Water, Kentucky Division of Conservation, Kentucky Geological Survey, USGS, TVA, University of Kentucky College of Agriculture, and Western Kentucky University Center for Cave and Karst Studies was established to work with the Oversight Committee and the Kentucky NPS Program in developing the NPS water quality project for the Mammoth Cave area. The Technical Committee will continue in a coordinating capacity throughout the project.

**The View of EPA Region IV**

"This is an ideal project," said Beverly Ethridge, NPS Coordinator for EPA's Region IV in Atlanta. "This is an example of problem solving at the local level. Farmers, industry, local conservation districts, and State and Federal agencies are working partners in developing and implementing solutions to the water quality issues in the area. There is a growing recognition that sinkholes are direct links to the underground water supply and must be protected. Land use practices can directly affect the quality and the safety of that water supply. Some old practices must be examined and new ones substituted."

Kentucky NPS Coordinator Merkler pointed out that this undertaking is not a single year effort. "Solutions will take time," she said. "We are off to a good start. This first year will see a lot of best management practices put in place. Our monitoring will help to establish initial key base-line bench marks. Our second year efforts will build upon first year results. We are optimistic about seeing significant improvements because of the excellent coordination and cooperation of this project from the start, especially from the local level."

*[For more information contact: Maureen D. Merkler, Coordinator, Nonpoint Source Program, Division of Water, Kentucky Department of Environmental Protection, 18 Reilly Road, Fort Boone Plaza, Frankfort, KY 40601. Phone: (502) 564-3410.]*

# Notes on Stormwater

*Editor's Note: The first article brings us up to date on how EPA is progressing in meeting the new stormwater management requirements of the Water Quality Act of 1987. This is followed by reports on how two regions, the State of Maryland and the San Francisco Bay area, are approaching stormwater management today. Maryland is assisting localities in setting up public utilities to finance local stormwater management. The San Francisco Bay Regional Water Quality Control Board is preparing to issue State NPDES permits in the bay area, county by county, with each permit to include all municipalities and other public agencies in a single county permit. What we are finding is that States and localities are looking to "modernize" often long-established governmental mechanisms that have in the past dealt with flood control by adding a water quality mission to their charters. Finally, a report comes from Texas describing how a local ground-water conservation district and the State highway department resolved construction and storm runoff management issues in an environmentally sensitive aquifer recharge area.*

**Clean Water Act Requirements**

The Water Quality Act of 1987 added Section 402(p) to the Clean Water Act (CWA), which requires EPA to develop a phased approach to regulating stormwater discharges under its Federal discharge permit program, the National Pollution Discharge Elimination System (NPDES). On December 7, 1988, EPA began the initial implementation of Section 402(p) by proposing permit application requirements for stormwater discharges associated with industrial activity, discharges from large municipal separate storm sewer systems (serving a population of 250,000 or more), and discharges from medium-sized municipal separate storm sewer systems (serving a population of 100,000 or more, but fewer than 250,000).

Permits for other stormwater discharges cannot be required until October 1, 1992, unless a permit for the discharge was issued prior to February 4, 1987, or EPA or an authorized NPDES State (where EPA has authorized the State to operate the NPDES program in lieu of EPA) determines that the discharge contributes to a violation of a water quality standard or is a significant contributor of pollutants to waters of the United States.

Section 402(p)(5) of the CWA requires EPA, in consultation with the States, to conduct two studies on stormwater discharges for which EPA and NPDES States cannot require permits prior to October 1, 1992. The first study will identify those stormwater discharges or classes of stormwater discharges for which permits are not required prior to October 1, 1992, and determine, to the maximum extent practicable, the nature and extent of pollutants in such discharges.

The second study will seek to establish procedures and methods to control stormwater discharges to the extent necessary to mitigate impacts on water quality.

Based on the two studies, Section 402(p)(6) of the CWA requires EPA, along with State and local officials, to issue additional NPDES stormwater regulations by no later than October 1, 1992. These regulations will designate additional discharges to be regulated to protect water quality and establish a comprehensive program to regulate such designated sources. At a minimum, the program must a) establish priorities, b) establish requirements for State stormwater management programs, and c) establish expeditious deadlines. The program may include performance standards, guidelines, guidance, and management practices and treatment requirements as appropriate.

The temporary moratorium from requiring NPDES permits for some stormwater discharges ends on October 1, 1992, at which time all municipal separate storm sewers, and possibly other sources, are subject to the requirements of Sections 301 and 402 of the CWA.

**Status of Implementation**

On December 7, 1988, EPA proposed permit applications for stormwater discharges associated with industrial activity and discharges from municipal separate storm sewer systems serving a population of 100,000 or more (53 FR 49416).

The December 7 notice proposed a broad definition of the phrase "stormwater discharges associated with industrial activity." It defined the phrase to include stormwater discharges from hazardous waste treatment, storage, or disposal facilities; landfills that receive industrial waste (but not necessarily hazardous waste); junkyards and salvage yards; mining facilities; oil and gas operations; construction activities disturbing more than five acres; certain transportation operations including airport de-icing operations; and sewage treatment works lands used for sludge handling.

*EPA's Stormwater Permit Program (Continued)*

Further, the notice proposed a permitting framework fundamentally different from the permitting approach used for traditional point sources (sewage treatment plants and industrial process discharges). The proposal indicated that rather than relying on the construction of traditional end-of-pipe treatment works, permits for municipal separate storm sewer systems will require municipalities to develop comprehensive stormwater management programs focusing on the reduction of pollutants in their discharges. Key components of these permits will be as follows:

- Identification and control of illicit connections, improper dumping, and spills to the municipal separate storm sewer system;
- Control of pollutants in urban runoff from residential and commercial areas, including controlling pollutants from new development;
- Control of pollutants from construction sites; and
- Control of pollutants in industrial site runoff.

On October 20, 1989, EPA entered into a consent decree with an Oregon citizens group, the Bull Run Coalition. Pursuant to the terms of the consent decree, the Agency is required to promulgate final stormwater application regulations by July 20, 1990.

EPA is reviewing a draft of the first stormwater study required under CWA Section 402(p)(5). Transmittal of the report to Congress is scheduled for later this year. The study identifies municipal separate storm sewer systems as well as stormwater discharges from the following eight major classes: mining and oil and gas production facilities, animal feedlots, manufacturing industries, construction activities, waste management and recycling facilities, automobile and related transportation facilities, electric power generating facilities, and selected wholesale facilities.

Identifying types of discharges and pollutants associated with the discharges is only an initial step in program development. The Agency must still address the challenge of developing effective regulatory programs for the large number of stormwater discharges. To gain assistance in this effort, EPA has begun the second stormwater study. Transmittal of the report to Congress is scheduled for 1991. The Section 402(p)(6) stormwater regulations will be developed in parallel with the second stormwater study. Currently, the final second round of regulations (those authorized by Section 402(p)(6)) is scheduled for October 1, 1992. During the development of these regulations, EPA will have to continue to build stronger bonds between the Federal and State NPDES program and the NPS program, particularly in areas such as developing requirements for State stormwater management programs and identifying stormwater discharges for immediate permitting under Section 402(p)(2)(E) of the CWA.

*[For more information contact: Kevin Weiss, Office of Water Enforcement and Permits (EN-336), U.S. EPA, 401 M Street SW, Washington DC 20460. Phone: (FTS/202) 475-9518.]*

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## Maryland Proposes a Stormwater Management Utility for Local Governments

***A Survey of Stormwater Utilities*, Greg Lindsey, Sediment and Stormwater Administration, Maryland Department of the Environment, March 1988. 39 pages.**

***Financing Stormwater Management: The Utility Approach*, Greg Lindsey, Sediment and Stormwater Administration, Maryland Department of the Environment, August 1988. 45 pages.**

The issuance of the above two publications by the Sediment and Stormwater Administration (SSA) of the Maryland Department of the Environment demonstrates its determination to find

*Maryland Stormwater Management (Continued)*

workable and practical means to fight water pollution in, and to reduce nutrient and other pollutant discharges to, Chesapeake Bay through the control of stormwater runoff and sediment control.

Under current State law (Md. Ann. Code, Sec. 4-201 through 4-208) SSA will provide stormwater management technical assistance to local governments throughout Maryland. This assistance supports them in devising the appropriate funding and fee structures to implement local stormwater management programs prepared under that statute.

Recently, SSA completed and published a final report entitled Financing Stormwater Controls in Baltimore County (February 5, 1990), prepared for the Baltimore County Stormwater Committee.

SSA recommends a utility approach to cover the costs of stormwater management services, including capital outlay. SSA's publication Financing Stormwater Management: The Utility Approach summarizes this technique as follows:

> *Stormwater management historically has been financed with general revenues from property taxes. Most local officials, however, have considered stormwater management a low priority activity, at least relative to other important local programs. As a result, reliance on property taxes to finance stormwater management has proven inadequate. The best alternative to property taxes appears to be stormwater utility charges, which are "user" charges paid by owners of properties in proportion to some estimate of the amount of runoff from their properties.*

The estimates of runoff in Baltimore County, for example, were developed by classifying all lands according to use (agricultural, commercial, industrial, residential, etc.) and assigning a utility rate factor to each land use category. Such factors were derived from standard hydrologic runoff coefficients which represent the typical percentage of impervious cover on a property. For instance, the rate factor for industrial parcels is 0.70. This means that, on average, about 70% of each industrial parcel is covered with impervious material. In other words, rates are derived from the relative amount of contribution of stormwater runoff by each land use.

Early in 1988, SSA published the results of A Survey of Stormwater Utilities. SSA received responses from nineteen operating utilities nationwide and five in the formation stage. These organizations had been or were being established at various times, under various circumstances, and for various purposes. Although there were many similarities, no single stormwater utility model emerged. They all, however, provided services paid for through fees levied on users.

Typical functions performed regularly that have to be paid for include basic stormwater administration and engineering; and comprehensive management, including drainage master plans, preventative maintenance, and major capital improvements. Many such utilities were originally organized for flood control purposes. Today, water quality is increasingly of equally major importance. This means that new types of control measures have to be designed and installed: infiltration practices, retention basins, filter strips, and grassy drainage ways are now important features of master drainage plans and are often requirements for new developments. Mowing, debris removal, and other routine activities are now built into cost calculations.

The survey found that public information programs and citizen advisory committees were helpful, and in some cases critical, particularly during the organizational and set-up phases.

*Financing Stormwater Management: The Utility Approach* carefully examines the factors to be considered in feasibility studies to estimate potential revenues from user charges: "Land use data needed to estimate charges include land use categories (not zoning information), total acreage in each category, and parcel area data." Average parcel area information is sufficient initially.

*Maryland Stormwater Management (Continued)*

Greg Lindsey, principal author of SSA's stormwater publications, has written:

> *Urban stormwater runoff is a major source of pollution in the Chesapeake Bay. To achieve targeted reductions in nutrient loadings to the Bay, stormwater management must be improved. Because laws mandating stormwater management are relatively new, most local governments have not yet developed comprehensive programs. Few stormwater programs are well financed, and one-third or more of all stormwater management facilities are inadequately maintained. It is clear that expenditures for stormwater management must increase if water quality goals are to be achieved.*

A portion of Maryland's current FY 1990 Section 319 NPS grant from EPA will fund two additional staff positions to offer technical assistance to Maryland localities seeking to establish local stormwater utilities.

*[For further information contact: Greg Lindsey, Sediment and Stormwater Administration, Maryland Department of the Environment, 2500 Broening Highway, Dundalk, MD 21222. Phone: (301) 631-3547. Also ask for SSA's list of available stormwater publications. A $3.00 charge accompanies each of the publications mentioned in this article.]*

## California Initiates Urban Runoff Control Programs for San Francisco Bay Area

The California Regional Water Quality Control Board, San Francisco Bay Region, has a number of urban runoff control development and implementation activities currently underway. The first phase of these activities began in 1987 and continues to date. An expanded second phase is planned to begin during 1990.

The Regional Board developed a general program concept and outline for the control of urban runoff in its 1986 review of the Water Quality Control Plan for the San Francisco Bay Basin (the Basin Plan). The program elements include identifying urban runoff sources, developing land use and drainage maps, collecting data on urban runoff, and assessing existing and potential urban runoff control measures. The urban runoff control program has initially focused on the South Bay area in Santa Clara County and along the East Bay Shoreline in Alameda County.

Santa Clara County has a population of 1.2 million and encompasses the renowned Silicon Valley. Institutionally, Santa Clara County is comprised of the county government, thirteen cities, and the Santa Clara Valley Water District, an independent agency with flood control responsibility in the county. In 1987, the fifteen Santa Clara County entities began a program which included compiling existing baseline information and designing and implementing an extensive urban runoff characterization study. The characterization study encompasses monitoring dry- and wet-weather runoff of stream waters and sediments as well as monitoring at storm drains representative of homogeneous land uses. The researchers collected data on conventional pollutants, toxic pollutants, and acute and chronic toxicity. System-wide hydrologic and pollutant loads were generated using the Stormwater Management Model (SWMM). The results of the characterization effort and an analysis of control measure options were then used to develop an implementation program for urban runoff control.

The Santa Clara characterization study results and implementation program were submitted to the State as an NPDES permit application in March 1990. The Regional Board will consider adoption of an NPDES permit in June 1990, which will include all fifteen county entities as co-permittees. The permit would essentially require implementation of the program with ongoing monitoring.

A similar effort began in 1988 in Alameda county, which includes the city of Oakland. Completion of the characterization effort and an implementation program for urban runoff control is expected in 1991. The Regional Board would then consider adoption of a single NPDES permit for all municipalities within Alameda County.

*San Francisco Bay Area (Continued)*

In addition to these ongoing efforts, the Regional Board will consider expanding its urban runoff control program in 1990, constituting the program's second phase. Expected actions would include requiring a baseline urban runoff control program in all areas under Regional Board jurisdiction and a comprehensive control program in the intensely urbanized areas.

The baseline control program would focus on prevention actions and include education programs, new development controls, operation and maintenance plans for storm drain systems, elimination of illicit discharges, and baseline monitoring, record keeping, and reporting.

The comprehensive control program would focus on prevention and remediation. In addition to the actions contained in the baseline control program, the comprehensive program would include characterization efforts and control of runoff to the maximum extent practicable. The comprehensive control programs, to be modeled after the Santa Clara and Alameda programs, would result in NPDES permits for the selected entities. The comprehensive program would also apply to selected industrial and other facilities such as military bases.

"Characterization studies provide information on the types and sources of pollutants being generated by runoff. These are different for residential areas and industrial areas," said Tom Mumley, Water Resources Control Engineer with the Regional Water Quality Control Board. "This information will help us focus our efforts on controlling pollution before it enters storm drains," he said.

Some of the actions under study to reduce pollutants in storm drains include the following:

- Policing industrial runoff required for processing in sewage treatment plants and preventing it from being illegally diverted into stormwater drainage systems;
- Providing places for homeowners to dispose of used motor oil, house paints, and other toxics to prevent these from being disposed into storm drains;
- Cleaning storm drains regularly of contaminated silt;
- Building catch basins where oil and gasoline can be separated from runoff water; and
- Requiring industry to cover toxic materials stored outdoors to prevent rain from picking up toxics.

"We have designed our program to encourage a pro-active response by municipalities, giving them maximum flexibility," Mumley said. "We are balancing a patient regulatory posture—allowing for identification and implementation of the most cost-effective control measures—with an urgent concern to mitigate water quality impacts."

One other action of note is a demonstration project to evaluate the effectiveness of a man-made wetland in controlling urban runoff. The project, utilizing an existing man-made wetland in Alameda County, is a joint effort of the Regional Board, the San Francisco Bay Estuary Project, and the Alameda Flood Control and Water Conservation District. This two-year project will begin in 1990 and is being financed by a $75,000 grant from EPA through its Office of Marine and Estuarine Protection's National Estuary Program Action Plan Demonstration Projects.

*[For further information contact: Dr. Thomas E. Mumley, Planning Division, San Francisco Bay Regional Water Quality Control Board, 1800 Harrison Street, Suite 700, Oakland, CA 94612. Phone: (415) 464-0962.]*

## *US District Court in Texas Makes Legally Binding an Agreement Protecting Aquifer from State Highway Runoff*

During the fall of 1989, the Barton Springs/Edwards Aquifer Conservation District in Austin, Texas joined in a lawsuit against the Texas State Department of Highways and Public Transportation over a major highway project which would cross significant portions of the Edwards aquifer and its environmentally sensitive recharge zone. The Edwards aquifer is a Federally-designated "sole source aquifer." After failing to obtain a temporary restraining order to delay work pending the outcome of the litigation, the Conservation District began extensive negotiations with the Highway Department on the design and construction of the highway. These negotiations took place while construction on the highway project was initiated and underway.

The Conservation District is charged with conserving, protecting, and enhancing the aquifers and ground waters within its jurisdiction. It is organized under the Texas Water Code with modification by the 70th State Legislature and was validated in a confirmation election by District residents.

Ground water from the Edwards Aquifer provides a domestic water supply for the rural areas of southern Travis County and northern Hays County, as well as the springs feeding Barton Springs, a major recreation area in Austin. Spring water from the aquifer contributes to Town Lake in Austin which provides part of that city's municipal water supply.

Negotiations were completed, and a settlement between the Conservation District and the State Highway Department was signed, on December 19, 1989. On January 23, 1990, Judge Walter S. Smith Jr. of the U.S. District Court for the Western District of Texas signed a Consent Decree and Partial Final Judgement on the litigation (Civil Action No. A 89 CA 719). In this way the court made legally binding the settlement agreed upon by the two parties.

Bill E. Couch, General Manager for the Conservation District, said the following on the settlement:

> *The District believes the terms of the settlement support its goal to protect the Edwards aquifer and the ground waters within the District, and to ensure that any roadways built over the aquifer, especially the all-important recharge zone, be constructed in an environmentally-sensitive and prudent fashion. The District, the State Highway Department, various environmental groups, and many individuals consider the settlement to be a landmark in highway construction in Texas. It sets a precedent which will help define environmentally sound construction practices, implement and analyze pollution mitigation devices, significantly reduce nonpoint source pollution to surface and ground water, increase public awareness, and provide long-term guidelines for the future planning, construction, and operation of environmentally-sensitive highways in Texas."*

Significant portions of the settlement addressed the following considerations:

- Environmental protection and pollution abatement devices such as pilot channels, hazardous materials traps with an 8000-gallon capacity, sand filtration systems, and detention filtration ponds capable of containing and isolating the first half-inch of rainfall runoff will be installed at every creek, waterway, or drainage the highway crosses.

- Any construction changes involving the roadway or stormwater runoff requirements will be identified to the Conservation District, which will have twenty days to submit comments prior to the implementation of the changes.

- The highway department will maintain ownership of the right-of-way and control of access points with no additional access from adjoining property permitted beyond that shown on existing plans. Therefore, the highway will remain as much of a "parkway" as possible to keep the impact on the recharge area at a minimum.

*Texas Protects Aquifer from Runoff (Continued)*

- The State Highway Department will commission an independent study by either the U.S. Geological Survey or the University of Texas Bureau of Economic Geology to monitor and investigate the water quality effects of the subject highway construction and operations. This will be a comprehensive study to define and analyze the quality of roadway stormwater runoff, the effectiveness of pollution abatement structures, and the possible effects of runoff on the environment during both the construction and subsequent use of the highway in question.

- Signs will be erected by the State Highway Department to inform motorists that they are over the recharge zone of the Edwards aquifer and that the area is environmentally sensitive.

**Later Developments**

The other plaintiffs continued in the case. On March 6, 1990, Judge Smith signed a Memorandum Opinion and Order in favor of the plaintiffs. The Highway Department must now conduct a Federal Environmental Impact Statement on the project before work can continue. Construction has now halted and equipment has been moved off the site. The Conservation District is currently providing input to the Highway Department concerning the requirements of the Court Order for the stabilization and revegetation of areas disturbed by construction.

*[For more information regarding the settlement and its enforcing court order contact: Bill E. Couch, General Manager, Barton Springs/Edwards Aquifer Conservation District, 1124-A Regal Row, Austin, TX 78748. Phone: (512) 282-8441.]*

# Notes from Other Agencies

## *USGS Finds Widespread Herbicides in Central States' Surface Waters*

Detectable amounts of triazine herbicides were found in 55% of 150 stream sites sampled in 10 midwest and north-central States during a 1989 testing survey, according to scientists of the U.S. Geological Survey (USGS), Department of the Interior. Atrazine and alachlor were detected most frequently.

USGS researchers sampled the streams during early spring 1989 before new applications of herbicides to fields. Follow-up sampling in May and June—after herbicides had been freshly applied to the fields to control weeds—yielded detectable levels at about 90% of the downstream sites.

"These herbicides have been detected before in streams in agricultural States, but we do not know of any reports of the widespread occurrences found in our study," said Donald A. Goolsby, USGS water quality specialist for the central United States. States included in the study are Iowa, Illinois, Indiana, Kansas, Minnesota, Missouri, Nebraska, Ohio, South Dakota, and Wisconsin.

"The reconnaissance study was designed specifically to determine the distribution and concentration of triazine herbicides in the streams of an agricultural region. This region of the Midwest was chosen for the study because about 60% of the pesticides used in the country are applied there to produce more than 75% of the nation's corn and 60% of the soybeans," Goolsby said.

"The effects, such as concentrations and distribution, of this intensive application of agricultural herbicides in surface waters of the region was largely unknown," the USGS spokesman said. By fall 1989, having established confidence in the results of its first two rounds of sampling, the USGS team passed its findings along to officials in the affected

*USGS Finds Widespread Herbicides (Continued)*

States. Goolsby noted that USGS has "also begun a third round of sampling during the late fall when streamflows tend to be the lowest and streams are being fed largely by ground water. This round will give us regional-scale information on contamination of ground water by herbicides in the ten-State study area."

Goolsby reported that of the 127 samples collected during the second round of sampling, 44 samples exceeded the EPA proposed drinking water maximum contaminant level for alachlor, 71 exceeded the health advisory for atrazine, 15 exceeded the health advisory for cyanazine, and five exceeded the health advisory for simazine.

Most frequent detections were in the States of Iowa, Illinois, Ohio and Indiana. Few or no detections above the EPA health advisory standard of two parts-per-billion for alachlor or three parts-per-billion for atrazine were found in the surface waters tested in South Dakota, Wisconsin, and Minnesota.

Atrazine and alachlor were detected in the study as follows:

| *Parts Per Billion* | | |
|---|---|---|
| **State** | **Atrazine** | **Alachlor** |
| Iowa | 0.13 to 71.60 | <0.05 to 51.30 |
| Illinois | 0.05 to 108.00 | <0.05 to 47.10 |
| Indiana | 0.05 to 27.00 | <0.05 to 12.80 |
| Kansas | <0.05 to 15.90 | <0.05 to 1.60 |
| Minnesota | 0.06 to 2.90 | <0.05 to 1.10 |
| Missouri | 0.18 to 11.00 | <0.05 to 0.97 |
| Nebraska | <0.05 to 52.00 | <0.05 to 4.70 |
| Ohio | 0.13 to 28.50 | <0.05 to 16.70 |
| South Dakota | <0.05 to 1.60 | <0.05 to 0.12 |
| Wisconsin | <0.05 to 26.40 | <0.05 to 4.50 |

*[For more information contact: Donald A. Goolsby, U.S. Geological Survey, Water Resources Division, Box 25046, MS 406, Denver Federal Center, Denver, CO 80225. Phone: (303/FTS) 776-5937.]*

## *Request for Proposals Issued for FY 1991 USDA Water Quality Program Projects*

State Directors of the Agricultural Stabilization and Conservation Service (ASCS), the Cooperative Extension Service (CES), and the State Conservationists of the Soil Conservation Service (SCS) have been invited by their parent USDA organizations to submit coordinated proposals from their respective States and to compete for final FY 1991 selections for the following water quality program projects:

- **Demonstration Projects:** These projects aim to accelerate the transfer and adoption of new or innovative technology to protect and/or improve water quality. Proposals are due June 1, 1990.

- **NPS Hydrologic Unit Areas:** These projects provides technical, financial, and educational assistance to implement a program within a hydrologic unit or aquifer recharge area to solve an agricultural NPS water quality problem identified in the State Nonpoint Source Water Quality Assessment Report or Management Plan approved under Section 319. Proposals are due June 15, 1990.

*USDA Water Quality Projects (Continued)*

- **ACP Water Quality Special Projects:** These projects attempt to accelerate cost sharing for program implementation within a hydrologic unit or aquifer recharge area to address an agricultural NPS pollution problem identified by local or State agencies. Proposals are due July 1, 1990.

Geoffrey H. Grubbs, Director of the Assessment and Watershed Protection Division, EPA, recently sent a memorandum to all of EPA's Regional Water Quality Branch Chiefs, which included USDA's water quality proposal guidance. He stated that this is an opportunity to work cooperatively with USDA on an important issue of mutual concern—the protection of surface and ground waters from agricultural NPS pollution.

*[For more information contact: Jim Meek, Special Assistant for Water Quality to the Assistant Secretary for Science and Education, USDA, 217-W Admin. Bldg., Washington, DC 20250. Phone: (FTS/202) 447-5979.]*

# Reviews

## SCS Publishes Water Quality Indicators Guide

***Water Quality Indicators Guide: Surface Waters*, C.R. Terrell and P.B. Perfetti, SCS-TP-161, September, 1989. 129 pages.**

This attractive publication was developed by the Soil Conservation Service. It contains color and black and white illustrations of aquatic organisms that serve as biological indicators of water quality and is designed to help field personnel recognize agricultural NPS problems. Conservation and best management practices "that can be employed to reduce or eliminate nonpoint source water pollution problems" are listed and briefly described in one of the appendices.

Field sheets are provided to enable the user to assess surface water quality problems and to select appropriate remedial practices. This guide is neither a research tool, nor does it offer quantitative data, but is a qualitative tool that assists field personnel to learn to visually recognize certain prominent indicators of water quality problems. The guide thus provides one of the several tools necessary and available to assess and restore waters currently failing to meet State water quality standards established by the State water quality agency. EPA recommends that its use be integrated with other State monitoring protocols designed to measure the effectiveness of BMPs and other NPS control methods established as a part of comprehensive State NPS management programs.

*[A limited supply of the guide is available. For more information contact: Charles R. Terrell, National Water Quality Specialist, SCS Ecological Sciences Division, P.O. 2890, Washington, DC 20013-2890. Phone: (FTS/202) 447-4925; or contact your State Soil Conservationist.]*

## NPS Water Quality Video

The Mississippi Cooperative Extension Service has developed a "Land and Water 201" NPS water quality video. We are told that this is an excellent production with most of the footage involving farmers describing their problems on camera and how they are attempting to solve them. The video includes shots from Mississippi, Tennessee, Georgia, Alabama, Kentucky, North Carolina, and Virginia. There is also coverage of the problems at Mammoth Cave, Kentucky (see our related story elsewhere in this issue). The video runs for 18:52 minutes and is priced at $25.00 each, or $6.00 each for quantities of 11 or more.

*[To order copies of the video contact: Danny Gardner, Mississippi Cooperative Extension Service, P.O. Box 5446, Mississippi State, MS 39762. Phone: (601) 325-2142.]*

## *Nonpoint Source Information Exchange Coupon*

*(Clip or Photocopy and Mail or FAX this coupon to us)*

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# Datebook

This DATEBOOK has been assembled with the cooperation of: *Conservation Impact*, the newsletter of the Conservation Technology Information Center, 1220 Potter Drive, Room 170, West Lafayette, IN 47906-1334; and *NWQEP NOTES*, the newsletter of the National Water Quality Evaluation Project, North Carolina Agricultural Extension Service, North Carolina State University, 615 Oberlin Rd., Suite 100, Raleigh, NC 27605-1126. Their cooperation is appreciated. If you have a date you want placed in the DATEBOOK contact the editors of NPS *NEWS-NOTES*.

## Meetings and Events

*May*

*16 - 18* — *Innovations in River Basin Management* (Canadian Water Resources Association), Penticton, British Columbia. Topics include watershed water quality. Contact: Robin McNeil, Program Chairman, Ministry of Environment, Water Management Branch, Parliament Buildings, Victoria, B.C., Canada V8V 1X5.

*17 - 18* — *Enhancing the States' Lake Management Programs*, Chicago, IL. Contact: Bob Kirschner, Phone: (312) 454-0400.

*June*

*5-7* — *Northeast Water Quality Coordinating Conference and Workshop*, Holiday Inn at the Crossing, less than 10 minutes from T.F. Green Airport, exit 12A, I-95, Providence, RI. One of four USDA-sponsored regional workshops to assist State Water Quality Action Plan committees. (Other workshops: South—held in April; West—July 17-19; North-Central: August 14-16.) Contact: Your State Cooperative Extension Service or State Soil Conservationist in your region for registration details.

*18 - 21* — *U.S./U.S.S.R. Joint Conference on Global Environmental Hydrology and Hydrogeology*, Leningrad, U.S.S.R. Invited paper topics include: factors affecting water quality (surface and ground), agricultural contamination, relationship of land use to groundwater quality, urban NPS contamination, and regional strategies to protect ground and surface water. Contact: American Institute of Hydrology, 3416 University Ave., SE, Minneapolis, MN 55414. Phone: (612) 379-1030.

*24 - 25* — *An Educational Partnership: Industry-University-Society* (1990 International Summer Meeting—Society of Agricultural Engineers), Columbus, Ohio. Sessions on water resource issues include: erosion/conservation, water management, and hydrologic systems and transport processes. Contact ASAE, 2950 Niles Rd., St. Joseph, MI 49085-9659. Phone: (616) 429-0300.

*July*

*9 - 11* — *1990 Watershed Symposium*, Durango, Colorado. Topics related to watershed processes, modeling of wind/water erosion, and application of planning and analysis tools in watershed management. Contact: Robert Riggins, USACERL, P.O. Box 4005, Champaign, IL 61824.

*16 - 17* — *Conservation Tillage for Agriculture in the 1990s*, Raleigh, NC. Contact: Dr. M. G. Wagger, Box 7619, North Carolina State University, Raleigh NC 27695. Phone: (919) 737-3285.

*17 - 19* — *West Water Quality Coordinating Conference and Workshop*, Reno, NV. One of four USDA-sponsored regional workshops to assist State Water Quality Action Plan committees. (Other workshops: South—held in April; Northwest—June 5-7; North-Central—August 14-16). Contact: Your State Cooperative Extension Service or State Soil Conservationist in your region for registration details.

*Datebook (Continued)*

*July*

*22 - 25* — *Urban Non-Point Source Pollution and Stormwater Management Symposium*, University of Kentucky, Lexington, KY. Contact: Kentucky Water Resources Institute, 219 Anderson Hall, University of Kentucky, Lexington, KY 40506-0046. For information call: (606) 257-8013

*24 - 25* — *Workshop on Methods for Determining Potential Aquifer Sensitivity to Pesticide Contamination*, Estes Park, CO. EPA's Office of Ground-Water Protection is preparing a Technical Assistance Document (TAD) on current methods to assess the sensitivity of hydrogeologic environments to contamination from applications of agricultural pesticides. This workshop is to provide a broad spectrum of input to the development of the TAD. A Call for Potential Attendees has been issued. Contact (by June 18, 1990): Jane G. Marshall, Office of Ground-Water Protection (WH-550G), U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460. Phone: (FTS/202) 382-7077.

*29-Aug. 1* — *Water Futures, 45th Annual Meeting of the Soil and Water Conservation Society*, Salt Lake City, UT. Contact: SWCS, 7515 Northeast Ankeny, IA 50021-9764. Phone: (515) 289-2331.

*August*

*12 - 15* — *ASIWPCA Annual Conference*, Hyatt Newporter Hotel, Newport Beach, CA. Contact hotel for reservations. Phone: (800) 341-1474 or (714) 644-1552. Contact ASIWPCA for registration materials and program information. Phone: (202) 624-7782.

*14 - 16* — *North-Central Water Quality Coordinating Conference and Workshop*, St. Paul, MN. One of four USDA-sponsored regional workshops to assist State Water Quality Action Plan committees. (Other workshops: South—held in April; Northwest—June 5-7; West: July 17-19). Contact: Your State Cooperative Extension Service or State Soil Conservationist in your region for registration details.

*15 - 18* — *National Sustainable Agriculture, Natural Resources Conference*, Lincoln, NE. Contact: Dixon Hubbard, USDA, Extension Service, Washington, DC. Phone: (202) 447-4341; or Jim Bushnell, University of Nebraska, Lincoln, NE. Phone (402) 472-2966.

*21 - 23* — *Great Plains Conservation Tillage Symposium*, Bismarck, ND. Contact: Hunter Follett, Colorado State University, Plant Science Building, C-4, Fort Collins, CO 80526. Phone: (303) 491-6201; or Jim Stiegler, Oklahoma State University, Agronomy Dept., Room 363, N. Ag. Hall, Stillwater, OK 74078. Phone: (405) 744-6421.

*September*

*5 - 7* — *Fourth Annual Montana Riparian Association Workshop*, Big Mountain Ski and Summer Resort, Whitefish, MT. The workshop will focus on the management of riparian forested ecosystems in Montana. Small group field trips are planned with reports and whole group discussion on each trip. Contact: Montana Riparian Association, School of Forestry, University of Montana, Missoula, MT 59812. Phone: (406) 243-2050.

*5 - 9* — *International Conference on the Conservation and Management of Lakes*, Hangzhou, People's Republic of China. Contact: Zhang Yutian, Secretariat of Preparation Committee, Foreign Affairs Office, Chinese Research Academy of Environmental Sciences, Beiyuan, Anwai, Beijeng, P.R.C. Phone: 421-1025.

*18 - 20* — *Ohio State Farm Science Review*, London, OH. Contact: R. Craig Fendrick, 232 Ag. Eng. Bldg., 590 Woody Hayes Dr., Columbus, OH 43210-6131. Phone: (614) 292-4278.

## September

**17 - 22** *Water Laws and Management*, American Water Resources Association Annual Meeting, Tampa, FL. Contact: Ken Reid, Phone: (301) 439-8600.

**25 - 27** *Farm Progress Show*, Amana, IA. Contact: Thomas Budd, 191 S. Gary Ave., Carol Stream, IA 60188-2089. Phone: (312) 462-2892.

## October

**16 - 19** *International Symposium on Ecological Indicators*, sponsored by EPA, Clarion Castle Hotel, Miami Beach, FL. Contact: Ecological Indicators Symposium, Kilkelly Environmental Associates, P.O. Box 31265, Raleigh, NC 27622.

**17 - 18** *FOCUS Conference on Eastern Regional Ground-Water Issues*, Springfield, MA. Contact: Eastern Conference/National Water Well Association, PO Box 182039, Dept. #017, Columbus, OH 43218. Phone: (614) 761-1711.

## November

**4 - 9** *The Science of Water Resources: 1990 and Beyond*, Denver, Colorado. Topics include: hydrologic trends, legal issues, water resources development, and emerging issues (NPS pollution, urban impacts on water quality, water resources education, radon, hazardous wastes, biomonitoring). Contact: Jim Loftus, Colorado State University, Rm. 100, Engineering South, Ft. Collins, CO 80523. Phone: (303) 491-7923; or Bob Montgomery, Woodward-Clyde Consultants, 4582 Ulster Parkway, Suite 1000, Denver, CO 80237. Phone: (303) 694-2770.

**4 - 9** *Symposium on Urban Hydrology*, to be held simultaneously and in conjunction with *Water Resources: 1990 and Beyond* (see above). Sponsored by the American Water Resources Association. Contact: Marshall E. Jennings, U.S.G.S., 8011 Cameron Road, Austin, TX 78753. Phone: (512) 832-5791.

**6 - 10** *10th Annual International Symposium on Lake, Reservoir and Watershed Management*, sponsored by the North American Lake Management Society, Sheraton Tara Hotel, Springfield, MA. Contact: NALMS, P.O. Box 217, Merrifield, VA 22116. Phone: (202) 466-8550.

**7 - 10** *Northlands Agri-Exhibit Show*, Edmonton, Alberta. Contact: Leroy Emerson, P.O. Box 1480, Edmonton, Alberta, Canada T5J 2N5. Phone: (708) 471-7210.

**12 - 14** *Conference on Application of Geographic Information Systems, Simulation Models and Knowledge-Based Systems For Land Use Management*, Virginia Polytechnical Institute and State University, Blacksburg, VA. Contact: Dr. J. P. Mason, Coordinator, 212 Seitz Hall, VPI & State University, Blacksburg VA 24061.

# 1991

## March

**18 - 21** *Fifth Interagency Sedimentation Conference*, sponsored by the Federal Interagency Subcommittee on Sedimentation, Las Vegas, NV. The conference will focus on "Practical Sediment Management: Issues and Answers." This Federally-sponsored conference is open to State and local government agencies and private sector/academic organizations. Contact: Bob Thronson, Assessment and Watershed Protection Division, (WH-553), U.S. EPA, 401 M Street, SW, Washington, DC 20460. Phone (FTS/202) 382-7103.

**NPS NEWS-NOTES**
**Nonpoint Source Information Exchange**
**Assessment and Watershed Protection Division**
**Office of Water (WH-553)**
**U.S. Environmental Protection Agency**
**401 M Street, S.W.**
**Washington, D.C. 20460**

**June 1990**

# Chesapeake Bay Nonpoint Source Conference

*Special Insert for Nonpoint Source News-Notes, June 1990, #5*

## *Introduction*

Editor's Note: The Chesapeake Bay Nonpoint Source Conference recently held in Williamsburg, VA (February 26-28, 1990) was of unusual significance. First, it dealt with the Chesapeake Bay Program, the nation's bay and estuarine model for interstate cooperation, broad public participation, and overall environmental soundness; second, its guiding theme concerned the management of nonpoint sources of pollution. For both of these very good reasons we are devoting this special center section to the bay program and the conference.

*[For more information on the Chesapeake Bay Program contact: Alliance for the Chesapeake Bay, 6600 York Road, Baltimore, MD 21212. Phone: (301) 377-6270.]*

## *The Chesapeake Bay Nonpoint Source Conference: Plenary Session Highlights*

Four-hundred-fifty people from Virginia, Maryland, Pennsylvania, and the District of Columbia were called to order early on a Monday morning during the last week of February 1990 to discuss Reducing Pollution from Nonpoint Sources: The Chesapeake Bay Experience. Held in Colonial Williamsburg, Virginia, this unique, broadly-based two and one-half day working conference examined NPS pollution in an intensive and educational atmosphere. Binding these participants together was their common purpose as residents of the Chesapeake Bay watershed. They were farmers, industrialists, environmental activists, plain citizens, and officials from all levels of government.

At the outset, conference participants knew full well that the health and well being of the bay—past, present and future—is a direct result of the collective health and well being of all of the different places where they live, work, and relax in the Chesapeake watershed. A sense of urgency as well as a sense of shared environment shaped the delegates' deliberations. Conference participants were looking forward to, and planning for, improvement in bay management efforts in the 1990s, particularly in NPS pollution control.

While concurrent, small group workshops dealt with specific water quality issues, the plenary sessions addressed bigger issues of long-range significance:

- The Chesapeake Strategy: Program Overview;
- Perspectives on Progress;
- Emerging Nonpoint Issues: The Growth Dilemma; and
- Into the Nineties: Issues and Strategies.

This article will highlight the tone and tenor of the plenary sessions as expressed by three of the speakers.

**Rosemary Roswell**
*Assistant Secretary, Maryland Department of Agriculture*

Secretary Roswell took a critical look at NPS pollution control programs. She commented at the outset of her remarks that we now recognize that nonpoint sources can carry a variety of pollutants, each of which has its own characteristics to consider and address:

> *Our NPS programs have evolved over time and are at different stages of development and implementation. We have been dealing with conventional pollutants for a number of years. And then as a result of the EPA report on the Chesapeake Bay, we began to develop programs just to address nutrients. And now, we are looking at programs to address the NPS aspects of toxics.*

Nevertheless, all NPS management involves a mix of elements that must be built into each individual pollutant program effort: research; information/education; technical assistance for individuals, groups, and local jurisdictions; financial assistance; and enforcement/regulation. These program elements may have different degrees of emphasis for each category of NPS control effort.

Secretary Roswell then provided an example to illustrate these varied elements:

> *The Soil Conservation Service's conservation planning is based on voluntary participation—the farmer working with technical staff of local soil conservation districts to identify management practices that will limit NPS pollution. But it's not just a voluntary program.*
>
> *Under Maryland's Chesapeake Bay Critical Area legislation or Virginia's Chesapeake Preservation Act certain requirements are set up. These mandate conservation plans on farmland.*
>
> *In other areas, conservation planning may be a requirement imposed on a farmer to solve a pollution problem.*
>
> *In Maryland we have an agricultural enforcement program within the Department of the Environment (MDE). When a situation is identified as a problem, staff of MDE contact both the land owner and the soil conservation district. A conservation plan is developed and a schedule is established for implementing best management practices to address the pollution problem. If the landowner refuses to cooperate, then formal enforcement action is taken through the courts.*
>
> *Even under Federal law, the conservation compliance aspects of the Federal Food Security Act mandate conservation planning and its implementation on highly erodible land in order for a farmer to retain USDA program benefits.*

Further, Secretary Roswell noted that to make this program work at its most efficient and desirable level, it must be accompanied by a proper mix of other program elements: training, technical assistance, education, salesmanship, and cost sharing. If conservation planning becomes a requirement, as in the example above, then it must be accompanied by enforcement. She also observed that:

> *legal requirements often result in minimal compliance. Education leads to understanding and appreciation of the need for conservation practices, expanding conservation efforts and increasing participation in conservation programs. It also helps to spread the word to others, as individuals who are committed to practicing conservation are the best salesmen of conservation.*

**Sandra S. Batie**
*Professor of Agricultural Economics, Virginia Polytechnic Institute and State University, Blacksburg, VA*

Professor Batie briefly traced the major differences between NPS pollution perceptions and actions ten years ago and today, concluding that bay water quality has improved. At the same time, she noted, the public's sophistication and understanding of bay issues has also improved. Therefore, we must not simply repeat what we have done in the past. We must instead demand far better performance: "the most water quality improvement possible with our program resources." Sharper definitions of problems and priorities will come in the 1990s, she indicated, because we understand these problems and priorities better:

> *Rather than voluntary programs presenting a menu of choices to those farmers or suburbanites who elect to participate, I would expect to see more refined diagnosis of which properties and which practices are causing which problems....Cost sharing funds and program assistance would be targeted not necessarily to where the problem is the greatest, but where the funds and assistance will result in the most improvement in water quality.*

Professor Batie said that program accountability in terms of outputs—improved water quality—will rise, while program accountability in terms of inputs—number of farmers reached and numbers of BMPs installed—will decline.

Continuing, Professor Batie made the following observations:

1. Program strategies will have less of a passive, voluntary nature—waiting for an individual to request assistance, and more of an assertive voluntary nature—seeking out the individuals whose changed behavior could have the most impact on water quality. For the reluctant participant, there will probably be mandatory requirements in certain situations.
2. Best Management Practices will be more precisely targeted: for example, to the more efficient use of nitrogen and improved use of pesticides based on loadings and toxicity levels.
3. BMPs will better incorporate the interrelationships between ground- and surface water quality.

4. There will be less concern with obtaining 100 % control than with obtaining the most control possible for each dollar spent. It may be more cost effective—that is, there may be more improved water quality obtained per program dollar spent—to reduce nonpoint pollution on many farms by 50 % than to reduce nonpoint pollution on a few farms by 95 %.
5. We will probably see more consideration of the tradeoffs between managing point and nonpoint sources—especially concerning where each program dollar has the most impact on bay quality. In some cases we may be better off in terms of improved Bay water quality to place more dollars in point source management than to manage numerous diverse farming operations. In other cases, the reverse may be true. Such coordination will require enhanced cooperation among agriculturally- and nonagriculturally-oriented agencies toward a common environmental goal of improved water quality—the genesis of which we have already witnessed in the 1980s.
6. The prospects for progress in terms of improved bay quality are good even with the knowledge we have available now; but they are even greater with the research that will be forthcoming in the 1990s. This conference is excellently positioned to be a catalyst for this progress.

**Ernest C. Shea**
*Executive Vice President, National Association of Conservation Districts*

Ernie Shea opened his remarks with an important reminder:

> *Nonpoint pollution is not a new problem....What is new, however, is the growing awareness and recognition of what it is and, more specifically, how land use activities contribute to the problem. At the heart of nonpoint pollution is human activity and, as such, NPS pollution is primarily a "people" problem.*

He then detailed seven "forces that are impairing or blocking widespread adoption of nonpoint source abatement efforts" and said that "efforts to overcome these impediments represent a priority agenda item for the 1990s." These impediments are as follows:

1. The public's lack of understanding and awareness of the nature of NPS pollution, its causes, its impact on society, and the consequences of not addressing ongoing problems.
2. The widespread belief among many policy makers that the problem is too big to handle. We must demonstrate that individual actions do make a difference.
3. The "quick fix," piecemeal approach which is often a characteristic of poorly designed NPS control programs. Successful NPS programs are holistic in nature and are based on an integrated watershed approach.
4. The lack of cooperation and coordination on the part of the numerous Federal, State and local government agencies which must be overcome. Turf battles coupled with poor communication and coordination of efforts at the local level contribute to the lack of progress in addressing NPS pollution.
5. The incomplete science and gaps in technology which impede further progress. Despite our best efforts to implement best management practices, there are still many unknowns which complicate control efforts.
6. The conflicting public policy and laws which exist at all levels of government. This can perhaps best be exemplified by Federal farm policies, which, in the past, have encouraged the production of agricultural commodities on fragile, environmentally sensitive land areas.
7. The lack of resources which has been made available to combat this problem. Despite the fact that NPS has now been clearly identified as the last major barrier to meeting the goals and objectives of the Clean Water Act, Federal appropriations for NPS abatement have been almost nonexistent.

In addition to overcoming these seven impediments if we hope to control NPS pollution in the 1990s, Shea proposed that we need to develop and execute a 1990s comprehensive abatement strategy. "Such a strategy must incorporate the following key ingredients":

1. We must place education as the cornerstone of our future NPS control efforts. Our goal should be to get people to accept personal ownership and responsibility for solving NPS problems.
2. We must continue to develop comprehensive NPS abatement programs that place primary emphasis on pollution prevention. These plans must deal with the problem holistically on a hydrologic unit basis.

3. We must do a better job of targeting our resources. It is also critical, particularly in the early stages of new NPS programs, that we find projects and programs where it can be clearly demonstrated that the abatement efforts make a difference.
4. We must all work to keep the momentum going. It is unrealistic to expect quick results in most cases and, therefore, program managers and policy makers need to be prepared for the long haul. By documenting and celebrating progress, we will in fact be planting important milestones.

## *Chesapeake Bay Target: 40% Nutrient Reduction by the Year 2000*

The Federal/State Chesapeake Bay Program developed a water quality computer model of the mainstream of the bay from 1985 to 1987. Model runs suggested that a significant improvement in the bay's water quality, particularly in dissolved oxygen in the deeper waters, could be realized if overall bay nutrient inputs from point sources and "controllable" nonpoint sources could be reduced by 40%.

After full public hearings and discussions with all of the jurisdictions involved, this goal was adopted by the Chesapeake Executive Council as a part of the 1987 Chesapeake Bay Agreement. The agreement states that, to achieve this goal of attaining water quality conditions necessary to support the living resources of the bay, the signatories agree

> *[b]y July 1988 to develop, adopt, and begin implementation of a basin-wide strategy to equitably achieve by the year 2000 at least a 40 percent reduction of nitrogen and phosphorus entering the main stem of the Chesapeake Bay. The strategy should be based on agreed-upon 1985 point source loads and on nonpoint loads in an average rainfall year.*

The Chesapeake Bay Program and the Army Corps of Engineers are sponsoring the development of a more detailed "second generation" bay model in order to make predictions with more confidence. Its completion is scheduled for 1991. At that time 1) the 40% reduction load goal will be re-evaluated in light of new monitoring and modeling results and 2) the ability of the mix of State programs in place (or to be put in place) to achieve that goal by the year 2000 will also be re-evaluated.

In the meantime, the amount of required reduction loads has been calculated for each State and the District of Columbia, and steps have been outlined and agreed to that will lead to the refinement and accomplishment of the nutrient strategy.

Significantly, this part of the Chesapeake Bay Agreement *establishes for the first time a numerical, measurable water quality target—a fairly simple, easy to understand goal.*

## *One Person's View of Workshop Discussions: A Report to Colleagues on Bay Restoration Efforts*

*Editor's Note: Concurrent small-group workshops with discussions on NPS problems and "success story" techniques were held on Monday afternoon and throughout Tuesday. What follows below is one person's report to her professional colleagues on what she saw and learned from these less-formally-structured Chesapeake Bay Nonpoint Source sessions (and the discussions which often continued in the corridors and the coffee shop). Our observer-correspondent attended the following workshops: nutrient and pesticide management on cropland, animal waste management, controlling urban nonpoint sources of pollution; stormwater and sediment management, and wetlands as management tools/riparian buffers.*

MEMORANDUM To: Agricultural Policy Analysis Group Members

From: Catherine M. Long, Water Policy Branch,
Office of Policy and Program Evaluation, EPA

The Chesapeake Bay NPS Conference provided an excellent forum for exchanging ideas on scientific research, successful programs, and continuing needs for pollution control.

Here are some notes I took. If you have any questions we can talk.

I attended workshop sessions focusing on reducing agricultural and urban/suburban NPS pollution. While agricultural NPS pollution may be widespread, control mechanisms exist at the local, State, regional and Federal levels. However, conference speakers stressed the rapidly growing importance of pollution from urbanizing areas; here, fewer mechanisms are presently at our disposal to control this kind of pollution. The concern is emphasized by the prospect of 2.5 million people moving into the bay area in the next XX years.

The overarching concern in agricultural pollution was on nutrient management, particularly that in livestock operations. Paul Swartz of the Pennsylvania Department of Environmental Resources stated that livestock in Pennsylvania generate each year more than twice the tonnage of solid waste as do Pennsylvania citizens—25 million tons of animal waste versus 12 million tons of people waste. However, as Sam Young of the same agency noted, the value of the manure from a nutrient management standpoint is less than the cost of its management. For that reason, Pennsylvania as well as Maryland and Virginia have substantial cost-share programs to provide total nutrient management.

Nutrient specialists like Herb Brodie of the University of Maryland and Richard Fitzgerald of the Virginia Division of Soil and Water Conservation recognize, however, that farmers must be won over to total nutrient management because managing manurial nutrients is much more complex than managing commercial fertilizers. For example, the relative share of nitrogen, phosphorous, and potassium varies over time and across livestock types and feeding regimes. Calibrating manure spreading is also complicated.

The trend in nutrient management is toward more control. In Maryland, expanding livestock facilities requires management plans. Moreover, Pennsylvania is now considering further regulation of livestock waste (see *News-Notes*, February 1990).

The use of nutrients on turf grass may become a more significant concern. Dr. Scott Angle of the University of Maryland found from a Maryland survey of 614,000 acres that turf is the most rapidly growing land use, second only to corn. In addition, Extension Service recommendations for nitrogen and phosphorous applications are significantly higher for turf than for crops such as corn. He also noted that misinformation may encourage landowners to apply nutrients at inappropriate times.

By its very nature, however, turf can be a lush filter unit which limits the amount of runoff of excess nutrients. In addition, stands of young turf rapidly take up nutrients for quick growth. The question of the actual pollution generated by this land use must ultimately by resolved by further research.

Representatives from two innovative companies presented their corporate strategies for minimizing the amount of chemicals applied to crops and turf. Waddy Garrett of Alliance Agronomics described his technical services that reduce the amount of inputs applied in crop production. He even recommended developing regulations to provide further credibility (and profitability) to low input, sustainable agricultural companies. Philip Catron, formerly with a national lawn care company, decided to start up Naturalawn, Inc. to provide an alternative to the total chemical treatment of lawns. He noted that one does not have to treat an entire lawn every time. Spot treatments can be just as effective, and can save money. Through using fewer chemical treatments, providing more services, and substituting organic and biological controls for chemicals, his company is 88% synthetic chemical free. Such industrial innovation demonstrates that non-regulatory approaches can play a useful role in NPS control.

With respect to urban NPS pollution, many speakers shared the view that totally uncontrolled growth can lead not only to greater pollution, but also to smaller filtering capacity in upstream areas of the bay. A speaker from Maryland noted that residential and industrial development both polluted and structurally impaired each of the tributaries leading to a major river emptying into the bay. These changes fundamentally altered the assimilative capacity of the river system, and stormwater runoff is now more problematic.

JoAnn Watson of the Maryland Department of the Environment stressed the need for preserving wetlands, which play a very crucial role in protecting the bay. Maintaining existing wetlands is essential because constructing new wetlands is difficult, and they may not serve all of the ecological functions of natural wetlands.

Torrey Brown of the Maryland Department of Natural Resources said that planners must ultimately balance development with maintaining natural ecosystems. He identified unrestricted road networks as increasing suburban sprawl and provided alternatives such as down-zoning, eliminating land wasting restrictions, limiting access to highways, and reducing financial incentives that encourage sprawl. He closed his presentation with a widespread concern: how do we reconcile an individual's property rights with society's need for maintaining a healthy environment?

Many speakers and attendees noted that NPS pollution in the bay area is the result of many individuals' actions. Therefore, one Federal policy or State law won't handle it all. Through coordinating present Federal and State laws, providing education, and creating efficient financial incentives and adequate resources we shall make greater advances in abating NPS pollution. However, most of the participants I listened to or spoke with agreed that each of us needs to contribute to the larger effort to make a difference.

## *Voluntary BMP Programs to be Evaluated for Implementation Effectiveness*

The Chesapeake Bay Program's Basinwide Nutrient Reduction Strategy includes a commitment to "evaluate the effectiveness of the voluntary programs for the implementation of Best Management Practices (BMPs)."

A panel representative of conservation groups, academia, farm organizations, and others has been named to conduct the evaluation. Frances H. Flanigan of the Alliance for the Chesapeake Bay has been designated as chairperson.

Called the "NPS Evaluation Panel" for short, the panel will examine and address a wide range of related questions:

- "Are we using the right BMPs in the right places?"
- "Will presently structured cost-sharing get the water quality improvements we need?"
- "What are the administrative issues related to cost-share programs, such as financial tracking? Are they adequate? Can water quality benefits be established? Are the results worth it?"
- "Can/should we make trade-offs between point and NPS pollution programs? Can we guarantee a mix of programs that yields the most water quality 'bang for the buck'"?
- "Can education be relied on to reach enough landowners in the right places to make a meaningful difference?"
- "Are policy options available to make the Food Security Act and other Federal legislation work more effectively toward water quality goals?"
- "Is our NPS data base adequate for the Chesapeake Bay restoration and management/maintenance task?"

The panel's charge includes reporting on its findings and recommendations to the Chesapeake Bay Program in November 1990. By meeting this deadline, the program's commitment to re-evaluate by December 1991 the 40% nutrient reduction goal, and the BMP and program mix to achieve that goal, can include a review of program implementation and the effectiveness of control measures.

## *Governance of the Chesapeake Bay Program: Evolving as Management Needs are Better Understood*

Since the 1976 Congressional funding of a five-year EPA study of the Chesapeake Bay, institutional arrangements and understandings between the various concerned and affected Chesapeake Bay governments have undergone three gradual but significant evolutionary shifts. The phases are as follows:

**Phase I: 1976-1983**

Under the legislation sponsored by Maryland Senator Charles Mathais, EPA was directed to assess bay water quality and to make recommendations to improve its management. These early years were spent in developing a basic program and

communications structure. EPA staff identified key program offices and personnel in the States and District of Columbia, as well as relevant Federal agencies and actors. By 1983, Choices for the Chesapeake: An Action Agenda was developed, published, and placed before the concerned governments.

The Choices document stated that:

> *[f]or the first time, a serious effort was made to forge a governmental partnership. EPA made a strong commitment to work with the States and the public; the result was a model of collaborative decision-making that embodied the best notions of federalism and created an atmosphere that enabled an agenda for the bay to be created.*

Addressing the technical and scientific side of the EPA study, the Choices document noted that

> *[u]nderstanding of the system [the complex Chesapeake Estuary]...was impeded by lack of synoptic, bay-wide data. The significance of pollution relative to weather and natural events was not well understood. Pollution control efforts were designed to reduce discharges to the bay, but knowledge of what the requirements of a healthy bay are was quite inadequate. These gaps in our understanding have been addressed to some extent....*

Pre-1983 research focused on toxics, nutrients, and the loss of submerged aquatic vegetation (SAV). The staff concluded that 1) the bay was overenriched with nutrients, 2) some toxic "hot spots" existed and were identified; 3) there had been a loss of SAV beyond anything seen historically; and 4) lowered dissolved oxygen levels were causing serious water quality and habitat problems.

EPA delivered final reports to Congress and the States in 1983. The political response was the first Chesapeake Bay Agreement, signed in December 1983 by EPA, Maryland, Virginia, Pennsylvania, and the District of Columbia. The signatories to this agreement committed to establish a structure to oversee cooperative and comprehensive measures needed to restore the bay. The second phase was underway.

**Phase II: 1983-1987**

The 1983 agreement was a broad statement of objectives that called the establishment of three entities:

1. An Executive Council, composed of senior staff heads from EPA, the States, and the District of Columbia, to assess and oversee the implementation of coordinated plans to improve and protect bay water quality;
2. An Implementation Committee from the jurisdictions to coordinate technical matters and the development and evaluation of management plans; and
3. An EPA Liaison Office to support the restoration program.

In 1984, the first basin-wide monitoring network was established. Between 1984 and 1987 a wide range of new actions, initiatives, and legislation passed in all three States and in the District: agricultural cost-share programs to assist farmers to install best management practices to reduce pollutant runoff, strengthened erosion and sedimentation control laws, phosphate bans, sewage treatment plant upgrades, fishing restrictions, shoreline setbacks, public education programs, increased staff, and so on.

**Phase III: 1987-Present**

In December 1987, after extensive discussions with the involved governments and citizens groups, and after a series of public hearings throughout the region, three new Governors and a new EPA Administrator signed a second bay agreement. Broader that the first pact, it addresses key issues and defines specific goals and milestones to facilitate public accountability and further public participation in the bay area. Under this agreement, the signatories themselves—the three Governors, the Mayor of the District of Columbia, the EPA Administrator, and the Chesapeake Bay Commission Chairman (representing the State legislatures)—make up the Executive Council. Under the First Agreement, its members were State department heads and their Federal counterparts. This third governance phase is still underway.

This broader second bay agreement addresses specific concerns under the following headings:

- Living Resources
- Water Quality
- Population Growth and Development
- Public Information, Education, and Participation
- Public Access
- Governance

Under each of these headings, appropriate and specific goals, objectives, and commitments are displayed and developed.

As opposed to its earlier phases, the Chesapeake Bay Program has since 1987 placed greater emphasis on 1) setting nutrient reduction targets; 2) highlighting toxics in the clean-up effort; 3) targeting growth, including the convening of a special panel to make recommendations for the year 2020; and 4) increasing the involvement of local governments.

The institutional structure provided for under the second agreement includes a series of committees and subcommittees to coordinate tri-State activities, oversee monitoring, and so on (see chart). A "super authority" has not been established. All planning and regulatory authorities continue to reside within their designated governmental agencies.

EPA, through the Chesapeake Bay Liaison Office, offers administrative and technical support to the network of regional committees, subcommittees and work groups that run the bay program under the overall direction of the Chesapeake Executive Council.

Other Federal agencies cooperate with the bay program, generally operating under written agreements with EPA. These include the Department of Agriculture's Soil Conservation Service, Forest Service, Agricultural Stabilization and Conservation Service, and Cooperative Extension Service; the Department of Interior's Fish and Wildlife Service and Geological Survey; the Department of Commerce's National Oceanic and Atmospheric Administration; the Department of Defense; and, under a separate agreement, the Army Corps of Engineers. Interior's National Park Service and the Department of Transportation's National Highway Administration and Coast Guard also participate in the bay program but have not entered into agreements with EPA.

From a $5 million beginning in 1976, efforts through EPA, other Federal agencies, involved States and the District of Columbia, and local governments are today collectively spending over $150 million annually to restore the bay. The Williamsburg NPS conference gave no indication that such interest is slackening. On the contrary, there is every indication that the amount of people-energy expected to be expended on Chesapeake Bay environmental management will continue to increase, and that future activities will be even more targeted to result in better water quality and a better Chesapeake Bay environment per-dollar-expended than in years past.

## *Chesapeake Bay Program*