Maryland

2001 Annual Report

Coastal Zone Management Division
Chesapeake & Coastal Watershed Services
Maryland Department Of Natural Resources
Annapolis, MD

April 2002

Parris N. Glendening
Governor

Kathleen Kennedy Townsend
Lt. Governor

A message to Maryland's Citizens:

The Maryland Department Of Natural Resources (DNR) seeks to preserve, protect and enhance the living resources of the state. Working in partnership with the citizens of Maryland, this worthwhile goal will become a reality. This publication provides information that will increase your understanding of how DNR strives to reach that goal through its many diverse Programs.

J. Charles Fox
Secretary

Karen M. White
Deputy Secretary

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Nonpoint Source Management Program Vision Statement

Maryland's vision is to implement dynamic and effective nonpoint source pollution control programs. These programs are designed to help achieve and maintain beneficial uses of water; improve and protect habitat for living resources; and protect public health through a mixture of water quality and/or technology based programs; regulatory and/or non-regulatory programs; and financial, technical, and educational assistance programs.

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Copies of this report are also available on the Nonpoint Source Program Website at:

http://www.dnr.state.md.us/bay/czm/nps

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United States Environmental Protection Agency

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Executive Summary

Maryland's Nonpoint Source Management Program is a multi-disciplinary program providing not only financial, technical and outreach assistance, but assistance in building local capacity to achieve nonpoint source controls. The Program relies on creating partnerships to advance long and short- term goals for nonpoint source pollution control. State agencies assist local governments -- which are primarily responsible for implementation of nonpoint source control measures -- by identifying water quality and resource problems, helping watershed planning efforts, and selecting and implementing management practices tailored to the source and area, as well as directing funding programs to help support those practices.

The Nonpoint Source Program's 2001 annual report summarizes pollution prevention and control efforts in broad management categories. During the past year, significant progress has been made toward achieving a variety of management measures and program goals including: the development of Watershed Restoration Action Strategies, nutrient management plans, the creation of hundreds of miles of forested buffers, the expanded number of marinas pledging and certified as Clean Marinas, implementation of Phase II Stormwater Management (SWM) guidelines, addressing the On Site Sewage Disposal (OSDS) issue, and increased funding for land preservation, stream restoration and wetland creation.

Introduction

Nonpoint source pollution (NPS) is runoff caused by stormwater (rainfall or snowmelt) or irrigation water moving over and through the ground. As this runoff moves, it picks up and carries away pollutants, such as sediments, nutrients, toxics, and pathogens. These pollutants are eventually deposited in lakes, rivers, wetlands, coastal waters, ground waters and the Chesapeake and Coastal Bays. Point source or end of pipe pollution historically has been easier to control than nonpoint source pollution because the source of the pollution is evident. Nonpoint sources of pollution are very diverse and diffuse, not only making the identification, but control, of the pollution sources challenging

Integrated Management of CWA Section 319 and NOAA Coastal Zone Programs

Evolving ever since its original inception in 1987, Maryland's Nonpoint Source (NPS) Program is operated in an integrated fashion with Maryland's Coastal Zone Program. The Program has a large number of state and local partners and is based on two authorities: the federal Clean Water Act (CWA) section 319 and Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990 – the Coastal Nonpoint Program. In March 2000, EPA approved the NPS Program Management Plan document update that completely revised the original. A number of priorities were identified in the updated management plan as long-term, statewide nonpoint source goals, including watershed programs and initiatives, and partnerships offering educational outreach and financial assistance.

Of these priorities, watershed programs and initiatives support not only the targeting of nonpoint source pollution control resources, but the Coastal Zone Program goals of: (1) sustainable coastal communities; (2) sustainable coastal ecosystems; and (3) government efficiency. In 2001, funding for the development of local watershed management plans and strategies was made available under two mechanisms: 1) the Clean Water Act Section 319 -- Nonpoint Source Program planning funds, and 2) Coastal Zone Management Act (CZMA) Section 309 – Coastal Enhancement Strategy funds. In addition, the Coastal Nonpoint Source Program funds were targeted within the coastal zone (comprising 66% of Maryland's area) to address septic systems, fund clean marina programs, and measure success.

Watershed Initiatives

In 2001, Maryland continued several interrelated watershed initiatives: 1) WRAS Partnership Program, 2) Chesapeake Bay 2000 Watershed Planning Commitment, and 3) Coastal Bays Comprehensive Coastal Management Plan.

WRAS Partnership Program

In 2001, Maryland's premier watershed strategy tool was the Watershed Restoration Action Strategy (WRAS) Partnership Program. The Program links the state and various local governments in jointly developing action strategies. WRAS watershed targeting is based on Maryland's Clean Water Action Plan (1998), which called for the assessment of the condition of all the state's waters. The resulting Unified Watershed Assessment (UWA) defined a set of those watersheds that were most in need of restoration – the Category 1 Priority Watersheds. Funding for development and implementation of WRASs is provided from both the 319 and Coastal Zone Management Programs, and is targeted to Category 1 Priority watersheds, with top priority being those Category 1s with special areas needing preservation (watersheds sharing Category 3 characteristics).

Development of strategies for individual watersheds is a local government-led process resulting in the development of priority water quality and habitat preservation and restoration actions within a comprehensive management context. Watershed management planning is primarily a county level function, with the assistance or input from other partners, such as Soil Conservation Districts, landowners, or local watershed associations. The WRAS Partnership Program recognizes that most of the decisions regarding land use, zoning, open space, etc., are the responsibility of local units of government. In addition, these local units of government are most knowledgeable of local conditions and stakeholders, and are best able to develop watershed assessments and plans, and commit resources to implementation.

WRASs utilize services of DNR and the state Departments of Environment, Planning and Agriculture to provide technical assistance and funding, with the participation of other partners such as the Soil Conservation District, and watershed associations or other citizen groups. Additional WRAS partners include landowners, Federal agencies, businesses, and schools. Partners also include the Chesapeake Bay Tributary Teams (Governor-appointed volunteers working to develop and implement policy, outreach and education initiatives). These additional partners provide technical assistance, community support, volunteers, and stewardship opportunities such as restoration plantings, cleanups, education, or other activities.

A completed WRAS strategy is a work plan, prepared with public input, which is based on an assessment of natural resource conditions and scientific monitoring data. The strategy identifies the most important causes of water pollution and resource degradation, and details actions, as well as responsible parties, to address problems. It also provides milestones for measuring progress. The WRAS identifies areas of concern, needed monitoring, gaps in information, mitigation options, and restoration and protection opportunities.

Chesapeake Bay 2000 Watershed Commitment Implementation and Tracking

Watershed management planning is also addressed in the multi-state Chesapeake Bay 2000 Agreement (See http://www.dnr.state.md.us/bay/science/c2k/c2k.html). One commitment, in particular, states:

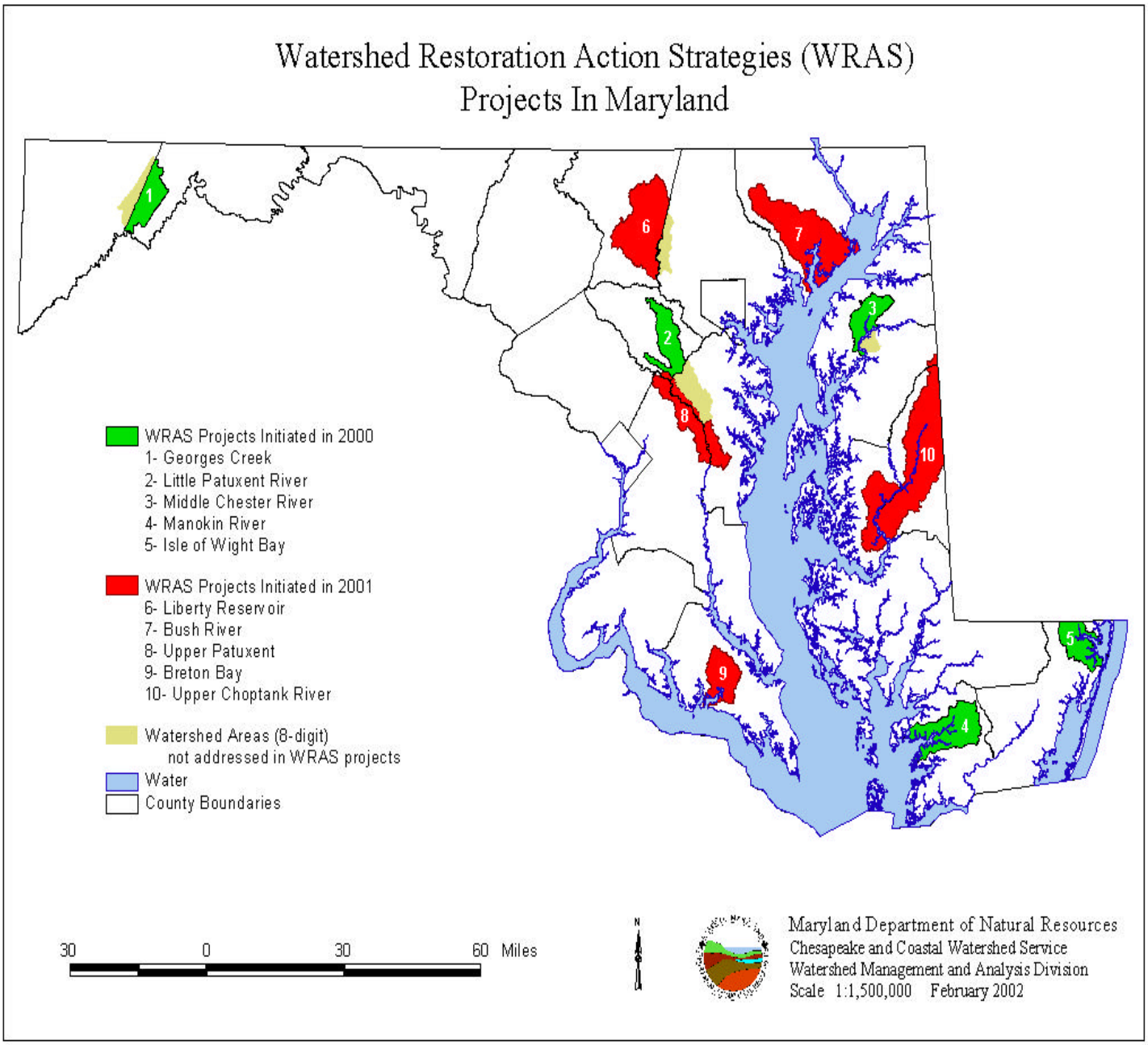
By 2010, work with local governments, community groups and watershed organizations to develop and implement locally supported watershed management plans in two-thirds of the Bay watershed covered by this Agreement. These plans would address the protection, conservation and restoration of stream corridors, riparian forest buffers and wetlands for the purposes of improving habitat and water quality, with collateral benefits for optimizing stream flow and water supply.

Within the Chesapeake Bay's drainage, Maryland has 127 watersheds (Maryland's 8-digit watersheds). Maryland has committed to develop and implement, by 2010, 2/3 of 127 or approximately 85 (8-digit) watershed management plans (WMPs) or strategies covering the Bay watershed.

Efforts to achieve this Bay Agreement commitment are two-fold. In 2001, DNR's Chesapeake and Coastal Watershed Services continued to lead development of locally-sponsored WRASs. At the same time efforts began to develop a system to recognize, count, and help implement local watershed management plans resulting from various other programs or requirements but which fulfill the requirements of the 2/3 commitment. These may include, for example, the WMPs developed pursuant to NPDES stormwater permit requirements or other programs. The tracking system, beginning with an on-site survey of local watershed management planning efforts, will begin in 2002. Potential benefits to local governments will include: 1) statewide recognition of quality work achieved, 2) ability for local governments to be more competitive for receipt of CWA 319 implementation funds and various other grant sources as well as technical assistance services and 3) potential consideration as part of an applicable TMDL (Total Maximum Daily Load) implementation plan or its equivalent (see Water Resource Program Integration section below).

Coastal Bays Comprehensive Coastal Management Plan

In addition, outside the boundaries of the Chesapeake Bay drainage area in Maryland -- in the Coastal Bays watersheds-- watershed planning efforts continued in 2001 with the provision of state technical and financial assistance, and WRAS Partnership development in the Isle of Wight Bay watershed to help implement the Coastal Bays Comprehensive Coastal Management Plan.


Watershed Restoration Action Strategies (WRAS)
Projects In Maryland
WRAS Projects Initiated in 2000
1- Georges Creek
2- Little Patuxent River
3- Middle Chester River
4- Manokin River
5- Isle of Wight Bay
WRAS Projects Initiated in 2001
6- Liberty Reservoir
7- Bush River
8- Upper Patuxent
9- Breton Bay
10- Upper Choptank River
Watershed Areas (8-digit)
not addressed in WRAS projects
Water
County Boundaries
30 0 30 60 Miles
N
Maryland Department of Natural Resources
Chesapeake and Coastal Watershed Service
Watershed Management and Analysis Division
Scale 1:1,500,000 February 2002

2001 WRAS Accomplishments

Completed WRASs

The Maryland Department of Natural Resources, in partnership with five counties continued developing local Watershed Restoration Action Strategies in five of Maryland's Clean Water Action Plan Priority watersheds:

C	Allegany County:	Georges Creek	(Upper Potomac Tributary Basin)
C	Howard County:	Little Patuxent River	(Patuxent Tributary Basin)
C	Kent County:	Middle Chester River	(Upper Eastern Shore Tributary Basin)
C	Somerset County:	Manokin River	(Lower Eastern Shore Tributary Basin)
C	Worcester County:	Isle of Wight	(Coastal Bays Watershed)

A number of nonpoint source pollution issues have been addressed in the WRASs, as well as such related issues as flood and stormwater management, shore erosion, wildlife and fisheries habitat, greenways, riparian buffers, and public access and recreation, among others. Local governments have used the opportunity to coordinate existing watershed activities and information, focus future activities in a specific watershed, address issues important to the public, and develop marketing tools (for grant applications, etc.). Various forms of implementation are already underway in each watershed. Final WRAS strategies are completed for Isle of Wight and Little Patuxent River, both of which are planning to use 319 implementation monies to implement priority actions. Final strategies will be completed in March 2002 for the Manokin River, Georges Creek, and Middle Chester River. Copies of the WRAS's watershed characterization documents are available at (http://www.dnr.state.md.us/watersheds/surf/proj/proj.html) and final WRAS strategies will be posted or linked on the Maryland Nonpoint Source Program website at: http://www.dnr.state.md.us/bay/czm/nps/

Kickoff of WRAS Second Round

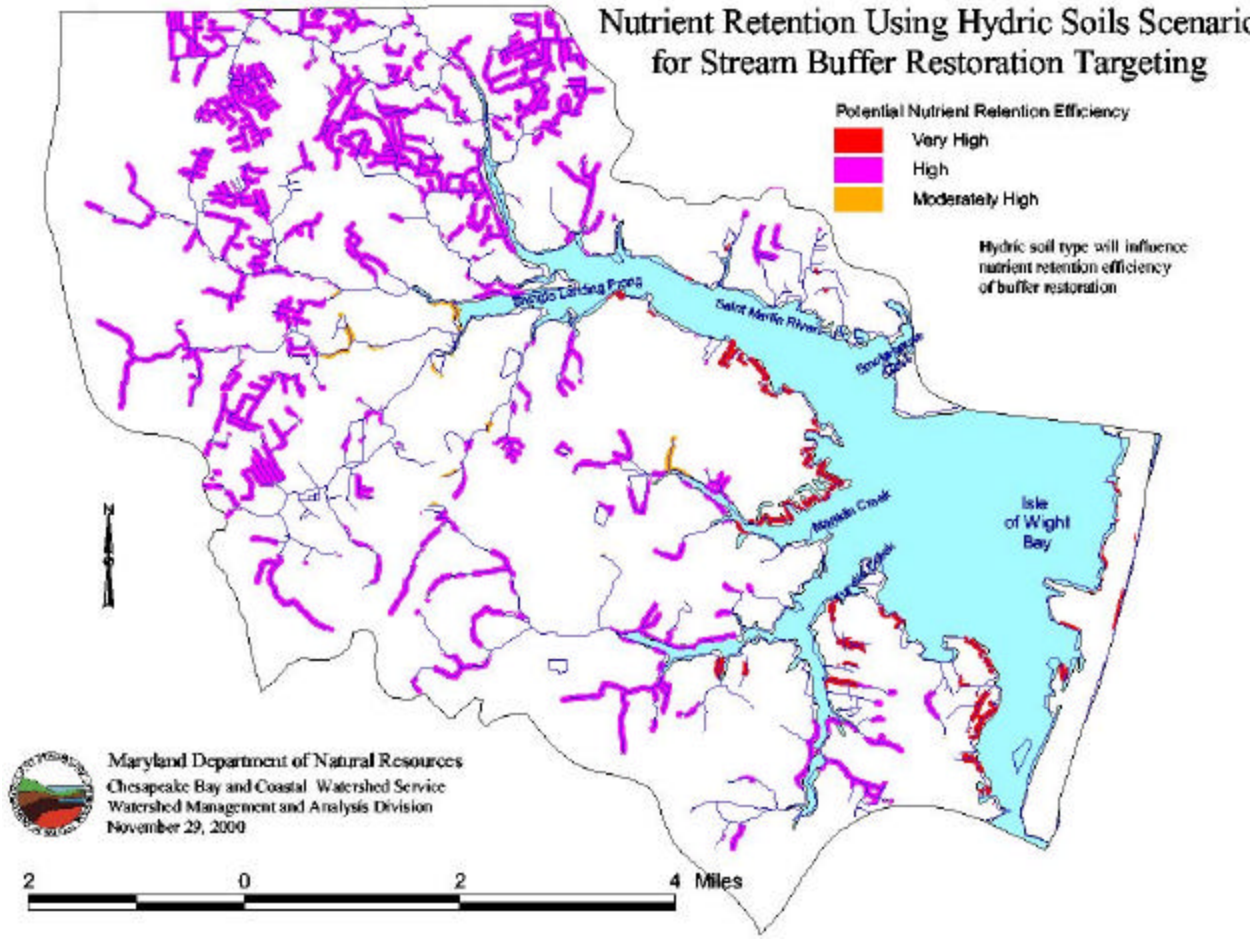
In September 2001, awards of new WRAS partnerships (WRAS2s) were made:

C	Anne Arundel and Prince Georges Counties	Upper Patuxent River	(Patuxent River Tributary Basin)
C	Carroll County:	Liberty Reservoir	(Patapsco/Back River Tributary Basin)
C	Harford County:	Bush River	(Upper Western Shore Tributary Basin)
C	St. Mary's County	Breton Bay	(Lower Potomac Tributary Basin)
C	Talbot and Caroline	Upper Choptank River	(Choptank Tributary Basin)

WRAS2 partners are currently working to:

- Establish Steering Committees; complete initial public outreach, and develop a process for ongoing public input and participation.
- Develop a watershed characterization, and survey stream corridors and shorelines for problems & restoration opportunities.
- Develop watershed vision statements and problem statements, with work plan goals and objectives.
- Finalize strategies in 2003; and begin implementation.

Sample Restoration Targeting Tool -- from Isle of Wight Bay's Watershed Characterization



Nonpoint Source Management Measures

The Statewide Nonpoint Source Management Plan and the Coastal Nonpoint Program are integrated through a number of management measures. The Coastal Nonpoint Control Program's management measures are defined as economically achievable measures to control the addition of nonpoint pollution to coastal waters. These measures reflect the greatest degree of pollution reduction achievable using the best available nonpoint pollution control practices, technologies, processes, siting criteria, operating methods, or other alternatives.

NPS Management Measure Categories

The revised management plan (March 2000) describes nonpoint source programs and initiatives aimed at controlling nonpoint source pollution from six broad pollution categories: agriculture, developed lands, forestry, marinas and recreational boating, hydromodification, and wetlands/riparian areas.

This annual report summarizes pollution prevention and control efforts in these broad pollution categories. During the past year significant progress has been made toward achieving a variety of management measures and program goals including: the development of nutrient management plans, the creation of hundreds of miles of forested buffers, the expanded number of marinas pledged and certified as Clean Marinas, implementation of Phase II Stormwater Management (SWM) guidelines, addressing the On Site Sewage Disposal (OSDS) issue, and increased funding for land preservation, stream restoration and wetland creation. This report contains detailed information describing statewide progress and specific projects within each broad pollution category.

Agriculture

Good water quality is the most critical element in the overall restoration and protection of the Chesapeake Bay, the Coastal Bays and their tributaries for the support of living resources and to ensure safe drinking water supplies and other beneficial uses. Agricultural activity, human population growth, low density development (i.e., sprawl), and septic systems are each contributing nonpoint source pollution in the form of nutrients and bacteria which affect the State's surface and ground waters.

A strong agricultural industry and a healthy environment go hand in hand. The Chesapeake Bay Watershed Model indicates that Maryland farmers achieved the majority of water quality objectives in every major watershed and continue to exceed their goals for implementing best management practices (BMPs) to manage nutrients, control erosion and protect water quality. As we move ahead into the future, agricultural and soil conservation partners will continue to preserve Maryland's rural legacy by developing and promoting farming practices that are both environmentally sensitive and economically sound. Maryland has a variety of agricultural programs (CREP, MACS, Soil Conservation Water Quality, Agricultural Water Management Program) described below that contribute to the overall reduction of nonpoint source pollution.

Conservation Reserve Enhancement Program (CREP)

Maryland's conservation programs have come a long way since initial efforts to protect natural resources focused chiefly on soil conservation. Today, agricultural partners work to develop new technologies that address a variety of environmental issues, such as wetland habitat protection, forest buffer plantings and animal waste management. In addition, partners work to develop new programs, including the innovative Conservation Reserve Enhancement Program (CREP), which helps farmers protect sensitive streamside areas. CREP provides annual rental payments for 10 – 15 years and cost share for installing BMPS to conserve sensitive resource areas.

During calendar year 2001, farmers enrolled a total of 14,695 acres in CREP. Included in this total are 5,658 acres of riparian vegetated buffers, 5,666 acres of riparian forested buffers, 765 acres of wetland restoration, and 2,562 acres of highly erodible land conservation. Some of these efforts are also highlighted in the forestry management measure category detailed below. Also, see the CREP website at http://www.mda.state.md.us/resource/crep.htm

Presentation on CREP program in Harford County by Soil Conservation District and MD DNR Forestry personnel, July 2001

Nutrient Management /Water Quality Improvement Act (WQIA)

In 1998, the Maryland General Assembly passed landmark legislation that places Maryland at the forefront of national efforts to protect water quality. The Water Quality Improvement Act (WQIA) established both short and long-term strategies for reducing nutrient levels in our streams, rivers and Chesapeake Bay. The most significant feature of the Act is a provision requiring nutrient management plans for virtually all Maryland farms. The Water Quality Improvement Act of 1998 changed the nutrient management program to a regulatory program, requiring farmers who use commercial fertilizers to submit a nitrogen and phosphorus based plan to the Maryland Department of Agriculture (MDA) by December 31, 2001 and implement it by December 31, 2002. Farmers who use animal manure or sludge must have nitrogen based plans by the same dates as those who use chemical fertilizers. Those who have sludge or animal manure have until July 1, 2004 to submit a nitrogen and phosphorus based nutrient management plan and must implement it by July 1, 2005. Although the new law includes a number of deadlines and requirements, it also offers many new incentives aimed at helping farmers comply.

In 2001, the majority of Maryland farmers complied with the first of the nutrient management plan reporting deadlines stemming from the Water Quality Improvement Act. As of December 31, 2001, Maryland farmers officially submitted nutrient management plan information for approximately 1.1 million acres of agricultural land, representing 65% of the agricultural land that is covered by the law. The information submitted includes 2,152 completed nutrient management plans covering 338,392 acres. Another 2,993 farmers submitted information on a Justification for Delay form indicating they were still working with a consultant to develop their plans on a total of 757,535 acres. The Nonpoint Source Program has provided cost-share funds to have private sector consultants develop nutrient management plans.

During 2001, information and instruction on proper sampling of soil and manure were disseminated during farm visits, yield checks were performed, nutrient application equipment was calibrated for producers, record keeping tools were distributed to producers to encourage improved record keeping, and instruction on the calibration of equipment was provided. Extension staff participated in numerous nutrient management training courses, and several training sessions on “Writing Nutrient Management Plans” were held.

Outreach activities geared toward agricultural producers are ongoing. The pamphlet “Nutrient Manager - Focus on the Phosphorus Site Index” was completed and distributed, the Nutrient Management Display was exhibited at county fairs, and the Urban Nutrient Management Workgroup continues to focus on events to educate people about urban and related nutrient practices to minimize or eliminate contamination to waters in Maryland. For example, materials entitled ‘Fertilizer Recommendations for Trees and Shrubs’ and ‘Recommendations for Cut Flowers Production’ were published. For more information on available publications, please see the MDA Nutrient Management website at http://www.mda.state.md.us/nutrient/contents.html

Manure Transport Program

The Manure Transportation Pilot Project provides support to animal producers who have excess manure and need to find alternative means of managing it in order to be in compliance with the Water Quality Improvement Act. The objectives of the program included subsidizing the cost of transporting animal manure to make it affordable for animal producers to address excess manure and providing an incentive for the development of alternative technologies and business ventures to create a market for use of animal manures. This year (SFY 01), approximately 36,930 tons of excess manure was transported. See http://www.mda.state.md.us/nutrient/transprt.pdf for more information.

Operations receiving manure for land application under the Project must apply it in accordance with a nutrient management plan prepared by a certified consultant. Receiving operations with alternative uses for manure are also eligible to participate. To date, practically all of the manure transported has been poultry litter. Reimbursement for all participants is capped at $20 per ton. Fifty percent of the cost of transporting poultry litter is paid by commercial poultry companies. Livestock producers received 87.5% of costs from public funds.

Maryland Agricultural Cost Share (MACS)

State and federal funds are used to provide grants to Maryland farmers for the installation of best management practices (BMPs) to alleviate existing or potential critical water pollution conditions associated with farming activity. Management actions were taken to continue to improve MACS Program administration at the Maryland Department of Agriculture (MDA) headquarters and to improve the consistency of Program administration at the local Soil Conservation District (SCD) level. These efforts have made the program more attractive to farmers, accelerating the installation of BMPs, and increasing farmer participation in Maryland's nonpoint source pollution control program. For more detailed information on the program, see the MACS website at: http://www.mda.state.md.us/nutrient/costsh61.pdf

For the 2001 reporting period (state fiscal year (SFY) 01), there were 1,327 BMPs installed, 68,021 acres of cover crops planted, and 75 Poultry and Livestock Waste Storage facilities built for use under the MACS program. The positive environmental impact of (MACS) BMPs resulted in an estimated 29,489 tons of soil saved, 2,084 tons of manure managed daily, and the prevention of movement of 578,000 pounds nitrogen and 13,600 pounds of phosphorus through the use of cover crops.

Soil Conservation and Water Quality Program

The Soil Conservation and Water Quality (SCWQ) Program enabled the development of 1,300 SCWQ plans for 101,000 acres with an associated 6,200 BMPs installed. An additional 800 existing SCWQ plans were updated on 87,000 acres. Statewide, 59% of agricultural land is managed under a current SCWQ plan. Plans are considered current for a maximum of ten years. In addition to planning acreage for new cooperators, local Soil Conservation Districts (SCDs) keep a rolling tally of acreage planned in the past and have an ongoing system of regular updates.

Grassed Waterway

The Coastal Zone Management Division, through the Nonpoint Source and Coastal Zone Programs, has funded soil conservation and water quality planning activities in many different areas across the state (including Antietam Creek, Deer Creek, Marshyhope Creek, St. Clements Bay, St. Martins, Lower Choptank, Chester River). One watershed, Antietam Creek, provides a snapshot of the tremendous amount of progress made in reducing nonpoint source pollution through the combined efforts of NPS program partners.

Case Study: Agricultural Project - Antietam Creek Targeted Watershed Project

The Antietam Creek Targeted Watershed Project is a prime example of the effectiveness of conservation partnerships working to solve common water resource problems within a major tributary of the Potomac River. The Washington County Soil Conservation District and its many partners report outstanding progress in improving water quality in Antietam Creek's watershed in Washington County, Maryland.

Antietam Creek's watershed placed eighth in the State for nutrient loading to the Chesapeake Bay. Runoff from numerous agricultural operations within the watershed carries nutrients, sediment, pesticides and organic wastes to Antietam Creek and its tributaries. Local stream and

water quality concerns include excessive streambank erosion, siltation, nutrient enrichment, algal growth, pathogen contamination, elevated stream temperatures, loss of fish habitat and fishery, and loss of riparian habitat.

Dairy barn wash water runoff prior to installation of BMP.

In addition to nutrient loading to the Bay and local water quality issues, this watershed was also targeted due to concerns about protecting several local Washington County-designated "Special Planning Areas" such as the Powell Trout Hatchery, the South Mountain Natural Environmental Area, the Greenbriar State Park, Appalachian Trail Corridor, and Antietam National Battlefield. The Edgemont and Smithburg Reservoirs, standby water systems for the city of Hagerstown, also lie within the watershed.

Funding from Section 319 was used by MDA and the Washington County SCD to employ a Soil Conservation Planner to complete a watershed assessment and to begin educational efforts in the targeted subwatersheds. A Conservation Technician was hired to help install BMPs identified by the planner in Soil and Water Conservation Plans and a nutrient management advisor was added to Cooperative Extension Staff to work with animal producers on nutrient management planning.

Over the last ten years, the Washington County SCD has successfully accelerated efforts towards implementing conservation practices and increasing conservation education efforts in the county. Examples of BMPs include waste storage structures, stream fencing and alternative livestock water facilities (to keep cattle out of waterways) and planting of riparian buffers. Since 1992, over 3,600 best management practices have been installed.

Fenced Stream

Livestock watering trough

Recently, the Washington County SCD has focused its efforts on the Little Antietam, Marsh Run, Beaver Creek, Little Antietam South and Sharman Branch subwatersheds. Soil conservation and water quality plans have been completed for 31,081 acres representing 78% of the agricultural acreage within these subwatersheds. The SCD also has a nutrient management specialist helping local farmers develop and update nutrient management plans. Local landowners have also participated in the Western Maryland Cover Crop program. In addition to traditional agricultural projects, the District completed the Beaver Creek Stream Restoration

Project, which restored a severely degraded section of the creek downstream from the Albert Powell State Fish Hatchery.

As a result of local efforts, supported by state and federal partners and resources, there has been improvement in water quality within Antietam Creek. Eroding stream banks along restored sections of Beaver Creek have been stabilized and the channel has been restored to more natural conditions. Water quality monitoring conducted by Maryland Department of Environment has shown a significant decline in nutrients and sediment. Riparian habitat and the trout fishery have improved dramatically.

Beaver Creek Stream Restoration Project

Cooperating Agencies and Roles

Washington County Soil Conservation District (WCSCD)
Project sponsor and proponent. Responsible for implementation of the agricultural program aspects.

U.S.D.A. Natural Resources Conservation Service (NRCS)
Provides technical supervision for development of Soil Conservation and Water Quality Plans, and the BMPs and systems.

Maryland Cooperative Extension (MCE)
Has primary responsibility for the information and education programs for both rural and urban activities. Supervises the nutrient management and Integrated Pest Management (IPM) programs.

Maryland Department of Agriculture (MDA)
Assists WCSCD by providing operating support, staff support, and cost-share funds for BMP installation.

Maryland Department of Environment (MDE)
Responsible for providing technical and financial support for urban activities in addition to their regulatory and enforcement responsibilities.

Maryland Department of Natural Resources (DNR)
Through its Forest Division and Wildlife Division, provides technical and financial assistance on some agricultural activities and on silvicultural activities including riparian plantings.

U.S.D.A. Farm Services Agency (FSA)
Provides financial assistance to landowners for installation of BMPs.

Washington County Health Department
Provides staff for technical assistance, regulatory and enforcement programs.

Washington County Commissioners
Through various departments, provides staff for technical assistance, regulatory, and enforcement programs for erosion/sediment control, and stormwater management control programs.

U.S. Geologic Survey (USGS) & Maryland Geologic Survey (MGS)
Has a network of stream monitoring stations and spring/well locations, which they use to monitor water quality.

U.S. Environmental Protection Agency (EPA)
Provides funding for staff and BMP installation.

Public Drainage Program

The Maryland Department of Agriculture (MDA) regulates agricultural public drainage facilities administered as Public Drainage Associations (PDAs). PDAs are independent political subdivisions and cover over 850 miles of drainage ditches in the coastal zone, mostly on the Eastern Shore. The PDAs are required to develop operation and maintenance plans which address sediment control and water quality protection. MDA assists PDAs to conduct biannual inspections and provides technical assistance to the PDAs through the SCDs. Typical best management practices include vegetative filter strips and channel stabilization.

In June of 1999, the Public Drainage Task Force was formed and charged by Maryland's Chesapeake Bay Cabinet to develop recommendations that would enhance the Eastern Shore environment and agriculture by addressing issues related to the management of public drainage systems. In October of 2000, the Task Force completed its report, which was endorsed by the Governor's Chesapeake Bay Workgroup, and forwarded to the Chesapeake Bay Cabinet for approval. Public drainage task force recommendations included recognition that best

management practices (BMPs) should incorporate the best achievable methods to reduce nutrient export and increase habitat quality.

In 2001, the Nonpoint Source (NPS) Program funded the development of a special video and informational outreach materials to promote the use of weed wiper technology and alternative management measures such as water control structures, pocket wetlands and other practices to retain vegetative buffers and slow the flow of water. The NPS Program has also funded the implementation of these alternative management measures including pocket wetland projects in the Hubbard Cohee, Weer Levengood, Edinberg and Whitemarsh PDAs.

Forestry Programs

Forest health is inextricably linked to healthy streams and robust Chesapeake Bay and Coastal Bays watersheds. Forests function as filters removing sediments, nutrients and other pollutants from water before they enter the groundwater system and receiving streams. The influx of excessive nutrients– caused in part by deforestation, however, has disrupted the Bays' ecosystems. Forests also regulate the amount, velocity, and rate of runoff maintaining a water body=s natural hydrology. Forested riparian buffers along streams and rivers stabilize banks, reducing erosion and sedimentation. These riparian buffers also enhance wildlife habitat by shading streams, providing woody debris for habitat, and regulating stream temperature. Protecting Maryland=s forest resources greatly contributes to nonpoint source pollution control.

Pursuant to Section 6217, Maryland State agencies and local governments are working to implement the ten forestry management measures for the control of nonpoint source pollution. The forestry management measures are well integrated with agricultural, urban, and

wetlands/riparian programs. This vital linkage strengthens the individual measures implemented and also makes the combined efforts more effective as a whole. Integrating forestry efforts benefits funding of projects associated with impaired waters, increases volunteerism, helps to educate and involve the public, emphasizes the importance of a 'watershed focus', and helps restore habitat values adjacent to cropland, along streams and in urban settings.

Stream ReLeaf

In 2001, Marylanders created over 264 miles of forest buffers along waterways under the leadership of DNR, a rate over twice the annual goal. Currently, the total accomplishment is 595.7 miles. This accomplishment brings us very close to the Governor's goal of 600 miles by 2010, and is a bulwark of our efforts to reduce nutrient pollution and restore habitat in the Chesapeake Bay watershed. The incentives in the Conservation Reserve Enhance Program helped almost double the rate of forest buffer planting in the last year. CREP is a major factor in making forest buffer establishment affordable for agricultural landowners. For existing buffers, efforts are underway to track conservation occurring through programs such as Forest Conservation Act, Critical Area Law, Rural Legacy, and other local programs.

Buffered stream in Washington County.

Based upon the challenge of recruiting additional participants, an independent contractor (funded by a NOAA grant) reviewed incentives for establishing riparian forest buffers in Maryland. The study included a comprehensive summary of existing incentives and rules and a survey of stakeholders. The report recommended expansion of eligibility in several programs, increased

coordination efforts, increased funding for incentives and technical assistance, and better funding for maintenance of newly installed buffers.

Partnerships, outreach, and coordination have continued to expand in support of Stream ReLeaf goals. See the DNR Forest Service Stream Re-leaf website at http://www.dnr.state.md.us/forests/programapps/ripfbi.html

Other Forestry Programs

Special Rivers

The Special Rivers Project consists of critical technical and outreach support for watershed improvement through forest restoration and management. Each of the four regional projects: the Anacostia River, Monocacy River, Susquehanna River, and Town Creek -- remain focused on buffer creation and preparation of site-specific forest stewardship plans. Landowner interest increased substantially during the 2000 – 2001 time period for which data is available. The latest reporting period for Special Rivers indicates that 49 miles and 663 acres of riparian forest buffers were established which totals over 2.5 times the target goal. Stewardship Plans were developed for 182 participants covering 5297 acres -- triple the target goal. Additional activities included ongoing monitoring, reinforcement plantings to assure stand development, and potential sites were targeted for inspection in 10 subwatersheds and on DNR lands. See the Special Rivers website at http://www.dnr.state.md.us/forests/programapps/srpcon.html for more detail.

Forest Conservation Act

The Forest Conservation Act (FCA) applies to all activities requiring a permit for subdivision, grading, or sediment control that is larger than 40,000 square feet, or slightly less than one acre. Information on the condition of the existing forest and a plan for conserving the most valuable portions of the forest are required. Plans are prepared on a site by site basis by qualified resource professionals and are reviewed for adherence to the Act at the county level. For more detail, see the FCA website at http://www.dnr.state.md.us/forests/healthreport/act.html

Urban - Developed land and New Development Programs

This category of management measures is intended to control runoff and treat associated pollutants generated from new development, redevelopment, and new and relocated roads, highways and bridges. In Maryland, this measure is met through the State's Stormwater Management (SWM) program, which addresses proposed disturbances over 5,000 square feet, including residential, commercial, industrial, and institutional development, as well as new and relocated roads and bridges. The Phase II SWM regulatory program incorporates low impact development methodologies to reduce the negative impacts of site runoff. Protection is also provided by erosion and sediment controls, smart growth initiatives, and open space preservation programs. In addition, the Critical Area Program (requiring forest buffers along the Chesapeake

Bay) is essential to these efforts as an important watershed protection tool. The Critical Areas Program applies to tidal lands and waters of the Chesapeake Bay to the head of tide and all lands within 1000 feet of Mean High Water or from the landward edge of tidal wetlands.

On a watershed scale, the implementation of these urban programs continues to promote environmentally sensitive site design, increase economic feasibility of low impact development, and contribute to the integrated approach of watershed protection. This approach is strengthened through the incorporation of non-agricultural nutrient management efforts, forestry, and wetland/riparian management measures.

Stormwater Management -- Phase II Program

Final 1999 Stormwater Phase II regulations expand the existing NPDES Stormwater Management (SWM) program to address stormwater discharges from municipal storm sewers and construction activity. The new SWM program incorporates the Phase II requirements, detailed in the publication known as the 2000 Maryland Stormwater Design Manual. It has become part of the State's development regulations by reference and SWM is required on all sites which disturb over 5,000 square feet of land. The new Manual (adopted October 2, 2000) concentrates on controlling runoff increases and mitigating water quality degradation associated with new development as well as redevelopment of more urbanized areas. The Manual includes a unified approach for sizing stormwater BMPs to meet pollutant removal goals, maintain groundwater recharge, reduce stream channel erosion, prevent overbank flooding, and pass extreme floods. For more detail, see the MDE website at www.mde.state.md.us/environment/wma/stormwatermanual.

Low Impact Development (LID)

Bioretention, raingardens, reductions in impervious surface area, disconnections of roof runoff, and directing sheet flow to vegetated buffers are some of the main components of the voluntary Low Impact Development (LID) approach for managing stormwater runoff. Prince George's County was one of the first areas to develop and use bioretention techniques as an integrated management practice (IMP). The County continues to refine the bioretention IMP design and its effectiveness has been documented by studies that show significant pollutant loading reductions. The standards address the minimization of impervious area and thus runoff, treatment/ pre-treatment, structural and non-structural BMPs, peak discharges, stream channel protection, redevelopment, industrial Pollution Prevention Plans, sites with high pollution potential (hotspots), and permitting. In addition, an innovative system of "credits" is offered to those employing progressive planning techniques. The six credit-producing efforts reduce the impacts of development as well as reduce the size and cost of SWM practices needed onsite.

Rain Garden in DNR parking lot: an urban stormwater demonstration project

Sediment and Erosion Control Program

The Maryland Sediment and Erosion Control Program is operated at the local level where local governments have shown the ability to enforce the provisions of their ordinances relating to soil erosion and sediment control. In other cases, the state has retained enforcement responsibilities. MDE conducts periodic reviews of local programs to ensure that implementation is acceptable and it has the authority to suspend delegation and take over any program that does not meet state standards.

Onsite Sewage Disposal Systems (OSDS)

Maryland has approximately 400,000 septic systems today (approximately 1 in 5 households), with potential for significantly more. With few exceptions, residents are still using the same septic system technology today that was used 50 years ago. These systems are not designed to remove nutrient pollution, which is the key type of pollution targeted by the Chesapeake Bay clean-up effort.

The Maryland Department of the Environment, Ground Water Permits Division is responsible for the development of regulations pertaining to the citing, construction, and general permitting of septic systems or OSDS. Authority for permitting, tracking and monitoring OSDS is delegated to county health departments. For the 2002 legislative session, a bill has been introduced for tax incentives to owners who upgrade their systems to be more efficient and for increased nutrient removal.

In 2001, the Coastal Nonpoint Program distributed a Request for Proposals (RFP) to local jurisdictions in the Coastal Zone of Maryland to fund projects that address the siting, design, operation, and maintenance of onsite sewage disposal systems (OSDS). The major objectives of the RFP solicitation were to help ensure conventional onsite or decentralized systems are sited and installed properly in accordance with appropriate state and local regulations and codes; are periodically inspected and repaired as necessary; and that the appropriate regulatory agency is aware of the location of systems to provide oversight and education, for example, periodically providing owners with operation and maintenance information.

As a result of the RFP, Maryland has approved funding for seven counties interested in improving OSDS management through improved record-keeping, outreach and repair and maintenance of septic systems. Maryland is using federal Coastal Nonpoint Source Program (Section 6217) funds to help coastal counties develop accurate and complete inventories, databases, and maps of properties served by septic systems since outdated, incomplete or missing records and information currently hampers existing local management efforts. These funds will enable local governments to reduce the impacts of septic systems and protect environmentally sensitive areas by (1) identifying areas in need of increased monitoring due to potential water quality impacts, (2) identifying areas that should be placed into sewer service systems, and (3) targeting homeowners for outreach on system maintenance.

Smart Growth Initiatives

As the State moves forward with various programs to reduce urban nonpoint source pollution (stormwater, on-site development, sediment and erosion control), it also moves forward with its Smart Growth Initiative. The Smart Growth Initiative addresses nonpoint source pollution by protecting rural landscapes, agricultural lands, forests, and other natural areas, encouraging development in areas with existing infrastructure, and by promoting the principals of Maryland's 'GreenPrint' and 'Green Building' programs. DNR has numerous programs and initiatives that contribute to achieving the goals of Smart Growth, some of which are described below. More information on Smart Growth is available at http://www.op.state.md.us/smartgrowth/index.html.

Program Open Space

The Department of Natural Resources' Program Open Space (POS) is a nationally recognized program that provides funding for Maryland's state and local parks and conservation areas. Established in 1969, Program Open Space symbolizes Maryland's long-term commitment to conserving natural resources while providing exceptional outdoor recreation opportunities. The program has resulted in the acquisition of more than 234,000 acres of open space for state parks and natural resource areas and 31,000 acres of local park land. More than 3,900 county and municipal parks and conservation areas have been built through POS.
http://www.dnr.state.md.us/pos.html

Rural Legacy Program

The Rural Legacy Program provides the focus and funding necessary to protect large, contiguous tracts of land and other strategic areas from sprawl development and to enhance natural resource, agricultural, forestry and environmental protection through cooperative efforts among state and local governments and land trusts. Protection is provided through the acquisition of easements and fee estates from willing landowners and the supporting activities of Rural Legacy Sponsors and local governments. During 2001, the Rural Legacy Program announced grants of $29.6 million to permanently protect 11,000 acres across the State. The State has previously awarded $82 million to counties and Baltimore City to protect rural lands. See http://www.dnr.state.md.us/rurallegacy/index.html for more information.

GreenPrint Program

In May 2001, Governor Glendening signed into law a new $35 million program designed to protect lands critical to long-term ecological health. These lands, referred to as Maryland's green infrastructure, provide the natural foundation needed to support a diverse plant and animal population, and enables valuable natural processes like filtering water and cleaning the air, to take place.

The GreenPrint Program authorizes two state agencies to undertake activities to conserve targeted lands: the Department of Natural Resources and the Maryland Agricultural Land Preservation Foundation (MALPF). DNR has the authority to spend 75% of the funds allocated on green infrastructure land acquisitions and easements. MALPF has authority to spend 25% of the GreenPrint Program funds for protection of properties within MALPF-approved agricultural districts that contain green infrastructure lands. Local government approval is required for all projects using DNR's portion of GreenPrint funds. During September through November 2001, the State's Board of Public Works approved over $11 million in GreenPrint funds to protect almost 3,000 acres of vital Maryland forests and wetlands. See the website at http://www.dnr.state.md.us/greenways/greenprint/

Marinas and Recreational Boating – Clean Marinas

The Clean Marinas Initiative was developed in response to Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990, which requires that states address nonpoint source pollution from marinas and recreational boating. Maryland established the Clean Marina Initiative to promote understanding and adoption of pollution prevention measures associated with the impacts of pleasure boats on water quality. Densely populated marinas and the associated operation and maintenance of boats can have seasonal or sporadic water quality impacts.

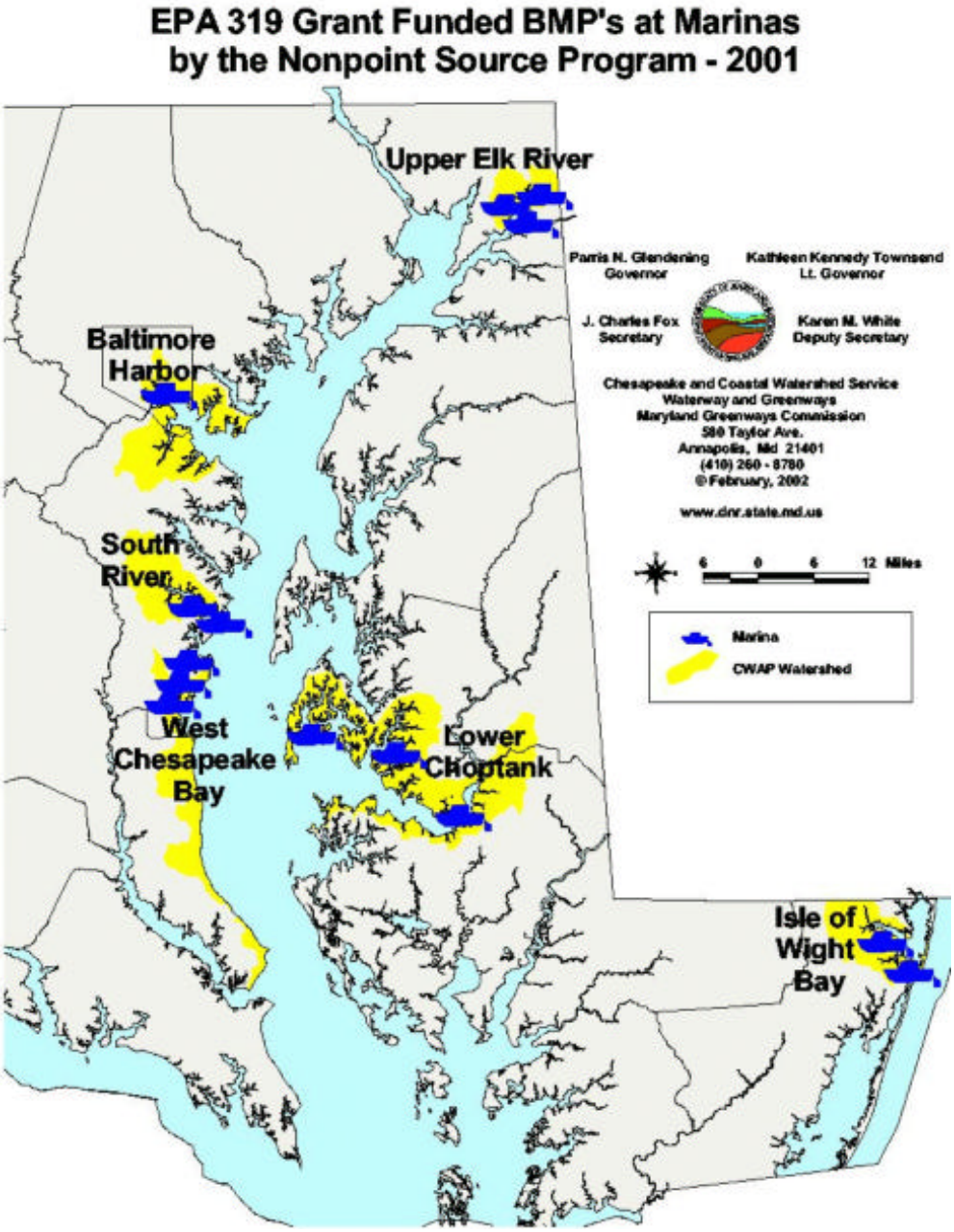
The Clean Marinas Program is able to demonstrate to the marina audience actual examples of effective pollution prevention and reduction practices. A voluntary Clean Marina certification process has proven beneficial as a marketing tool to businesses (marinas, boat maintenance) interested in promoting environmentally sensitive boat and marina operation. In addition, other nonpoint source management measures have been shown to fit well into the Clean Marinas Program. These include vegetated or forested buffers, reducing impervious area, sewage pumpout facilities, wetland creation, and onsite fuel, pesticide, and chemical control.

The program goal is to certify 25 percent of the State's 600 boating facilities as Clean Marinas by 2004. As of December 2001, 127 facilities have pledged (Step 1) to protect MD's waterways from harmful chemicals, excess nutrients, and debris. Of these, 44 have implemented pollution prevention measures and been certified (Step 2) as Clean Marinas or Clean Marina Partners. The Clean Marina Partner designation is for facilities, such as public boat ramps, which are not true marinas but that promote Clean Marina ideals. The DNR Clean Marinas Program staff increased participation in the Clean Marina Initiative, and conducted meetings of the Clean Marina Committee, plus workshops, and a program evaluation to identify and address implementation roadblocks. Program staff continuously refine the Initiative by keeping abreast of advances in technology and new BMPs through industry and academic publications and attending relevant meetings, workshops and conferences. The Clean Marina Guidebook will be revised as technologies and laws change.

During 2001, the Clean Marina Initiative was implemented through a combination of outreach to marinas, confirmation visits, marketing to boaters, and promotion of certified Clean Marinas. Staff continued to encourage marinas to adopt pollution prevention measures and become certified Clean Marinas by conducting outreach efforts such as personal phone calls and visits, workshops, quarterly newsletter, etc. Certified Clean Marinas were highlighted by award presentations, features in newsletters and exhibits, and through hosting the annual awards ceremony. Press releases announced new pledges, new certifications, workshops, clean boating tip cards, free petroleum control kits (*i.e.*, oil absorbent pad, instructions for use & disposal, and petroleum control brochure), and other outreach materials. Many of these activities were accomplished through a display of the Clean Marina exhibit at the 2001 U.S. Sail and Power Boat Shows and other appropriate shows and festivals. See the Clean Marina website at http://www.dnr.state.md.us/boating/cleanmarina/.

The Nonpoint Source Program has funded the installation of best management practices (BMPs) at Maryland marinas located in Priority Category 1 watersheds. The map below indicates the marinas that have used nonpoint source cost-share funds to install a variety of practices (e.g. the installation of fish cleaning stations, oil and antifreeze recycling stations, recycling pressure washing systems, vacuum sanders, high-volume low pressure (HVLP) spray guns and BayScape buffers). BMP implementation assists the Clean Marinas Program in its overall outreach toward

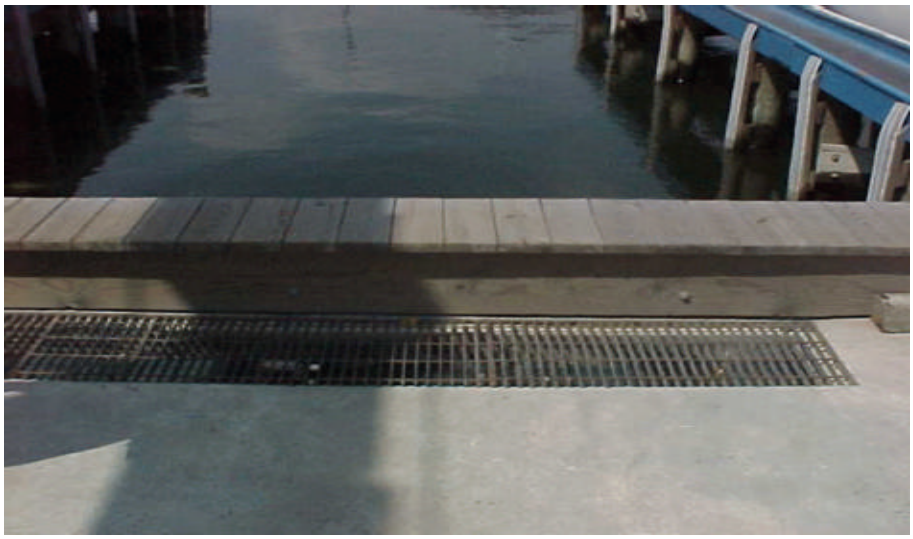
marina owners as it demonstrates cost effective methods of pollution reduction and prevention practices.



During the summer of 2001, EPA Region III representatives toured several nonpoint source program projects in Maryland. As part of their tour, EPA and DNR representatives visited the Tidewater Marina, a Clean Marina in Havre De Grace, Maryland. State and EPA staff were able

to see first-hand a clean marina and on-the-ground implementation of best management practices.

Tidewater Marina operator Jeff Williams speaking about best management practices.



Wash water capture facility at the Tidewater marina.

Hydromodification/Channelization

In Maryland there is a network of over 14,000 miles of streams and rivers. Human activities, such as channelization, building of levees, dams, diversions, and floodplain development disrupt the natural hydrologic regime of the system resulting in a widespread deterioration of environmental quality. Current management approaches focus on the modification of watershed hydrology to replicate (to the degree possible) the hydrology in undisturbed forested watersheds. This restores stream channels to greater potential for stability because the magnitude and frequencies of peak storm discharges are reduced.

Maryland is working to curtail or reverse damages from hydromodification through a variety of programs and projects including the shore erosion control and fish passage programs.

Shore Erosion Control

Shoreline and streambank erosion result not only in the loss of land and the reduction of riparian buffer areas and wildlife habitat, but erosion is also identified as a major contributor of sediment to the waters of Maryland. Approximately 5.1 million cubic yards of sediments are delivered annually to the Chesapeake Bay from shoreline and streambank erosion. Sedimentation both increases nutrient pollution and degrades water clarity.

There are approximately 4,360 miles of tidal shoreline within the Maryland portion of the Chesapeake Bay and Coastal Bays watershed. One thousand three hundred forty-one miles of tidal shoreline have been identified as eroding at various yearly rates. In addition, approximately 14,063 miles of fresh water streams, an integral part of the Chesapeake Bay watershed system, are experiencing intermittent erosion problems.

Maryland's Shore Erosion Control Program was established in 1968 within DNR for the purpose of addressing shoreline and streambank erosion problems along the Chesapeake Bay and Coastal Bay and their tributaries. The Program provides assistance to Maryland property owners in resolving shoreline and streambank erosion problems. Since 1968, Shore Erosion Control has assisted numerous property owners and established more than 800 structural projects and 325 non-structural projects. Property owners in Maryland can request technical assistance and financial assistance from Shore Erosion Control. (see http://www.dnr.state.md.us/forests/programapps/sec.html)

In August 1999, Governor Glendening appointed a Shore Erosion Task Force, charged with investigating shore erosion in Maryland, its causes and effects, effective solutions and available resources. In January 2000, the Task Force published a set of nine recommendations to be implemented under the umbrella of a Comprehensive Shore Erosion Control Plan.

In order to initiate statewide planning, the Maryland Department of Natural Resources established substantial partnerships with two coastal counties: Dorchester and St. Mary's. These partnerships will enable the counties to prioritize stretches of shoreline for erosion control measures based on erosion rates, environmental impacts, impacts to public and private infrastructure and vulnerability to sea level rise; prepare detailed data on stretches of shoreline in three coastal areas; conduct public outreach activities to citizens about the causes and solutions to shore erosion; and serve as templates for the development of Statewide components of the Maryland Comprehensive Shore Erosion Control plan.

Fish passage

Another related component of water resource and habitat protection, which complements efforts to reduce nonpoint source pollution and restore designated uses, is fish passage improvement. Maryland's Fish Passage Program, administered by the Department of Natural Resources (DNR), began in 1988 and was developed in response to the 1987 Chesapeake Bay Agreement. One of the agreement's priorities was to re-open habitat and remove blockages on streams to allow fish to return to traditional spawning grounds. Since its inception, the program has completed 53 projects, re-opening 292 miles of spawning habitat.

The main goal of DNR's Fish Passage Program is to restore migratory fish populations to as near historic levels as possible. The program has operated on every major river system in the State by constructing notches and fish ladders, by breeching dams or removing barriers. Some of the program's major works are the Union, Simpkins, Bloede and Daniels passages on the Patapsco River, Ft. Meade on the Little Patuxent River, and Van Bibber on Winters Run, a tributary of the Bush River. DNR's Fish Passage Program is solely funded through development mitigation settlements and grants.

Wetlands and Riparian Areas

A variety of wetlands exist in Maryland, however two basic types of wetlands are commonly recognized: nontidal wetlands and tidal wetlands. Nontidal wetlands found in Maryland are most commonly inland freshwater areas not subject to tidal influence. Tidal wetlands are associated with daily fluctuations of water levels driven by the ocean tides. In Maryland, tidal wetlands are typically found along the ocean coast, in the Chesapeake Bay estuary, and along the tidal reaches of streams and rivers flowing into the ocean and bay, as well as Coastal Bays. Measures to both restore and protect wetlands are an important component of nonpoint source pollution control.

During 2001, the Maryland Department of the Environment (MDE) created a draft State Wetlands Conservation Plan whose mission is "to identify and resolve gaps in current wetlands management for statewide conservation and preservation of wetland ecosystems and their functions through consistent federal, state, public, and private participation, while recognizing competing resource needs." A workgroup composed of representatives from federal, state, and local governments, private business, and nonprofit environmental advocate organizations is working to provide an organized and comprehensive guide for collaboration and improvement to

new and existing federal, state, local and private programs for wetlands conservation and management. A draft of the plan will be available for public comment in 2002.

Created wetland serving both environmental education and waste treatment needs behind North Harford High School

Web-Based Tracking Initiative

Maryland has ongoing tracking mechanisms for some of the nonpoint source management measures to provide the State and federal agencies with indicators of accomplishments. In 2001, Coastal Nonpoint Program funds were allocated to enhance existing tracking systems at the state and local level for wetlands and riparian areas restoration. This analysis will better ensure coordination of tracking efforts, identify gaps and develop the systems necessary so all implementation activities can be tracked. Opportunities for incorporating this information into Maryland=s nutrient and sediment reduction programs and habitat restoration programs will also be identified and addressed.

401 Water Quality Certifications

Protection of wetlands' water quality and habitat is a component of nonpoint source pollution control. Water quality certification for wetlands via Clean Water Act Section 401, State Water Quality Certifications, is under the purview of the MDE Wetlands & Waterways Program. Under Section 401, Maryland has the authority to review any federal permit or license that may result in a discharge to wetlands and other waters under state jurisdiction, in order to ensure that the actions would be consistent with the State=s water quality requirements.

The goal of the Section 401 State Water Quality Certifications is to manage nontidal wetlands and to provide essential resource protection by authorizing only necessary and unavoidable impacts. To accomplish this goal, the following activities are regulated by MDE:

- Grading or filling
- Excavating or dredging
- Changing existing drainage patterns
- Disturbing the water level or water table
- Destroying or removing vegetation

A State Water Quality Certification permit is required for any activity that alters a nontidal wetland or its 25-foot buffer. The state-mandated 25-foot buffer is expanded to 100 feet for wetlands of special state concern as defined in Maryland's regulations (COMAR 26.23.06.) Applicants are required to demonstrate that proposed impacts to nontidal wetlands are necessary and unavoidable.

The application review process first eliminates, then reduces impacts through avoidance and minimization. An alternatives analysis may be required as part of this process. Mitigation is required for all authorized impacts. Wetland mitigation monitoring is required and extends beyond construction of an approved mitigation project. Mitigation measures may incorporate management measures addressing stream buffers, wetland creation, and habitat. If denied certification by the state, the federal permit or license cannot be issued. For more information, see the MDE web page at: http://www.mde.state.md.us/wetlands/

Case Studies

Several case studies below illustrate the effectiveness of partnership efforts to address nonpoint source pollution control and habitat improvement goals in wetlands and urban riparian areas.

Case Study: Wetland Project

Worcester County Nontidal Wetlands Project -- The Pocomoke River watershed and the St. Martin River subwatershed (part of the Isle of Wight watershed) have a history of severe nutrient impacts from agricultural activities. The restoration of agricultural areas back to wetlands can significantly reduce nutrient impacts to receiving waters and provide habitat to a variety of species. The Worcester County Soil Conservation District in cooperation with the USDA Natural Resource Conservation Service and the Department of Natural Resources' Watershed Restoration Division and local landowners, recently completed the restoration of over one hundred acres of wetlands and associated buffers in the Pocomoke and St. Martin River watersheds.

The District, using Nonpoint Source Program and Transportation Equity Act 21st Century (TEA-21) funds administered by DNR's Watershed Restoration Division created forested wetlands on a variety of locations that are capable of supporting a wide range of reptiles, amphibians, migratory waterfowl and fauna associated with wetlands and wetland habitats. The wetland projects ranged from in size from creating three acres to creating nearly forty acres of wetlands.

Several smaller projects are part of larger more comprehensive Wetland Reserve Projects. In addition, several wetland sites were constructed in areas that had been drained by Public Drainage Associations. The Worcester County wetland restoration project will have a strong local impact on reducing nutrients and improving wildlife habitat within the Pocomoke and St. Martin River watersheds.

Case Study: Urban Stream Restoration Projects- - Roland Run & Redhouse Run

The Back River and Jones Falls watersheds are identified as Priority Category 1 watersheds under Maryland's Unified Watershed Assessment. Baltimore County's Department of Environmental Protection and Resource Management also identified these highly urbanized areas as local priority watersheds. The county has developed comprehensive water quality management plans for all of its priority watersheds. Each local watershed plan identifies and ranks potential stream restoration projects.

In December 2001, Baltimore County completed stream restoration projects identified in the Back River and Jones Falls watershed plans. These restoration projects, through the use of bioengineering techniques, sought to stabilize streambanks and riparian areas and reduce sediment loads. The Roland Run (Gwynns Falls) and Redhouse Run (Back River) projects were partially funded through the Nonpoint Source Program.

The Redhouse Run Stream Restoration project is located on the Overlea High School Property in Eastern Baltimore County. The goal of the Redhouse Run project was to restore approximately 2,600 linear feet of stream channel using an environmentally sensitive approach. At the beginning of the project there was a steeply eroded gully that carried large amounts of sediment and associated pollutants to the project area where sediment deposition had obliterated the original stream channel. In addition, the stream was head cutting into this depositional area creating extensive erosion and sedimentation. Restoration was accomplished by establishing a stable stream profile, channel dimensions and by maintaining the capacity to convey peak storm discharges. Innovative techniques such as rock cross vanes and step pools were constructed to direct flows in the newly established channel. Banks were stabilized with structures consisting of natural materials (e.g. native plants, boulders) used to withstand erosional forces.

The Roland Run Stream Restoration project is located along Essex Farm Park within a residential neighborhood. Roland Run also experiences severe bank erosion and there was headcut erosion on several stream tributaries. This project stabilized 1,000 feet of the Roland Run mainstem and protected exposed sewer lines, stabilized 500 feet of the Jeffers Road tributary and stabilized 500 feet of the Jeffers Road tributary. Similar to the Redhouse Run project, the Roland Run project decreased sediment loads to the stream. The photographs below show the progress of these stream restoration projects.

Redhouse Run (Before and After Stream Restoration)

Before

Upper reach

After

Roland Run (Before and After Stream Restoration)

Water Resource Program Integration

A number of efforts occurred in 2001 to help increase coordination and public understanding of water resource and water quality programs, particularly within the context of the Chesapeake Bay Agreement commitments. During 2001, Nonpoint Program staff actively participated as part of the State's Tributary Strategy Development Workgroups, as well as the interagency TMDL Workgroup. The Tributary Strategy Development Workgroup is leading an effort to update Maryland's Chesapeake Bay Tributary Strategies, including an effort to define linkages between Tributary Strategies and TMDLs. The TMDL Workgroup, chaired by the Maryland Department of Environment, also includes DNR, and the Departments of Agriculture, Planning and Transportation. The TMDL Workgroup expanded its efforts in 2001 to address needs for enhanced coordination (i.e., data-sharing, TMDL project selection and review, and TMDL implementation planning, etc.), stemming from the stepped up schedule for production of TMDLs, as well as 319 funding guidance for TMDL implementation watershed plans.

Nonpoint Source Program Funds

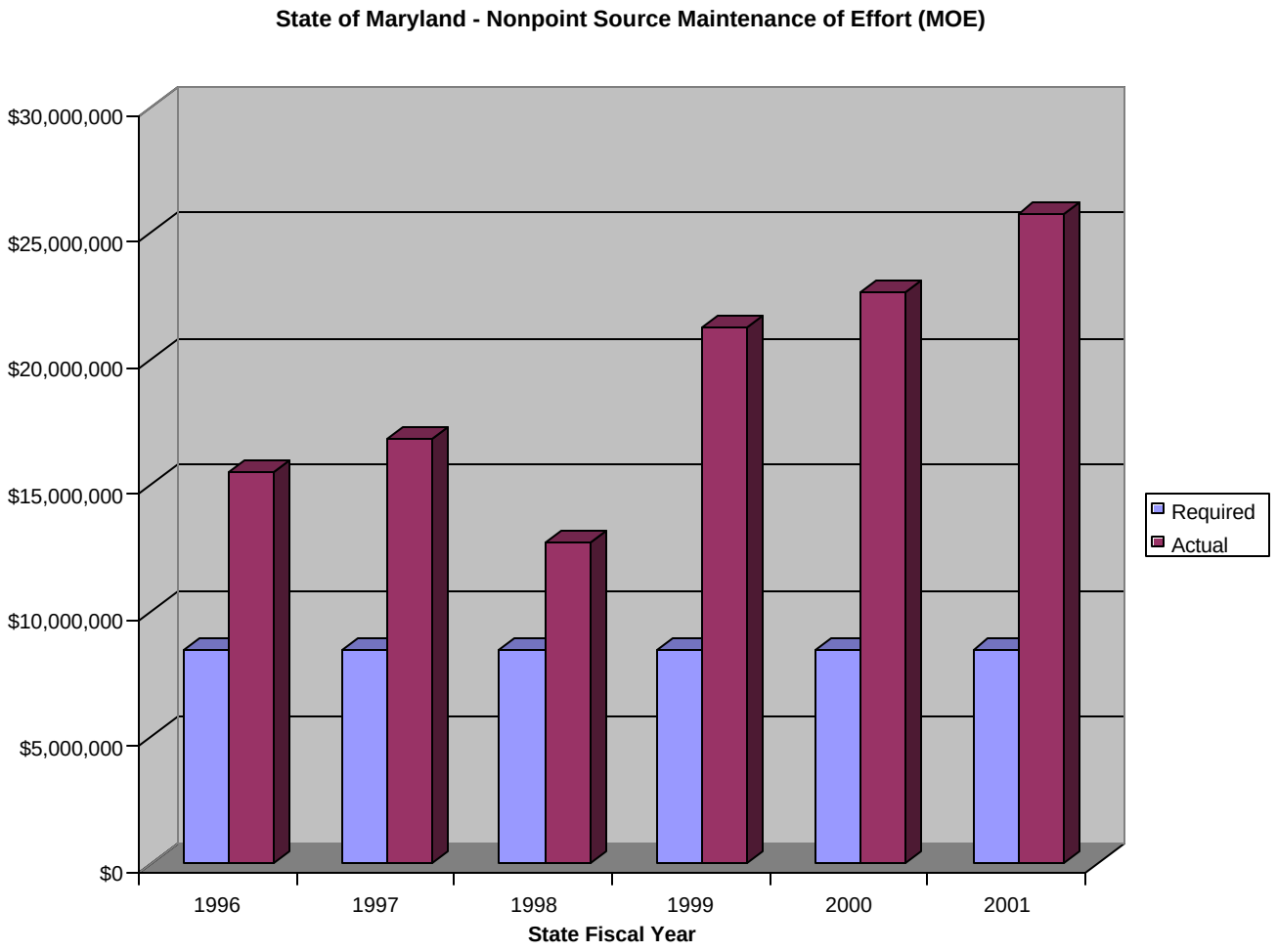
The allocation of funds from the NPS and the Coastal Nonpoint Pollution Control Program under CZMA section 6217 is coordinated by the Department of Natural Resources, Coastal Zone Management Division. The Section 319 funds are used throughout the state primarily for direct implementation (80% of funds for in-the-ground improvements) and secondarily, program management, planning and technical assistance. The Coastal Nonpoint Source funds are currently being used within the coastal zone (comprising 66% of Maryland's area) to address septic systems, fund clean marina programs, and measure success. The Division ensures that the projects funded under each grant authority are complimentary and well-coordinated. These two funding sources provide only a small (but necessary) amount of the funds that are currently used by Maryland to protect and restore water quality from the impacts of nonpoint source pollution (see Nonpoint Source Program Funding section).

The State of Maryland currently receives over three million dollars from the United States Environmental Protection Agency under CWA Section 319 to control and prevent nonpoint source pollution. The state matches these federal funds with a commitment to spend over two million dollars. Below is a breakdown of funds received and spent during the most recent federal fiscal years. This breakdown includes the expenditures of state and local match funds.

Federal Fiscal Year*	Federal Allocation	Federal Expenditure	Non-Federal Allocation	Non-Federal Expenditure	Total Allocation	Total Expenditure
1998	$1,327,699	$1,279,297	$885,133	$852,865	$2,212,832	$2,132,162
1999^	$2,856,841	$2,376,026	$1,904,559	$1,636,569	$4,761,400	$4,012,595
2000^	$2,847,302	$1,907,055	$1,898,204	$1,297,910	$4,745,506	$3,204,965
2001	$3,091,600	$490,335	$2,061,066	$593,418	$5,152,666	$1,083,753

**Note: The 1999, 2000 and 2001 federal grants remain open. It is expected that the State will spend most, if not all, of allocated federal and state funds before grant close out.*
^Includes unexpended prior year balances

Section 319(h)(9) of the Clean Water Act requires any State that applies for Section 319 grants to establish and maintain its aggregate annual level of State nonpoint source pollution control expenditures for improving water quality at the average level of such expenditures in FFY 1985 and 1986. This is referred to as the State's "Maintenance of Effort" (MOE) requirement. The goal of the MOE requirement is to insure that states allocate a minimum level of resources to control and prevent nonpoint source pollution. In addition this requirement prevents states from substituting federal resources for state resources. Maryland's MOE requirement is $8,447,270. Maryland's Nonpoint Source Program documented state fiscal year (SFY) 2001 nonpoint source expenditures of over $25 million in state funds to control and prevent nonpoint source pollution. Maryland continues to exceed its MOE requirements.



The Department of Natural Resources in coordination with other State agencies recently undertook a fiscal analysis of fully implementing the 2000 Chesapeake Bay Agreement in Maryland for FY 2003 - 2010. The analysis was done to calculate the cost of achieving the 100+ commitments found in the Agreement, identify the largest areas of funding need, and identify opportunities for funding to achieve the Bay Agreement commitments between now and 2010. The largest area of need includes improving water quality through sewage treatments plant upgrades, stormwater management, septic systems, and nonpoint source reductions. It is estimated that Maryland will need an additional $4.3 billion (for FY 2003 - 2010) to meet the various Chesapeake Bay commitments related to nutrients and sediment. Funding this gap will be an ongoing challenge.