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VIRGINIA DEPARTMENT OF CONSERVATION
AND RECREATION

VIRGINIA WATER QUALITY IMPROVEMENT FUND COOPERATIVE NONPOINT SOURCE POLLUTION PROGRAM
and the
CLEAN WATER ACT SECTION 319 NONPOINT SOURCE POLLUTION PROGRAM

TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA

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Annual Report

VIRGINIA WATER QUALITY IMPROVEMENT FUND COOPERATIVE NONPOINT SOURCE POLLUTION PROGRAM and the CLEAN WATER ACT SECTION 319 NONPOINT SOURCE POLLUTION PROGRAM

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Department of Environmental Quality
Department of Forestry
Department of Game and Inland Fisheries
Department of Health
Department of Mines, Minerals and Energy
Department of Transportation
Virginia Cooperative Extension
Virginia Marine Resources Commission
U.S. Department of Agriculture Farm Services Agency
U.S. Forest Service
U.S. Department of Agriculture Natural Resources Conservation Service
U.S. Environmental Protection Agency
U.S. Geological Survey

to the
Governor
and the
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INTRODUCTION

This report fulfills the legislative requirement under Section 10.1-2134 of the *Virginia Water Quality Improvement Act of 1997* (WQIA), Chapter 21.1 of Title 10.1 of the *Code of Virginia*, for an annual report to the Governor and the General Assembly of the Commonwealth of Virginia on the implementation of the Virginia Water Quality Improvement Fund (WQIF). It also fulfills the annual reporting requirement under Section 319(h)(11) of the Federal Clean Water Act.

In particular, the report describes nonpoint source pollution management program activities undertaken by the Department of Conservation and Recreation (DCR) and other cooperating agencies during 2000. These activities include nonpoint source pollution management program implementation, development and issuance of a request for proposals, submission of project proposals, and development and implementation of cooperative nonpoint source pollution control programs. In addition, this report identifies future funding needs for nonpoint source programs.

The WQIA under Section 10.1-2127.D., Chapter 21.1 of Title 10.1 of the *Code of Virginia* directs DCR to report each year to the Governor and the General Assembly on the implementation of cooperative nonpoint source (NPS) pollution programs in Virginia. In enacting the WQIA, the General Assembly pronounced that the restoration, protection, and improvement of the quality of state waters is a shared responsibility among state and local governments and individuals, and to that end, established the authority for cooperative programs related to nutrient reduction and other types of nonpoint source pollution. In order to accomplish this, DCR shall assist local governments, soil and water conservation districts (SWCDs), and individuals with technical and financial assistance made available through WQIF grants and other funding sources.

I. NONPOINT SOURCE POLLUTION MANAGEMENT PROGRAM

Section 10.1-104.1. of the *Code of Virginia* states that DCR shall have the lead responsibility for the Commonwealth's nonpoint source pollution management program. This section also assigns responsibility for the distribution of assigned funds, identification and establishment of priorities of nonpoint source related water quality problems, and the administration of a statewide nonpoint source advisory committee.

In implementing the nonpoint source pollution program, DCR receives input from the Nonpoint Source Advisory Committee (NPSAC), an interagency committee comprised of representatives of federal and state agencies. The mission of this committee is to serve as an interagency forum to facilitate effective nonpoint source pollution reduction and prevention programs that support the achievement and maintenance of beneficial uses of water throughout the commonwealth. NPSAC is comprised of representatives from the following agencies: Chesapeake Bay Local Assistance Department (CBLAD), Department of Agriculture & Consumer Services (VDACS), Department of Conservation & Recreation (DCR), Department of Environmental Quality (DEQ), Department of Forestry (DOF), Department of Game and Inland Fisheries (DGIF), Department of Health (VDH), Department of Mines, Minerals and Energy (DMME), Department of Transportation (VDOT), Virginia Cooperative

Extension (VCE), Virginia Marine Resources Commission (VMRCS), US Department of Agriculture Farm Services Agency (FSA), U.S. Forest Service (USFS), U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), U.S. Environmental Protection Agency (EPA), and the U.S. Geological Survey (USGS).

A. Virginia Water Quality Improvement Act Of 1997

The *Virginia Water Quality Improvement Act* was passed during the 1997 legislative session of the Virginia General Assembly and signed into law on March 20, 1997. The Act established the Water Quality Improvement Fund (WQIF) to provide funding for water quality improvements throughout the Commonwealth.

From FY1998 – FY2001, nonpoint source pollution WQIF funding totals $46,979,645. Activities funded through this program include agricultural best management practices (BMPs) cost-share assistance, nonpoint source pollution control implementation projects and funding support for the Conservation Reserve Enhancement Program (CREP). **Table 1** summarizes annual WQIF funding.

Table 1. WQIF Funding FY1998-2001

Fiscal Year	***Deposits Available***	***Interest Earned***	***Totals***
98	5,000,000	194,669	**5,194,669**
99	8,390,000	873,063	**9,263,063**
00	20,584,606*	701,602	**21,286,208**
01	11,000,000	235,705	**11,235,705**
Totals	**44,974,606**	**2,005,039**	**46,979,645**

*includes deposit approved by Secretary of Natural Resources

The WQIF has enabled the commonwealth to meet the nonpoint source pollution reduction commitments outlined in the *Shenandoah and Potomac River Basins Tributary Nutrient Reduction Strategy* by the deadline of December 31, 2000. This strategy is part of the commonwealth's commitment to reduce the flow of excess nitrogen and phosphorus into the Chesapeake Bay. In addition, the WQIF has enabled the commonwealth to make significant nonpoint source pollution reductions in the Southern Rivers Watersheds.

On August 17, 2000, Secretary of Natural Resources John Paul Woodley, Jr. announced the release of strategies to improve water quality in the Rappahannock, York and James River watersheds as well as the Eastern Shore and Coastal Basins. Collectively, these basins are known as the lower bay tributaries. Each lower bay tributary strategy establishes goals for reducing the flow of nutrients and sediment into these tributaries of the Chesapeake Bay. As Virginia moves forward with implementation of these strategies, the WQIF will be a primary source of funding.

B. Federal Clean Water Act of 1987

Section 319 of the Federal Clean Water Act requires that states develop and implement nonpoint source pollution management programs. DCR's role as the primary agency responsible for implementing the commonwealth's nonpoint source pollution management policies was reaffirmed under Executive Order No. 23 (98) signed by Governor Jim Gilmore on June 29, 1998.

Virginia received approval of a major revision and update of the *Virginia Nonpoint Source Pollution Management Program* from the U.S. Environmental Protection Agency in December of 1999. The attainment of beneficial uses as measured by water quality standards compliance is the overriding purpose of control programs identified in the management program. The program also identifies reportable milestones for a five-year time frame through which progress towards the achievement of stated goals can be reported and monitored.

As required by Section 319 of the Clean Water Act, this annual report highlights achievement of reportable milestones identified in the management program.

II. PROGRAM ACTIVITIES

A. FY2000 WQIF Implementation Projects

Grant agreement contracts for WQIF implementation projects, fiscal year 2000, were finalized in March. Table 1 is a list, by region, of approved projects, amount funded, and the anticipated nutrient and sediment reductions for each project. Regional project managers were assigned to assist project sponsors. Table 2 indicates that a total of 34 projects were funded, at a cost of $2,522,000. Anticipated reductions are:

- nitrogen 9,283 lbs. per year,
- phosphorus 5,758 lbs. per year, and
- sediment 483 tons per year

Table 2. Water Quality Improvement Fund Projects FY2000

Lower Bay Tributaries FY 2000					
Name of Project	Sponsor	Funding	lbs./year Nitrogen	lbs./year Phosphorus	tons/year Sediment
City of Lynchburg Stormwater Retrofits, Streambank Stabilization & Riparian Restoration	City of Lynchburg Robert E. Lee SWCD	$ 75,000	1,649	276	36
County of Henrico Proposed Watershed Management Program	County of Henrico	76,626	0	0	0
Establishment & Preservation of a Forested Buffer Along Reedy Creek with the Installation of Selective Streambank Stabilization & Enhancement	City of Richmond Dept. of Public Works	55,000	78	6	1
Friends of Chesterfield's Riverfront James River Land Conservation Project	Friends of Chesterfield's Riverfront	40,434	42	3	1
Greenwood Drive - Regional Retention Stormwater Basin	City of Portsmouth Dept. of Engineering	88,000	813	80	8
Hanover County Stormwater Management Program	Hanover County SWM	100,000	420	21	2
Riparian Lands Restoration/Protection	James River Association	35,400	790	58	13
Innovative Nursery BMPs	Tidewater RC&D	95,750	3,310	550	19
Lambert's Point Stormwater Quality Pond	City of Norfolk	250,000	756	75	7
Louisa County Stormwater Management	Louisa County	17,904	289	15	4
Lower Tributaries Soil & Water Conservation Plan Writing for the Reduction of Excess Nutrient Runoff	Eastern Shore SWCD	67,600	22,618	1,221	0
Nutrient Management Plan Project in the York River Watershed	Agricultural Systems	47,353	22,702	1,047	0
Onsite Wastewater Improvements Project	MP Planning District Commission	57,483	138	0	0
Southgate Plaza Constructed Wetland Stormwater Retrofit	The Elizabeth River Project	75,000	739	95	9
Thalia Creek Wetlands Re-establishment	City of Virginia Beach	100,000	1,212	156	15
Tylers Beach Boat Harbor Shoreline Stabilization	Isle of Wight County	51,000	163	67	211
Urban Conservation Planning (Residential Nutrient Management)	Tidewater SWCD	17,450	26	1	0
	Subtotal	**$1,250,000**	**55,745**	**3,671**	**326**

Shenandoah-Potomac River Basin FY 2000					
Name of Project	**Sponsor**	**Funding**	**lbs./year Nitrogen**	**lbs./year Phosphorus**	**tons/year Sediment**
Augusta Cooperative Farm Bureau, Inc. NMP Initiative	Augusta Coop Farm Bureau	$ 36,000			
Houff's Feed Fertilizer -Continued NM Initiative	Houff's Feed Fertilizer	36,000			
Nonpoint Source Pollution Control from Existing Urban Development	Prince William County	72,000	1,006	34	3
TMDL Implementation for Muddy Creek, Lower Dry River, Mill Creek & Pleasant Run Watershed	Rockingham County Farm Bureau	128,000	8,803	642	0
	Subtotal	**$272,000**	**9,809**	**676**	**3**

Southern Rivers FY 2000					
Name of Project	**Sponsor**	**Funding**	**lbs./year Nitrogen**	**lbs./year Phosphorus**	**tons/year Sediment**
Big Walker SWCD No-Till Drill	Big Walker SWCD	$ 11,157	3,905	490	52
Birch Creek Watershed Septic Tank Maintenance	Halifax SWCD	30,300	156	0	0
Blackwater TMDL Implementation Planned Development & Execution	Ferrum College	138,250	4,127	278	6
Franklin County Septic System Repair	Franklin County	42,000	459	0	0
Guest River Restoration	Lonesome Pine SWCD	90,000	151	4	1
Hardscrabble Engineering Academy	Clinch Valley SWCD	42,600	0	0	0
Joint Septic Tank Pump-Out Maintenance & Evaluation Program	Bedford County	46,500	0	0	0
South Roanoke County Regional Stormwater Management Facility	County of Roanoke	230,000	3,238	433	65
Southwest Streams Partnership	Western Virginia Land Trust	100,000	873	167	25
Upper Bluestone River Watershed Protection District-Phases 1-3	Town of Bluefield	30,000	285	31	4
Upper Levisa River Restoration	Lonesome Pine	72,700	60	2	0
Upper Powell River Restoration Project	Hands Across the Mountain	82,243	338	6	1
Wallen Creek Conservation & Education Program	Daniel Boone SWCD	84,250	137	0	0
	Subtotal	**$1,000,000**	**13,729**	**1411**	**154**

Table 3. FY2000 WQIF Implementation Projects Totals

TOTALS FY2000					
	# of Projects	**Funding**	**lbs./year Nitrogen**	**lbs./year Phosphorus**	**tons/year Sediment**
Lower Bay Tributaries	17	$1,250,000	55,745	3,671	326
Shenandoah-Potomac River Basin	4	$272,000	9,809	676	3
Total Chesapeake Bay Area	**21**	**$1,522,000**	**65,554**	**4,347**	**329**
Total Southern Rivers Area	**13**	**$1,000,000**	**13,729**	**1411**	**154**

Total WQIF Implementation Projects	**34**	**$2,522,000**	**79,283**	**5,758**	**483**

B. FY2001 WQIF Request for Proposals

On October 16, 2000, DCR mailed approximately 800 copies of the request for proposals (RFP) application package entitled *Virginia Water Quality Improvement Fund Nonpoint Source Pollution Management Program FY 2001 Request For Proposals* to stakeholders and interested parties. The application submittal deadline was December 1, 2000. The RFP provided background information on the WQIA program, a definition of eligible applicants, and discussion of project eligibility according to two categories: geographic priorities, and NPS program priorities. To improve the quality of project proposals and to target specific program needs, the following NPS program priorities and eligibility requirements were established with this RFP:

- Stormwater Management - Eligible projects included ordinance and management plan development, as well as stormwater retrofits. Projects designed to accommodate new development or to meet industrial National Pollutant Discharge Elimination System (NPDES) permit requirements were NOT eligible.

- Onsite Sewage Disposal - Eligible projects included repair or replacement of onsite sewage disposal systems in areas that are in close proximity to surface water or hydrologically connected to surface water. Septic system pump-out projects and utility connection projects were NOT eligible for funding.

- Streambank Stabilization - Project eligibility was limited to areas where steps have been taken to correct conditions that have led to streambank instability or where the project would correct conditions that have led to streambank instability. Tidal shoreline stabilization projects were NOT eligible for funding.

- Mined Land Reclamation - Eligible projects included both abandoned (coal) and orphaned (mineral) mined land reclamation projects.

- Watershed Restoration - Eligible projects included, but were not limited to, wetlands restoration projects (with clearly defined pollution reduction benefits), riparian buffer or easement projects (on lands not eligible for funding through the WQIF-funded Conservation Reserve Enhancement Program--CREP), ground water protection projects, and urban nutrient management projects. Agricultural projects that are eligible for the WQIF-funded Virginia Agricultural Cost-share Program were not eligible for funding through this RFP process.

A critical element of each proposal was the anticipated water quality improvements to be attained by the project. The projects must result in measurable environmental results and prove cost-effective in reducing nonpoint source pollution. Applicants were required to submit information to quantify pollutant reductions that will be achieved by the project so that pollutant reduction estimates of

nutrients, sediment, and other nonpoint source contaminants (e.g. fecal coliforms) could be calculated by DCR staff.

Specific guidance for preparing proposals addressed the scope of work, project budget and milestone table requirements. Details of the three elements of the application scoring criteria (water quality improvements/measurable environmental results; project area/scope; and project coordination) and the project review process were also included.

C. Proposals Received and Funding Requested

DCR received 48 nonpoint source pollution project proposals for the FY2001 grant cycle. Of these proposals, 23 were from local governments, 6 were from SWCDs, and 19 were from individuals or other sponsors. **Table 4** describes the amount requested and number of nonpoint source project proposals received.

Table 4. FY 2001 WQIF Applications

Nonpoint Source Water Quality Projects	***Number Received***	***Amount Requested***	***Amount Available***
Chesapeake Bay Watershed	26	$1,515,577	$1,000,000
Southern Rivers Watershed	22	$1,472,182	$1,000,000
NPS Project Total	**48**	**$2,987,759**	**$2,000,000**

D. Project Review and Selection

As specified in the guidelines, a grant review subcommittee of the Nonpoint Source Advisory Committee reviews and scores project proposals. The subcommittee consists of staff from the Department of Conservation and Recreation, the Chesapeake Bay Local Assistance Department, the Virginia Department of Agriculture and Consumer Services, the Virginia Department of Environmental Quality, the Virginia Department of Forestry, the Virginia Department of Health, the Virginia Marine Resources Commission, the Virginia Cooperative Extension Service, the Natural Resources Conservation Service, and the US Geologic Survey. DCR coordinates the review process.

Proposals are evaluated and scored by members of the review subcommittee based on their respective areas of expertise and program responsibility. Scores determine the rank of projects, which aids in making funding decisions. A recommended list of projects is submitted to the director of DCR for funding approval. As required by the Code of Virginia, the list of projects approved for funding is made available for public review and comment for at least 30 days prior to executing grant agreements.

E. WQIF Funding for the Agricultural Cost-Share Program

Agricultural best management practices (BMPs) are techniques (technological, economic, and institutional) that treat surface water runoff associated with cropland, pastureland and animal wastes. These BMPs are primarily implemented through the *Virginia Agricultural BMP Cost-Share Program* administered by DCR through local Soil and Water Conservation Districts (SWCDs). The Cost-Share Program offers an incentive to farmers and landowners (agricultural producers) to encourage the installation of BMPs on agricultural properties they manage. The commonwealth provides up to 75% of the cost of each BMP, a flat rate amount per acre, or a combination of a flat rate and 75% of the cost, not to exceed the individual annual funding cap. The state cost-share cap limits funding to an individual landowner in any given year to receiving a maximum of $50,000.

The Cost-Share Program, historically, was funded with state general funds and federal Chesapeake Bay implementation grant monies. In 1997, the WQIF provided a substantial increase in funding for the Cost-Share Program. This led to an unprecedented increase in the implementation of the Cost-Share Program in 1998. In July 1999 $6.95 million was allocated for the Cost-Share Program under WQIF for the Shenandoah and Potomac River Basins, $2.5 million for the Lower tributaries, and $1.75 million for the Southern River watershed. There also was an additional $1 million from the Chesapeake Bay Implementation grant and $0.8 million from Section 319 of the Clean Water Act allocated for the Shenandoah and Potomac River Basin. With this continued support in Cost-Share Program funding, accomplishments continue to be significant.

The number of farmers, or agricultural producers, who participated in the Cost-Share Program from 1990 to 1999 generally correlated with the amount of cost-share funding provided during that period. The number of participating farmers remained at a high of approximately 900 farmers in 1990 and 1991 and decreased thereafter. However, due to the recent increase in funding for the Cost-Share Program provided by the WQIA Fund, the number of producers has been increasing since 1998. The number of farmers participating in the Cost-Share Program reached an unprecedented high of 1,512 during the 2000 fiscal year. As a result of the continued strong support from the Governor and General Assembly for Cost-Share Program funding, the number of participating farmers is expected to continue to remain high.

As with the number of participating farmers, the number of acres under Cost-Share Program management also generally increased and decreased relative to changes in funding. The number of acres reached a high of approximately 45,000 in 1991 and decreased thereafter. Due to the recent increase in funding for the Cost-Share Program, the number of acres under Cost-Share Program management increased to over 120,000 acres for fiscal year 2000.

The total number of BMPs installed from 1990 to 1999 also correlated with the amount of funding, participating farmers, and acres under Cost-Share Program management. The number of BMPs installed has been continuing to increase with the funding support of the WQIF. An unprecedented 4,699 BMPs were installed during fiscal year 2000.

Historically, the demand for cost-share assistance to install BMPs has outpaced the amount of funds provided. SWCDs are reporting that funding is still not meeting the demand from agricultural producers requesting to install BMPs.

The BMPs installed through the Cost-Share Program are designed to reduce soil loss, nitrogen, and phosphorus entering streams and rivers, which can adversely affect water quality. Each BMP has a

different pollutant reduction factor, which is determined by the type of practice, location, and treatment of pollutants in the runoff.

Due to the success of the program in 2000, the following nutrient and sediment reductions have been achieved:

- 2,415,730 pounds of nitrogen,
- 462,581 pounds of phosphorus, and
- 434,722 tons of soil.

In July 2000, approximately $3.3 million was allocated under WQIF for the Chesapeake Bay tributaries and approximately $1.8 million for the Southern Rivers watersheds. Furthermore, approximately $0.9 million from the Chesapeake Bay Implementation grant, and approximately $1.6 million from Section 319 of the Clean Water Act grant were allocated to the Shenandoah and Potomac River basins. As a result, all the measurable outcomes of the Cost-Share Program are expected to remain strong in 2001. These outcomes will be reported in the (fourth) Annual Progress Report for the Agricultural BMP Program November 4, 2001.

A list of WQIF allocations to SWCDs for Agricultural Cost-Share Program implementation for FY 2001 can be obtained in the *Third Annual Virginia Agricultural Best Management Practices Program Report* from DCR.

F. Measurable Environmental Results

Anticipated pollution reductions are a critical element of WQIF implementation projects, the Agricultural Cost-Share Program, and Clean Water Act Section 319 projects. These measurable environmental results are calculated for each project and considered as part of project review and selection.

As part of quarterly reporting, sponsors of each selected project provide DCR with project-specific information regarding nonpoint source pollution control implementation accomplishments. DCR tracks the results, then calculates the pollutant reductions in a manner consistent with the Chesapeake Bay Program and other state reporting formats.

III. COOPERATIVE NONPOINT SOURCE POLLUTION PROGRAMS

This section describes cooperative nonpoint source (NPS) pollution programs between state, local governments, and individuals, as required under the WQIA, to restore, protect and improve the quality of Virginia's waters. Highlights of institutional state nonpoint source pollution programs, along with cooperative watershed initiatives, by river basin, are provided. During the year, DCR created a ninth watershed office, continued to develop effective cooperative partnerships, conducted watershed assessment and analysis, strategic planning and the implementation of watershed-based program delivery.

DCR manages and coordinates the implementation of a wide range of NPS pollution

management programs. The majority of these programs are incentive-based, with technical and financial assistance provided to encourage voluntary participation by various stakeholders. The programs described in this report have been fully integrated into cooperative NPS pollution management programs and comprehensive watershed-based initiatives throughout the commonwealth.

During 2000, development of new cooperative NPS pollution programs, along with strengthening of existing partnerships, significantly enhanced the effectiveness of the commonwealth's NPS pollution management program. Accomplishments of specific programmatic performance measures are detailed below.

A. Cooperative Programs Administered by DCR

1. The Virginia Conservation Partnership

Virginia's 46 (soon to be 47) Soil and Water Conservation Districts have served the commonwealth for more than 60 years. The partnership of natural resource conservation agencies is one of mutual reliance with each partner fulfilling a niche that supports agency missions and support of partner goals. This cooperative relationship provides efficient delivery of natural resource programs and services to landowners. The primary partners of the Virginia Conservation Partnership are Soil and Water Conservation Districts (SWCDs), DCR, and the US Department of Agriculture Natural Resources Conservation Service (NRCS). SWCDs continue to provide local connections with landowners and the farming community. NRCS provides technical expertise for the installation of conservation practices. DCR supports SWCDs with training, guidance, and financial assistance to help achieve the commonwealth's water quality goals.

During 2000, Soil and Water Conservation District Boards, with support from DCR staff:

- conducted more than 375 monthly board meetings;
- sponsored 159 technical training sessions; and
- supported more than 269 conservation demonstrations, tours, and events.

Beyond the primary conservation partners, other agencies and organizations participate in conservation partnership initiatives as appropriate. Other active partners include the Virginia Department of Forestry (VDOF), Virginia Cooperative Extension (VCE), Virginia Department of Agriculture and Consumer Services (VDACS), the Chesapeake Bay Local Assistance Department (CBLAD), and the Virginia Department of Game and Inland Fisheries (DGIF). Examples include support of the Riparian Restoration Directive, delivery of agricultural planning required by the Chesapeake Bay Preservation Act, assistance with implementation of the Virginia Agricultural Stewardship Act, the Conservation Reserve Enhancement Program (CREP) and promotion of the Forest Stewardship program. The conservation partnership provides a framework for cooperation at all levels of natural resource conservation. Through this partnership citizens benefit from an organization and network that minimizes duplication and satisfies federal, state and local natural resource conservation goals.

To further support SWCD Bay restoration efforts, DCR distributed $280,000 in grants to Soil and Water Conservation Districts annually to pursue cooperative projects that further the planning,

development, and implementation of the Tributary Strategies. SWCDs worked closely with the state in developing the Strategies, and collaborated extensively with local governments and other river basin interest groups. These SWCD initiatives resulted in the establishment of basin-wide coalitions to facilitate unified tributary strategy development and implementation of programs to achieve strategy goals. New grants emphasize formation of conservation coalitions to provide long-term leadership and guidance to continue local delivery of water quality programs.

2. Stormwater Management

The goal of the stormwater management (SWM) program is to control the quantity and quality of stormwater runoff to protect downstream properties and reduce NPS pollution. DCR is charged under Section 10.1-603 of the Code of Virginia to provide technical assistance, training, research, and coordination in stormwater management technology to local governments and citizens for the protection of properties and reduction in NPS pollution. 1998 amendments to the Stormwater Management Regulations, and the federal National Pollutant Discharge Elimination System Phase 2 Rule, have prompted new interest in the local adoption of this voluntary program. In an effort to provide greater levels of service to local governments, DCR's stormwater program staff completed the first Virginia Stormwater Management Handbook in 1999. Over 800 handbooks were sold in 2000, with the rate of sales increasing each month. This document provides local governments, SWCDs, and citizens with valuable technical information on the SWM program and the various methods employed to protect properties from increases in rates of runoff and NPS pollution. DCR staff have continued to conduct technical stormwater training as part of the Erosion and Sediment Control Training and Certification Program. Requests for additional training have led to the development of an advanced stormwater management course to be made available to local government officials, consultants, and the general public. This training is currently under development. DCR SWM program staff assisted in the adoption of 6 local government stormwater programs to bring the statewide total to 15 local stormwater management programs adopted pursuant and consistent with state law and regulations. Staff is currently working with additional localities, some of which are developing watershed-based programs that actively pursue adoption of a stormwater program.

During 2000, DCR's Stormwater Management Program:

- responded to 489 technical assistance requests and complaints;
- conducted 110 1ocal program visits;
- prepared 69 summaries of local stormwater program status;
- performed 35 locality assistance visits;
- conducted 74 state agency plan reviews; and
- performed 211 state agency site inspections.

3. Erosion and Sediment Control

The Erosion & Sediment Control (ESC) Program oversees the statewide implementation of the Virginia Erosion and Sediment Control Law and Regulations by localities, conservation districts, state and federal agencies, and private companies. These statutes provide an integrated framework for state and local regulation of land use conversion activities to control soil erosion, sediment deposition, nonagricultural runoff, and localized flooding, and in turn, prevent degradation of property, water quality, and other natural resources. DCR environmental engineers throughout the state provide assistance through ESC plan review, on site inspection, enforcement support, local urban program planning, and provision of technical/regulatory guidance and training.

Significant changes to the state statutes since 1997 include the addition of (1) DCR oversight authority over regulated activities by private utility, pipeline, and railroad companies and (2) a local option to require ESC plans for "erosion impact areas" not associated with active land development. Both of these changes have enhanced the tools available to DCR to deliver a consistent program.

A major focus of the ESC Program efforts over the past year has been to conduct a substantial number of training and certification courses across the state for government officials and private contractors implementing ESC at the local level. Approximately 4,000 people successfully completed these courses between March and October 2000.

4. Nutrient Management

DCR, through Section 10.1-104.2 of the Code of Virginia, provides assistance to localities and training to individuals in nutrient management planning. DCR works closely with large and small agricultural operations to manage agricultural nutrients found in fertilizers, manure, municipal sewage sludge, and other sources to minimize impacts on Virginia's ground and surface waters. DCR also educates urban landowners about the impacts of nutrient runoff from lawns, gardens, golf courses, parking lots, and other landscaped areas.

DCR uses various strategies to encourage proper land application of fertilizer, manure, and sewage sludge for agricultural and horticultural purposes. DCR's nutrient management specialists provide technical assistance to landowners. These specialists develop site-specific nutrient management plans (NMPs) with cooperating farmers, assist farmers with manure testing for nutrient levels, calibrate nutrient application equipment, and coordinate soil nitrate testing in agricultural crop fields. DCR's nutrient management specialists also assist localities in developing nutrient management programs and ordinances. DCR certifies private and public sector nutrient management planners, and conducts training sessions and examinations.

♦ Nutrient Management Certification Program - As of August 2000, 208 people have become certified to develop nutrient management plans in Virginia. Planners represent fertilizer, seed, and pesticide suppliers, private consultants, employees of Soil & Water Conservation Districts, DCR, the Department of Environmental Quality, with a few in miscellaneous categories. Funds to offset a portion of the fees charged by private planners are available through the Cost-Share program and by Invitations-to-Bid (contracts). These programs provide incentive to private planners to write plans and the opportunity to the farmer to get plans written by the private sector at a lower cost. Private planners have reported new plans of over 50,000 acres during the last reporting period.

♦ Nutrient Management Plan Approval for VPA Program - Two training sessions to educate VPA permit holders of confined animal feeding operations were held in 2000. Training covered the requirements necessary to comply with their permits. A total of 45 attended. More sessions are scheduled for next year.

Seventy-nine nutrient management plans for VPA permitted operations were approved, of which, 45 were for new permits. To facilitate plan development for permitted operations, the cost-share plan writing practice was expanded to encompass regulated farms that are not under an enforcement order from DEQ or VDACS and are in compliance with the Food Security Act.

A joint meeting with DCR, DEQ, VDACS, and Virginia Cooperative Extension was held on April 18 to discuss technical and administrative procedures related to VPA permits.

♦ Development of Virginia Phosphorus Index – Virginia Tech is developing a phosphorus site index, which considers phosphorus soil test levels and runoff characteristics of fields. This index will be used to supplement and/or amend strategies now being used to manage phosphorus applications to crop fields.

♦ Urban Nutrient Management Activities - Representatives from the Chesapeake Bay Land Assistance Department, DCR, and Virginia Cooperative Extension met to discuss and develop guidelines for nutrient management plans and BMPs for container nursery and greenhouse operations. At this time, applicable best management practice and erosion and sediment criteria is being collected to be reviewed by the committee.

♦ Nutrient Management-Poultry Update – The Poultry Waste Management Act (HB 1207) was passed by the General Assembly and was signed by the governor in 1999. This legislation requires DEQ to develop regulations for poultry waste. The Water Board approved the regulations developed by DEQ on September 19, 2000. The regulations, effective on December 1, 2000, require poultry operations with greater than 11,000 turkeys or 20,000 chickens to file a Poultry General Permit by October 1, 2001. These operations must have a DCR approved Nutrient Management Plan, which includes requirements for proper storage of poultry litter. The regulations also require NMPs developed after October 1, 2001 to limit the application of phosphorus to crop nutrient needs or crop removal, whichever is greater. Burial of daily mortality will not be allowed under the general permit regulations. Also, the construction of new poultry operations in the 100-year flood plain will not be allowed.

♦ Poultry Waste Alternate Use Project - Harmony/Shenandoah Valley is constructing a processing plant that will convert raw poultry litter into a granulated fertilizer product. This project is in cooperation with Rocco and Duke Energy. The project, which is scheduled to begin limited operation in the spring of 2001, will also use a gasification process to convert poultry litter into energy to power the granulation process. WQIF funding of $500,000 was provided to match contributions.

5. Floodplain Management

The Floodplain Management Section of DCR supports all efforts that promote sound floodplain management practices. This includes federal state and local initiatives, and specifically the efforts of the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP). The NFIP is the only widely available source of flood insurance to the citizens in the commonwealth; the basic homeowner's insurance policy does not cover flood damages. For flood insurance to be available through the NFIP, the commonwealth and individual localities must agree to participate in sound floodplain management activities that meet the minimum standards of the NFIP and its regulations. Local governments must adopt a NFIP compliant regulation and commit to the enforcement of that regulation. There are 265 communities that currently participate in the NFIP; 16 local governments do not participate. In the 1999 report there were 262 NFIP participating communities. Within the past seven years the number of communities participating in the NFIP has increased from 258 to 265. Currently there are over 67,000 flood insurance policies in Virginia for a total coverage for flood damage of more than 9 billion dollars.

DCR's Floodplain Management Program staff provides leadership, training and technical assistance to local governments to ensure that local floodplain programs meet or exceed the minimum standards of the NFIP. The program also supports all floodplain management initiatives within the commonwealth, including initiatives of the U.S. Army Corps of Engineers, NRCS Emergency Watershed Protection (EWP) Program, FEMA's Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance Program (FMAP), and Project Impact.

DCR also administers the Flood Prevention and Protection Assistance Fund (FPPAF). The original intent of the fund was for the commonwealth to provide localities with up to a 50% match for local flood prevention or protection projects or studies. Such projects can include floodplain studies and mapping, structural protection (floodwalls and channel improvements) and buyouts, relocation and/or elevation of repeatedly flood-damaged structures. The FPPAF has been used to support the local cost share of flood prevention and protection projects implemented under FEMA's Hazard Mitigation Grant Program as administered by the Department of Emergency Management.

During 2000, DCR's Floodplain Management Program staff:

- answered approximately 600 technical assistance requests;
- conducted and participated in 8 training sessions, workshops, and conferences on floodplain management;
- conducted 65 community assistance visits; and
- reviewed over 350 applications under the 401/404 Joint Permit Application process, VDOT and Community Block Grant program.

It is significant to note that there were major activities conducted by DCR's floodplain staff as the result of Hurricane Floyd, which were not reported in the 1999 report. Hurricane Floyd made landfall in North Carolina on September 16, 1999 and caused major flooding in eastern Virginia. DCR staff worked with FEMA and other federal and state agencies out of the Disaster Field Office supporting the response and recovery efforts from mid-September through December. A very brief overview of DCR activities in this response and recovery effort follows:

- performed preliminary and secondary damage assessments in 16 communities;
- provided oversight of identifying 900 structures for tertiary assessment and 700 structures for mitigation elevation certificates as part of the HMGP process and;
- conducted numerous meetings on NFIP compliance, floodplain enforcement, flood mitigation strategies and planning for local officials surveyors, home builder associations, insurance agents and other trade and professional organizations involved in the response and recovery efforts.

6. Shoreline Erosion Advisory Service

DCR's Shoreline Erosion Advisory Service (SEAS) promotes environmentally acceptable shoreline erosion control measures to protect private property and reduce sediment and nutrient loadings to state waters. The SEAS Program was expanded in 1993 to provide landowners, local governments, and environmental agencies with technical advice and assistance related to streambank erosion and riparian buffer problems. The program also promotes research for improved shoreline management techniques to protect and enhance Virginia's shoreline resources.

Since creation of SEAS in 1980, DCR has provided technical advice for control of shoreline erosion to more than 6,800 clients. Clients include landowners, local governments, and environmental agencies. During 2000, DCR's SEAS Program completed 285 site evaluations along approximately 38 miles of shoreline. Staff also provided 15 oral presentations regarding the services of the SEAS Program.

7. Public Beach Program

DCR provides technical advice to localities with public beach maintenance and improvement to enhance recreational opportunities for the state's citizens and its visitors. DCR provides staff assistance to the Board on Conservation and Development of Public Beaches (Public Beach Board). The Public Beach Board evaluates the financial needs of localities with public beaches and administers a matching grant fund. The fund provides 50% cost-share to localities to implement projects to conserve, protect, improve, maintain, and develop public beaches. The board provided $1,100,000 in matching grant funds to the following localities:

- City of Hampton
- City of Newport News
- City of Norfolk
- City of Virginia Beach
- Mathews County
- York County
- Town of Cape Charles
- Town of Colonial Beach
- Town of West Point

8. Virginia Adopt-A-Stream Program

DCR is charged under Section 1-105 of *Chapter 1 of the 1998 Special Session I, Virginia Acts of Assembly* to develop and implement the Adopt-A-Stream Program. The program is a statewide litter education and cleanup campaign aimed at promoting citizen-based stewardship of the commonwealth's water resources, while reducing the amount of litter entering Virginia's waterways. It also promotes education, citizen outreach, and community capacity building. The Adopt-A-Stream Program, administered through DCR, began in July of 1998 and has been evolving to include various components, reaching across Virginia to include a very diverse constituency.

During 2000, the Program has experienced substantial growth and expansion. The Adopt-A-Stream Program has evolved to include three main components: adoptions/cleanups, storm drain stenciling, and white goods collection/disposal.

♦ Adoptions/Cleanups - For the year 2000, there have been 58 new local program adoptions of 93 additional miles of stream, river, bay, lake, or ocean shoreline throughout the commonwealth. Along with this, there have been 97 documented cleanup events in 2000. *This has resulted in a grand total of 163 local adoptions, 397 cleaned shoreline miles, and 195 cleanup events throughout the Program's history, since July of 1998.*

♦ Storm Drain Stenciling - The storm drain stenciling component of the Adopt-A-Stream Program has experienced substantial growth. Storm drain stenciling involves spray painting stenciled messages adjacent to storm sewers in order to heighten citizen awareness and educate the public on the relationship between stormwater runoff and nonpoint source pollution. A stenciled storm drain serves as a reminder of the connection between paved surfaces and nearby waterways. S*ince this program subcomponent began in the spring of 2000, there has been a total of 68 storm drain stenciling kits distributed to citizens, neighborhood associations, and other civic groups, and 204 storm drains being stenciled.*

♦ White Goods Collection/Disposal - During this period, a new component of the Adopt-A-Stream Program was initiated, involving the collection of "white goods." White goods collectively refer to any large household appliance, such as refrigerators, hot water heaters, washing machines, clothes dryers, freezers, and stoves. This new addition to the Adopt-A-Stream Program enables citizens to remove appliances, or white goods, that are often carelessly disposed of along streambanks and waterways.

As an innovative approach to implementing this component of the Adopt-A-Stream Program, the Wise County Clean Team was subcontracted to implement the white goods collection/disposal component of the Adopt-A-Stream Program. Funds secured by DCR through the Litter Control and Recycling Fund Advisory Board were transferred to Wise County to pay for the "buy-back" of improperly disposed white goods. A pay-out amount of $10 was established for each white goods item brought to any of the county's nine convenience centers. This served as a financial incentive to enhance citizen participation. The citizens of Wise County have proven the exciting potential of the white goods collection/disposal component of the Adopt-A-Stream Program by conducting two inaugural white

goods collection events. The initial pilot event was held on September 16, 2000, in Wise County, and a second event was held on October 28, 2000. *In total, with both events combined, Wise County was able to collect 1,636 white goods items.*

♦ New Adopt-A-Stream/EASI Partnership - Most recently, DCR has developed a partnership with the Environmental Alliance for Senior Involvement (EASI) and its eight associated Virginia Senior Environmental Corps (SEC). Through embracing the talents of many active seniors in Virginia, DCR will work with seniors, empowering them to carry on the legacy of promoting the stewardship of the commonwealth's water resources through the Adopt-A-Stream Program.

Starting in the middle of January 2001, DCR will conduct a series of training sessions throughout Virginia to train EASI SEC volunteers on the Adopt-A-Stream Program. The intent is to provide active seniors with the necessary skills and knowledge to train others in the community to become more involved with Adopt-A-Stream activities, including conducting cleanup events, storm drain stenciling activities, or simply advocating community stewardship and nonpoint pollution educational awareness.

9. Tributary Strategies

a. Chesapeake Bay Restoration

On June 28, 2000, the Chesapeake Bay Program adopted a new bay agreement, Chesapeake 2000. This agreement will guide the next decade of restoration in the Chesapeake Bay watershed. Signed by the Executive Council – Maryland Governor Parris N. Glendening; Pennsylvania Governor Thomas J. Ridge; Virginia Governor James S. Gilmore, III; District of Columbia Mayor Anthony A. Williams; U.S. Environmental Protection Agency Administrator Carol M. Browner; and Chesapeake Bay Commission Bill Bolling – the agreement contains commitments that will improve water quality and protect living resources in the bay and its tributaries. It is also intended to remove the bay from the federal list of impaired waters by 2010.

The new bay agreement, reaffirms and strengthens Virginia's commitment to tributary strategy implementation. Having exceeded the nutrient reductions goals set forth in the Shenandoah-Potomac Nutrient Reduction Strategy, the focus of bay restoration efforts will be on implementing the Rappahannock, York, and James rivers and the Eastern Shore coastal basin tributary strategies approved by the Secretary of Natural Resources in August. Another important focus of DCR staff will be implementation of a strategy for maintaining the reductions that have been achieved in the Shenandoah and Potomac basin.

b. Shenandoah and Potomac River Basins Tributary Nutrient Reduction Strategy

A milestone has been reached in Virginia's effort to clean up the Chesapeake Bay. Thanks to the efforts of farmers, local governments, conservation groups and others in the Shenandoah Valley, northern Virginia and Northern Neck, Virginia has met the nonpoint source pollution commitments in the *Shenandoah and Potomac River Basins Tributary Nutrient Reduction Strategy* by the Dec. 31, 2000 due date.

After working with local governments, soil and water conservation districts, planning district commissions, agribusiness and grassroots watershed groups, Virginia completed the Shenandoah-Potomac tributary strategy in December of 1996. It was developed as part of Virginia's participation in the Chesapeake Bay Program, a voluntary, cooperative partnership to restore water quality in the Chesapeake Bay watershed and it is part of the commonwealth's commitment to reduce the levels of nitrogen and phosphorus entering the Chesapeake Bay.

The nonpoint source nutrient reduction goals of the strategy called for nitrogen reductions of 3.47 million pounds and 560,000 pounds of phosphorus reductions. DCR tracks nutrient reductions from the use of agricultural best management practices (BMPs), nutrient management planning, erosion and sediment controls and other actions.

Nutrient reduction tracking shows an estimated reduction of 3.6 million pounds of nitrogen and nearly 620,000 pounds of phosphorous has been achieved. The numbers exceed the original goals established in 1996 with the year 2000 deadline. Due to this accomplishment, pollution has been cut by more than one-third from feed lots, farm fields and other similar sources along the Shenandoah and Potomac river basins.

The results indicate that water quality improvements can be accomplished through cooperative partnerships and environmental stewardship between communities and government. Farmers and private landowners contributed more than $6 million of their own money to match state and federal grants, and after seeing the results, many paid the total cost for installation of BMPs.

Table 5. Tributary Strategy NPS Nutrient Reduction Commitments and Achievements

	Nitrogen (lbs.)	**Phosphorus (lbs.)**
Commitments	3,465,621	560,176
Reductions Achieved		
Agricultural BMPs	2,243,080	399,696
Nutrient Management	997,200	127,043
WQIA Special Projects	189,721	48,036
Non-Agricultural BMPs	191,662	44,747
Total Reductions	**3,621,663**	**619,522**

Since 1998, approximately $15 million in state funds (primarily Water Quality Improvement Act funds) and another $5 million in federal funds (Chesapeake Bay Program Implementation Grants and Clean Water Act Section 319 grants) has targeted the reduction of nutrients entering streams from nonpoint sources.

Although nonpoint source pollution comes from various sources, including runoff from agricultural fields, construction sites and commercial and residential lawns, the majority of the nutrient

reductions in the Shenandoah and Potomac River basins were accomplished through reductions in agricultural pollution loads. Soil and water conservation districts throughout the watershed played a major role in achieving the nutrient reduction goals.

Examples of practices used to reach nonpoint source reductions:

- 396,909 acres under farm plans
- 280,000 acres under nutrient management plans
- 228 miles of stream fencing installed
- 20 miles of streambank stabilized
- 25,789 acres of agricultural land retired
- 31,447 acres of grazing land protected
- 422 acres of grass filter strips planted
- 469 animal waste control systems in place
- 725 poultry waste control systems in place
- 105 loafing lot management systems in place
- 1,225 septic systems pumped through pilot programs
- 5,481 acres under erosion and sediment control
- 13 miles of shoreline erosion control measures

In June of this year, the signatories of the Bay Agreement committed to helping achieve the water quality necessary to support aquatic living resources in the bay and its tributaries. This commitment requires Virginia to maintain the reductions that have been achieved and it may require the development of new nutrient reduction goals needed to support living resources within the Shenandoah and Potomac Rivers. A strategy to maintain nutrient reductions achieved through the tributary strategy is currently under development. The strategy will be completed by March 31, 2001.

10. Citizen Water Quality Monitoring

The Department of Conservation and Recreation continued its cooperative efforts with the Department of Environmental Quality and the Izaak Walton League, Virginia Save Our Streams Program to support citizen monitoring efforts, promote appropriate quality assurance and quality control and establish methods for data use and assessment. Together, the agencies and the Save Our Streams Program:

- Support the Citizens for Water Quality, a consortium of approximately 60 citizen monitoring groups;
- Sponsored 2-day Stream Schools for volunteer monitors introducing attendees to the skills, knowledge and abilities needed to effectively monitor Virginia waterways;
- Established the Citizen Monitoring Data Use Matrix, describing state agency use of citizen data; and
- Provide training and assistance in developing and sustaining citizen water monitoring programs.

Planning is underway to develop citizen monitoring councils at various locations throughout the

state. Monitoring councils will collect and provide needed background or baseline water quality data in areas of the state with limited monitoring. This data will be used by state and local agencies and stakeholder groups to address local and state water quality issues.

11. Environmental Alliance for Senior Involvement

The partnership between the Department of Conservation and Recreation and the Environmental Alliance for Senior Involvement is encouraging Virginia's seniors to be more involved in improving the commonwealth's water quality and other environmental projects. Senior Environmental Corps (SECs) have been established in eight locations throughout Virginia in cooperation with a variety of host organizations such as Lynchburg College, Alliance for the Chesapeake Bay, Soil and Water Conservation Districts and local associations of senior persons. AmeriCorps*VISTA positions provide staff to the SECs. Volunteers are in training to promote the Virginia Adopt-A-Stream Program and other efforts in cooperation with the Department of Conservation and Recreation. The program is enabling interested seniors to use their expertise and knowledge in helping and promoting the stewardship of Virginia's natural resources.

12. Virginia Water Monitoring Council

DCR, along with partner agencies, undertook support for the newly formed Virginia Water Monitoring Council. The council, consisting of water monitoring stakeholders in the state, seeks to foster cooperation and exchange of information among groups involved in all types of water monitoring. Stakeholders include federal and state agencies, such as USGS and the Virginia Department of Health, as well as Citizens for Water Quality. As a member of the steering committee, DCR provided funds for the council staff and participated in strategic planning, establishing goals for the organization. The council has begun an inventory of all water monitoring activities in Virginia including state, federal, and local activities, as well as, citizen monitoring efforts. In November, the council, with VA Tech and EPA, sponsored the *VA Water Research Symposium 2000 – Advances in Land and Water Monitoring Technologies and Research for Management of Water Resources*.

13. Conservation Reserve Enhancement Program

The commonwealth's Conservation Reserve Enhancement Program (CREP) and the U.S. Department of Agriculture (USDA) Farm Services Agency (FSA) Conservation Reserve Program (CRP) jointly are targeting $91 million to restore 35,000 acres of environmentally sensitive land along many of Virginia's streams and rivers.

The commonwealth's CREP is intended to enhance the existing USDA CRP, providing financial incentives for agricultural land removed from production for a ten to fifteen year period. The CRP has enrolled approximately 70,000 acres in the program to date, and CREP will enhance the existing program by adding additional landowner incentives for land removed from production, provide

additional funding for landowner implementation of conservation practices and provisions for purchase of dedicated conservation easements for established riparian restoration areas or restored wetland.

Sign-up for CREP began on June 5, 2000, targeting 25,000 acres in the Chesapeake Bay Watershed and 10,000 acres in the Southern Rivers Watershed. CREP will provide an avenue for the installation of stream fencing, alternative water sources, including hardened limited accesses, cropland filter strips and wetland restorations that will have minimum financial impact on agricultural producers. The installation of hardwood tree species within the CREP protected riparian areas will reduce runoff inputs of sediment, nitrogen and phosphorous to surface waters. These plantings will jump-start the return of riparian tree species that provide temperature moderation and large woody debris necessary for benthic macroinvertebrate communities and diverse fisheries. To date, sign-up reveals the following progress:

- Southern Rivers CREP area - 120 contracts approved, covering 983 acres
- Chesapeake Bay CREP area - 81 contracts approved, covering 1,160 acres

14. Karst Groundwater Protection Program

The Karst Groundwater Protection Program operates primarily in the western region of the state where karst terrain is common. Karst is a term for the cavernous, sinkhole-prone topography that develops on top of soluble rocks such as limestone, dolomite, marble, and gypsum. Subtle karst features are present in the Piedmont and Coastal Plain areas; however, the majority of the Valley-and-Ridge region of western Virginia is underlain by karst bedrock, in which groundwater flows relatively rapidly through fissures and cracks that have been enlarged by solution to form nearly 4000 documented caves. Due to the natural permeability of the rocks in this area, the number of people dependent upon groundwater for drinking water supplies, and the exceptional ecological diversity found in western Virginia, the karst region is a worthy target for focused protection and pollution prevention efforts.

a. Overview of WQIF/Section 319 Projects

Products delivered and under development as a part of the Program Enhancement Grant include:

- source water assessment and protection workshops in cooperation with the Department of Health
- brochures on Forestry BMPs for Groundwater Protection, *Sinkholes-Doorway to Your Drinking Water*, and fact sheets on karst resources of the Upper Tennessee River watershed
- model cave and karst resource preserve designs and management prescriptions
- karst field trips for nutrient management planners

- draft sinkhole classification scheme for county site reviewers and nutrient management planners
- karst subsidence database with counties and SWCDs
- BMPs for storm water management in karst areas

b. Karst Program Highlights

The most exciting development in karst education in Virginia was the decision by DCR Director David G. Brickley to fully support Project Underground for fiscal year 2000, including hiring a full-time employee to spearhead Project Underground efforts in Virginia. Prior to this, Project Underground activities were funded, in part, by EPA Section 319 funding.

Other major accomplishments of the Karst Program include the addition of technical staff, as well as the environmental educator, for Project Underground, the curriculum on caves, karst and groundwater for grades K-12. DCR provided essential staff support for the Rockingham County Schools Children's' Groundwater Festival sponsored by DEQ and the Perrier Company, with hopes of encouraging several similar groundwater festivals at the county level next year. Karst staff also promoted the benefits of groundwater monitoring for watershed protection at a workshop for the Virginia Volunteer Monitoring Council.

DCR participated in a joint program with the Tennessee Valley Authority (TVA), the USF&WS, and the Cave Conservancy of the Virginias to clean up a number of sinkhole dumps, and to establish a cost-share program to continue sinkhole clean ups in the watersheds. The Karst Resource Inventory Team, a group of cavers who volunteer their services through DCR, continued it's work in the George Washington and Jefferson National Forest, and contributed greatly to the knowledge of aquatic fauna found in Virginia caves. Karst staff are providing technical support to the State Water Commission's initial study of karst groundwater protection and monitoring needs in the Shenandoah Valley, and to the VA Association of Soil & Water Conservation Districts in the development of a position paper on groundwater protection issues.

15. Cooperative Watershed Initiatives

DCR is charged in assisting in the development of local cooperative NPS pollution programs, in accordance with the Water Quality Improvement Act, Section 10.1-2124.B. of the Code of Virginia, as follows:

> *In order to restore, protect and improve the quality of all bays, lakes, rivers, streams, creeks and other state waters, and to achieve the pollution reduction goals...the Department [DCR] shall assist local governments, soil and water conservation districts and individuals in the control of nonpoint source pollution, including nutrient reduction, through technical and financial assistance...*

Furthermore, in accordance with Section 10.1-2127 A. - C.:

> *The Department [DCR] and a county, city or town...identified as contributing to*

the impairment or degradation of state waters may develop a cooperative program to address identified nonpoint source pollution impairment or degradation, including excess nutrients.

The Water Quality Improvement Act continues by requiring DCR to:

…conduct an assessment of the geographic regions [emphasis added] where water quality is demonstrated to be impaired or degraded as the result of nonpoint source pollution and an evaluation of the basis or cause for such impairment or degradation; and enables DCR and localities comprising all or part of any geographic region [emphasis added]...to develop cooperative programs to address identified nonpoint source pollution impairment or degradation, including excess nutrients.

The purpose of the cooperative NPS pollution programs is to maintain and/or restore water quality standards in stream segments where NPS pollution is a significant loading factor. NPS pollution problems require locally based remedies that address the unique, site-specific, and varied causes of NPS contaminants. Cooperative NPS pollution programs are combinations of programmatic tools and technical and financial resources of varying emphasis used to target water quality impairments in a given watershed and political jurisdiction. A cooperative approach to protecting water quality helps local stakeholders develop their capabilities individually and collectively to address local water quality impairments. The outcomes of cooperative NPS pollution programs have been a combination of existing efforts and new opportunities, which address specific water quality impairments and improvements, supported by the public and the numerous stakeholders.

With this legislative directive, DCR reaffirmed existing partnerships and continued to pursue new relationships through cooperative watershed initiatives. DCR's eight watershed offices aggressively sought to establish and solidify conservation partnerships during 1999 with local governments, state and federal agencies, conservation organizations, volunteers, landowners, and local industries and businesses (see **Table 6** for office locations). To further address implementation of watershed initiatives, DCR has established a ninth watershed office in the Rappahannock River basin.

Table 6. **DCR Watershed Offices**

Office (Location)	***Phone***
? Albemarle, Chowan and Coastal Watersheds (Suffolk)	(757) 925-2468
? James Watershed (Henrico Co./Richmond)	(804) 527-4484
? New River Watershed (Dublin)	(540) 643-2595
? Potomac Watershed (Warrenton)	(540) 347-6420
? Rappahannock Watershed (Fredericksburg)	(540) 899-4463

? Roanoke Watershed (Chase City)	(804) 372-2191
? Shenandoah Watershed(Staunton)	(540) 332-9991
? Upper Tennessee and Big Sandy Watershed (Abingdon)	(540) 676-5529
? York Watershed (Tappahannock)	(804) 443-6752

a. Chesapeake Bay Watershed

(1) Shenandoah - Potomac Watershed

Tributary Strategy -*The Shenandoah - Potomac River Basin Nutrient Reduction Tributary Strategy*, completed in 1996, established nutrient reduction goals for controllable nutrients for the Shenandoah - Potomac watershed. This goal was a part of the Chesapeake Bay Program's multi-jurisdictional objective to achieve 40% reductions in the tributaries with significant effect on the Chesapeake Bay. Through the implementation of the strategy, that NPS goal was achieved by December 31, 2000. The principal nonpoint source pollution management components of the strategy include agricultural best management practices (BMPs) and agricultural nutrient management planning. Agricultural BMPs are implemented through Virginia's Agricultural Best Management Practices Cost-Share Program, administered locally by Soil and Water Conservation Districts. Each of the ten SWCDs in the watershed was assigned nutrient reduction goals based on the projected number of BMP installations. All ten districts have met or exceeded their goals. These goals were achieved through accelerated promotion of BMPs to landowners. Increased funding to SWCDs bolstered installation and technical assistance efforts.

Nutrient management planning in the Shenandoah - Potomac watershed is being accomplished through the combined efforts of the DCR nutrient management staff, local SWCD staff, and private certified nutrient management planners. In addition, two local agribusiness firms are under contract to provide nutrient management planning in the Shenandoah watershed. This multi-pronged approach provides nutrient management planning services to farms that traditionally have not participated in state or federal conservation programs.

♦ Nutrient Cap Strategy - With the completion of the Shenandoah - Potomac River Basins Tributary Strategy, a new process is underway to ensure that nutrient reductions are maintained. This continuation of the Shenandoah - Potomac Tributary Strategy is known as Virginia's *Interim Nutrient Cap Strategy for the Shenandoah and Potomac River Basins*.

The Interim Nutrient Cap Strategy will identify practices, programs, and solutions for capping nutrient loads until the Bay-wide living resource goals are reassessed by 2005. The Interim Strategy will provide options and alternatives for use in developing the *Final Cap Strategy*. Considerations will include methods for tracking load increases, point source/nonpoint source reduction ratios, and nutrient trading options.

Development of the Interim Nutrient Cap Strategy is led by a team of state agencies, Planning District Commissions (PDCs), and representatives from groups such as the Potomac Council, Interstate Commission on the Potomac River Basin and the Shenandoah Valley Pure Water 2000 Forum. The Potomac Council consists of one Director from each of the six SWCDs in Virginia's portion of the Potomac watershed and DCR's Potomac Watershed Manager. DCR and DEQ staff coordinate this team.

The Interim Nutrient Cap Strategy steering committee met five times and established the process and direction for the Interim Cap Strategy. The steering committee determined that the Interim Cap Strategy would be developed through a local approach. Several types of meetings were conducted throughout the Shenandoah and Potomac watersheds to solicit input. The meetings included three "kick-off" meetings for elected officials and ten focus group meetings with local governments, SWCDs, and water utilities. In addition, three meetings were conducted in October 2000, for community watershed and environmental groups, agricultural businesses and interest groups, and business associations. The Interim Cap Strategy is being drafted based on input received at the meetings.

- Watershed Conservation Roundtables - *Shenandoah Watershed*

The *Shenandoah Valley Pure Water 2000 Forum* serves as the watershed conservation roundtable for the Shenandoah watershed. The membership of this organization reflects the interests of business, local government, state and federal agencies, and agriculture and environmental groups. The Pure Water 2000 Forum hosted and facilitated three local focus group meetings for the Interim Cap Strategy process. Additionally, the Pure Water 2000 Forum has partnered with DCR on several educational initiatives.

- Watershed Conservation Roundtables - *Potomac Watershed*

The *Potomac Watershed Roundtable* was launched at the first ever *Potomac Watershed Forum*, held on August 25, 2000. The forum was sponsored by the Potomac Council, DCR, and DEQ. Nearly 300 local government officials, planners, conservation leaders, and concerned citizens met at George Mason University to discuss water quality issues in the Potomac basin. Nonpoint source pollution was a major topic of discussion.

The Potomac Watershed Roundtable held its first formal meeting on September 27, 2000, at George Mason University. The Roundtable seeks to broaden participation to include all major stakeholders in the Potomac River basin. The Roundtable is made up of elected local officials, SWCDs, agencies, PDCs, industrial and municipal point source dischargers, boating and fishing interests, agribusiness, developers, and environmental community leaders.

Early discussions will focus on developing the Interim Nutrient Cap Strategy. Then, the roundtable will address what manner the implementation of the Cap Strategy can contribute to the ongoing efforts to remove the tidal portions of the Potomac and the Chesapeake Bay from the federal impaired waters list.

♦ Total Maximum Daily Loads - Virginia's first completed Total Maximum Daily Load (TMDL) study was completed on Muddy Creek in the Shenandoah watershed. In addition, a TMDL Implementation Plan is being developed for the Muddy Creek watershed. Since then three additional TMDL studies have been completed in the Shenandoah and Potomac watersheds. Currently five TMDL studies are under development. An important component of the TMDL process has been public participation. The Virginia Farm Bureau, SWCDs, and the Shenandoah Valley Pure Water 2000 Forum have been instrumental in facilitating public participation in the TMDL development process as well as development of implementation plans.

(2) Rappahannock Watershed

♦ Tributary Strategy - Rappahannock stakeholders who participated in the development of the *Rappahannock River Basin Nutrient Reduction Tributary Strategy*, are taking on a new role to assist in its implementation. These stakeholders, led by the Rappahannock River Basin Commission and the Rappahannock Conservation Council, will provide a critical link between state agencies and landowners.

The Commission and the Council jointly sponsored the *Third Annual Rappahannock River Basin Summit* in August 2000, with approximately 130 stakeholders attending. To complement previous informational efforts, the 2000 Summit was more interactive, allowing participants the format to provide feedback on barriers and opportunities toward implementing the Rappahannock Strategy.

To assist implementation of the Rappahannock Strategy, Agricultural BMP Cost-Share Program funds will be targeted to areas and programs of a high priority in the Rappahannock Strategy. DCR allocated funds to the seven Rappahannock SWCDs for implementation of BMPs identified in the Rappahannock Strategy.

♦ Local Cooperative Efforts - To promote public awareness of the Rappahannock Tributary Strategy and to encourage public education programs, DCR awarded EPA project funds to conservation groups, watershed organizations, and local communities. The EPA funds are being allocated by DCR as seed money to encourage capacity building within stakeholder organizations and to develop public outreach campaigns. DCR issued a Request for Proposals to more than one hundred representatives of local governments, SWCDs, and nonprofit organizations. Nine projects were funded, offering a wide variety of activities, from a television marketing campaign to formation of a regional stormwater management ordinance workgroup.

♦ Total Maximum Daily Loads - DCR and DEQ are working cooperatively on TMDL projects in the Rappahannock watershed. DEQ is finalizing the Mountain Run TMDL study in Culpeper County. Once completed and approved, DCR and DEQ will hold public meetings to develop and carry out an implementation plan. In addition, a pre-TMDL monitoring study is being conducted on Thumb Run in Fauquier County. This is a cooperative effort between DEQ, DCR, Rappahannock - Rapidan Regional Commission, and local stakeholders.

(3) York Watershed

♦ Watershed Conservation Roundtable - The *York Watershed Forum* held its kickoff meeting on June 29, 2000, in Ashland. Subsequent quarterly meetings were held on September 22, 2000, in Yorktown, and on December 14, 2000, at Lake Anna State Park. Representatives from DEQ, the Chesapeake Bay Local Assistance Department (CBLAD), the Department of Forestry (DOF), PDCs, local governments, SWCDs, and some point source dischargers in the watershed have attended these meetings. Forum meetings are co-hosted by the York Watershed Council, SWCDs, and DCR.

Invitees to the York Watershed Forum and other stakeholders were surveyed prior to the June kickoff meeting. Results revealed that in addition to general surface and ground water quality issues, stakeholders in the York watershed have a particular interest in Total Maximum Daily Load (TMDL) studies and water quality strategies. During 2000, the Forum also began to explore other issues identified in the stakeholder survey, such as minimum in-stream flow and water supply.

♦ Tributary Strategy - The *York River Basin Nutrient Reduction Tributary Strategy* was completed in February 2000. This Strategy seeks to reduce oxygen deficient water, or anoxia, by 47%, and to increase the density of submerged aquatic vegetation by 39%, by the year 2010. During December 2000, a research team from Virginia Institute of Marine Science, contracted by DEQ via a special budget allocation from the Virginia General Assembly, solicited input from the Forum on the design of a water monitoring study to address concepts incorporated in the York Tributary Strategy.

The Forum spent much of its time during 2000 on the first year of implementation of the York Tributary Strategy. The York Watershed Forum will continue to become better informed about the issues that will be relevant to the revision of the York Tributary Strategy in 2002, per the Chesapeake Bay 2000 Agreement. An emerging consensus on environmental endpoints was presented by the Chesapeake Bay Water Quality Steering Committee in December 2000. These endpoints will be the basis for future load reduction targets in each of the tributaries. Once the endpoints and resulting load reduction targets have been finalized, revision of the Tributary Strategy can take place in 2002. The revised York Tributary Strategy will be the principal work product of the Forum through 2002.

(4) James Watershed

♦ Watershed Conservation Roundtables - DCR staff worked with SWCDs in the James watershed to form three Watershed Conservation Roundtables for the Upper, Piedmont, and Lower James River. The *Upper James River Roundtable*, sponsored by the four SWCDs in the upper basin, met in May and September 2000. The May meeting focussed on identifying issues of concern in the Upper James watershed. The second meeting of the Upper James Roundtable focussed on identifying additional issues and generating a draft vision statement for desirable conditions in the Upper James River basin in 2010. Additional meetings are planned for 2001.

The *Piedmont James River Roundtable*, coordinated by the 11 SWCDs in the central area of the basin, met in September 2000. Speakers provided background information on conditions in the basin. Meeting participants focused on identifying issues of interest. Additional meetings are planned for 2001.

DCR, four SWCDs, localities, and the Hampton Roads Planning District Commission (HRDC) have been working together in the Lower James River watershed. The HRPDC is under contract to establish and facilitate the *Lower James Watershed Roundtable*. HRPDC has established a stakeholder group and the initial meeting of the Lower James Roundtable is planned for January 2001. The current focus of the Lower James Roundtable is the development of a viable implementation plan for the *James River Basin Nutrient Reduction Tributary Strategy*. Other interests include coordinating local, state and federal resources to benefit the environmental viability of the lower James watershed and its inhabitants.

♦ Tributary Strategies - Four public meetings were held across the James River basin between January and March, 2000, to present the draft *James River Basin Nutrient Reduction Tributary Strategy* goals to the public and solicit comments. Following these meetings, the Strategy was revised based on comments received at the meetings. The Secretary of Natural Resources approved the reduction goals for the James watershed in August 2000. The approved goals are to achieve a 9% sediment reduction, implement biological nutrient removal (BNR) at point sources and an equivalent reduction in nonpoint sources by 2010, and cap nutrient loadings.

It is expected that the recommended nutrient and sediment reduction goals for the James River will be re-evaluated in several years to accommodate improvements to the modeling tools and better integration of the TMDL program goals with the living resource based goals of the Chesapeake Bay Program.

♦ The James River in the 21st Century Conference - On November 17, 2000, a conference entitled "The James River in the 21st Century: A Watershed in Transition" was held at Lynchburg College. The conference, sponsored by the James River Association, Lynchburg College School of Sciences, DCR, SWCDs, and the James River Basin Association, was the fifth in a continuing series to focus on water resources issues facing the river. Former Delegate Tayloe Murphy gave a keynote address in the morning, followed by a water resources panel that examined water supply and planning concerns throughout the basin. The Honorable Secretary of Natural Resources John Paul Woodley, Jr., addressed the conferees at lunch, followed by an afternoon panel discussion of water quality in the James River basin. The conference provided an important opportunity to share information among stakeholders from across the basin and to examine issues at a basin-level scale.

♦ Local Cooperative Efforts - Local partners accomplished significant progress in 2000. Recent events include the signing and commitment of numerous local, state and federal stakeholders to the sediment cleanup within the Elizabeth River. This effort, headed by the Elizabeth River Project and the Army Corp of Engineers, has engendered unprecedented cooperation and coordination with many state agencies including DCR and DEQ, the Cities of Norfolk, Portsmouth and Virginia Beach, as well as several more local civic and community groups. Within this watershed at least two new Community Watershed Organizations have been organized through support of DCR and other partners.

DCR coordinated with the Chesapeake Bay Program and the University of Virginia's Institute for Environmental Negotiation (IEN) to identify a local watershed in the middle portion of the James River basin in which a Bay Program-sponsored local watershed planning project could be undertaken.

IEN, in partnership with a local coordinating committee, is developing a community watershed forum for the Rockfish River in Nelson County. The goal of the forum is to involve community members in developing a plan to improve the health of the Rockfish River and the Chesapeake Bay watershed, and ultimately the quality of life of local residents. The community will create a local implementation plan for protection and restoration of the Rockfish watershed by: identifying environmental values important to the community; learning about innovative tools to protect, manage, and monitor the watershed; and devising strategies for protecting the watershed's social, cultural and environmental resources. A forum for local stakeholders is planned for early February 2001.

With technical assistance provided by DCR, a number of localities established, reviewed, and/or revised storm water and erosion and sediment control ordinances.

b. Southern Rivers Watersheds

(1) Big Sandy Watershed

♦ Big Sandy Tri-State Watershed Coalition - The *Big Sandy Tri-State Watershed Coalition*, consisting of Virginia, West Virginia and Kentucky, has several efforts underway. The Third Annual Big Sandy Conference was held in West Virginia where the "paddle was passed" from agency to stakeholder support. A strategic planning session was held in May to plan future activities in the watershed and the Coalition is developing bylaws and establishing an organizational structure. Plans are underway to have a fourth Big Sandy Conference during the spring of 2001, probably in Kentucky, since Virginia hosted the event in 1999.

♦ Local Watershed Initiatives - A new Soil and Water Conservation District was approved by the Soil and Water Conservation Board for the Big Sandy watershed during 2000. The Big Sandy SWCD is scheduled to be certified by July 1, 2001, marking a step forward in local efforts to address water quality and other resource issues. Work continued on the Pound River Study, a joint effort to obtain preliminary data for future implementation efforts. A WQIF grant to the Lonesome Pine SWCD for the Levisa River in Buchanon County built on newly developed local partnerships within the district and county. Many meetings were held with the Board of Supervisors in each county in the watershed to explain and promote watershed management in the Big Sandy and its importance to local governments and citizens.

(2) Upper Tennessee Watershed

♦ Upper Tennessee River Roundtable - During 2000, the *Upper Tennessee River Roundtable* (UTRR) undertook and completed a number of important activities furthering local leadership on resource management issues. The UTRR met at the Southwest Virginia Higher Education Center in October for their fourth Roundtable meeting, officially "passing the baton" of leadership to the citizens. Approximately 80 people attended the meeting including a wide range of stakeholder representatives and agency partners such as the Resource Conservation and Development Councils. Dr. Ed Davis, Professor of Geology and Environmental Studies at Emory and Henry College chairs the UTRR

Executive Board and served as Master of Ceremonies for the meeting. Attendees were positive regarding accomplishments of the Roundtable to date and encouraging with respect to activities planned for the future.

A major step leading up to the "passing the baton" event was the strengthening of the UTRR organization through creation of an Executive Board and an Organization Coordinating Group. At the same time several committees were established to address grants, planning, program, public outreach and legislation. These committees met throughout the year to establish parameters for serving the Roundtable and to discuss potential funding requests. The UTRR Executive Board has met several times to follow through on issues, ideas, and assignments generated at the Roundtable meetings.

Public outreach activities were important to the UTRR during 2000. The UTRR newsletter was established and published twice during the year to complement the communication efforts begun with the UTRR web site. A Communication Matrix was developed by the Roundtable to promote understanding of responsibilities among the involved agencies. This and other UTRR materials are available on the web site. A UTRR logo was developed and publicized through promotional tee shirts. In addition, the UTRR received excellent coverage in the news media with numerous in-depth articles and special segments on the local television stations. Representatives of the UTRR met with a wide range of community groups including Lions Clubs, Emory & Henry College, "Teach the Teachers" training sessions and Boards of Supervisors.

Upcoming for 2001 is the possibility of a bi-state partnership (Tennessee and Virginia) on issues of concern for the Upper Tennessee watershed. The next Upper Tennessee River Roundtable meeting is scheduled for spring 2001.

- Upper Tennessee River Watershed Strategic Plan - The *Upper Tennessee River Watershed Strategic Plan*, published in October, was developed by the UTRR through a series of 50 public strategic planning sessions. The plan reflects a bottoms-up, grassroots development process, which assessed available water information and identified specific steps to improve or conserve the watershed waterways. Twenty broad categories are addressed such as water supply, agriculture, mining, recreation and education. Resource professionals in each of the categories assisted with strategy development. The plan includes general cost to implement for each category and strategy and suggests a responsible agency or organization for each strategy. The strategic plan will form the basis for future efforts of the UTRR.
- Local Cooperative Efforts - A number of projects continued implementation during 2000. The Guest River Restoration project combines efforts of the Lonesome Pine SWCD, the Wise County Clean Team and Wise County Health Department, among others. Special studies were conducted on Straight Creek and Lick Creek to prepare for future restoration efforts. The USFWS. DEQ, DCR, The Nature Conservancy, SWCDs, Resource Conservation and Development Councils, local colleges and others cooperated on a number of efforts addressing septic system problems, karst topography protection, riparian restoration and illegally dumped household appliances. Furthermore, citizens in 22 of 38 sub-watersheds in the Upper Tennessee watershed formed watershed groups to begin cooperative efforts in their neighborhoods.

(3) New River Watershed

♦ American Heritage River - The *New River American Heritage River Program* is serving as the focus for the *New River Watershed Roundtable*. The American Heritage River Program is an on-going basin-wide effort with strong grassroots support in Virginia, North Carolina and West Virginia. These efforts are serving as the building blocks for the *New River Strategic Plan in Virginia*. The New River watershed initiative in Virginia includes numerous cooperative efforts with stakeholders to promote better water quality and reduce nonpoint source pollution, including the Board of Directors of the New River Community Partners and numerous work groups. The *Second Annual New River Watershed Conference*, sponsored by the Honorable Congressman Rick Boucher, brought together local stakeholders under the American Heritage Rivers program. The Interagency Environmental Health Task Force, a work group of the New Century Turning Point effort initiated by DEQ and DOH, is working to promote interagency cooperation and data sharing related to resource issues in the New River basin.

♦ Local Cooperative Efforts - NPS pollution program priorities in the New River watershed are focused on conserving the tributaries with good water quality as well as improving the impaired ones. Since the New River is rated by DEQ as one of the cleanest watersheds in Virginia, conservation easements are important to river preservation. Conservation easements for streambank protection are considered the most permanent practices to conserve clean water. In addition, ecosystem-based management to support conservation goals in land use planning and ecotourism with local governments and developers is an important strategy for the watershed.

A number of interagency NPS pollution management efforts were underway during 2000. Efforts such as the Reed Creek Riparian Restoration Project, the New River Blueway Development, the Wilson Creek Endangered Log Perch Project, the New River All-Hazards Mitigation Plan, the New River Reconnaissance project, Landowner Conservation Easement Workshops, and the New River Controlled Grazing Project brought together a wide range of local, state and federal agencies to conserve and promote the New River.

(4) Roanoke River Watershed

♦ Roanoke Basin Commission - A *State Water Commission Subcommittee* is currently studying the formation of a Roanoke Basin Commission. The subcommittee discussed a current U.S. Army Corps of Engineers Section 216 study and the Corps' interest in supporting the basin water resources management study. In addition, the subcommittee reviewed the Rappahannock Basin Commission enabling legislation and concluded that it provided a good model for the Roanoke watershed. The proposed legislation includes: drought management; River Basin Commission standing with the State Water Control Board; River Basin Commission appointment of out-of-state members to the basin advisory committee; and appointment of Congressman within the basin to the member list.

♦ Total Maximum Daily Loads - The first public meeting on the development of the *TMDL Implementation Plans* for four segments of the Blackwater River took place October 26, 2000, in

Rocky Mount. The purpose was to develop for public involvement in shaping the implementation plans. Stakeholders were recruited to participate in focus groups that will play a key role in ensuring local input to develop a practical work plan. Focus groups and the steering committee started meeting in November. The next general public meeting will be in May 2001.

♦ Roanoke Summit and Watershed Conservation Roundtable - On July 25, 2000, Virginia Delegate William W. (Ted) Bennett, Jr., in cooperation with Representative Jim Crawford of North Carolina and the Roanoke River Basin Association, conducted a meeting of all stakeholders in South Boston, Virginia. This meeting was called the *Roanoke Summit*. The focus of the Summit was to determine the feasibility of establishing a permanent watershed-based, unified entity to facilitate planning and coordination of water resources in the Roanoke River Basin. More than 190 stakeholders attended the Summit and the three most important issues currently facing the basin were identified as water quality, interbasin transfer, and water quantity.

The *Roanoke River 2000 Strategic Watershed Conference* was held on September 8, 2000, at Explore Park near Roanoke. Delegate Ted Bennett, Jr., was the keynote speaker; other attendees included County Board of Supervisors, SWCDs, community watershed organizations, agencies, and academic institutions. As a result of this conference 11 people indicated an interest to participate on a steering committee to form the *Roanoke River Roundtable*. The Steering Committee met in early December to determine the direction and composition, and to establish an action plan for the Roundtable.

(5) Albemarle and Chowan Watersheds

♦ Albemarle-Pamlico National Estuary Program and the Watershed Conservation Roundtable - DCR is actively working with the *Albemarle-Pamlico National Estuary Program* (APNEP) to coordinate nonpoint source pollution management efforts within the shared watersheds. DCR is the liaison between the APNEP staff, the Pasquotank Regional Council and the Chowan Regional Council in North Carolina, and Virginia Watershed Conservation Roundtables.

In support of this collaborative effort, Virginia and North Carolina have been in negotiation for a Memorandum of Agreement regarding APNEP. The APNEP MOA focuses on information sharing and coordination of NPS pollution management programs in order to, where feasible, achieve mutually compatible water quality goals. The APNEP MOA was accepted by the APNEP Executive Council and is currently under review by DCR. It is anticipated that an agreed upon MOA will be signed in 2001.

♦ Southern Watershed Area Management Plan -Within the Albemarle watershed, the Cities of Virginia Beach and Chesapeake in conjunction with DCR, Hampton Roads Planning District Commission, and other local, state, and federal agencies are cooperatively coordinating efforts through the Southern Watershed Area Management Plan (SWAMP). The SWAMP is intended to improve coordination of management efforts in the Southern Watershed Area and to develop new and enhanced management tools. A Multiple Benefits Conservation Plan (MBCP) is under development for the watershed. In support of these efforts, an Information Exchange MOA is currently under review by the

Multiple Benefits Conservation Plan Technical Advisory Committee.

(6) Eastern Shore (Bay and Atlantic Coastal)

- Activities within the Eastern Shore's Bay Coastal watersheds have rapidly expanded over the last year. An extensive SAV monitoring program has been launched to support several nonpoint source initiatives to include the *Eastern Shore Tributary Strategy*. Further, in cooperation with DCR, the Northampton-Accomack PDC and local interest groups, the Eastern Shore Soil and Water Conservation District has instituted the Eastern Shore Watershed Network. This Network is designed to share information among the broad spectrum of conservation partners on the Shore as well as coordinate activities, initiatives and resources. These efforts have been supported and financed primarily through DCR.

- Other activities on the Eastern Shore include the development of a locally supported *Watershed Assessment Plan* for Sandy Bottom Branch, a TMDL listed waterway. This effort, funded through DCR, has identified the process, protocol and partners needed to identify the impairment source and subsequent restoration plan implementation for Sandy Bottom Branch. Implementation of the Plan will be focused on the de-listing of the impaired waterway prior to the identified TMDL development date of 2004.

B. Cooperative Programs Administered by Partner Agencies

1. Department of Environmental Quality (DEQ)

a. Total Maximum Daily Load (TMDL)

The DEQ is the lead agency in the TMDL process administering the public participation, technical review, and formal submittals to EPA and Virginia State Water Control Board for approval. DCR and DMME have signed Memoranda of Understanding with DEQ agreeing to a cooperative effort in the TMDL and Implementation Plan development process. The Virginia Department of Health has agreed to participate in this cooperative effort for impaired shellfish waters.

Virginia needs to develop 648 TMDLs on 600 impaired waters. This includes:

- 295 TMDLs for waters identified in the DEQ's 1998 303(d) list,
- 260 shellfish waters identified in DEQ's 1998 303(d) List,
- 18 waters from EPA's additions to Virginia's 303(d) List, and
- 75 impaired waters expected to be added to the 2002 303(d) List.

This number of impaired waters most likely will change in the future based on changes in water quality standards, EPA listing guidance, de-listings, and changes in water quality conditions.

Currently, contracts have been awarded for the development of 35 TMDLs. EPA has approved 2 of these TMDLs and 12 others are under review by EPA. These TMDLs meet the 1999

and 2000 Consent Decree schedules. The other TMDLs currently under contract are being developed to meet the 2002 schedule. This leaves 613 TMDLs still to be developed by 2010.

A report has been prepared for the Governor and General Assembly in response to Item 415.F.1 of the 2000 Appropriations Act, that directed DEQ to develop a comprehensive plan for implementation of the Total Maximum Daily Load (TMDL) program through 2010. Included were projected costs for developing 353 TMDLs and Implementation Plans. The costs for developing TMDLs for the 260 shellfish waters are not included because neither EPA nor DEQ have yet developed the appropriate methodology for this type of TMDL. Based on state agency experience with developing TMDLs to date, the projected cost of developing the 353 TMDLs is estimated at $59.1 million over this ten-year period. This estimate includes additional positions to meet the increasing workload of the TMDL program. Total State and Federal funds available to the three state agencies for this same period leave a deficit of $40.8 million if no additional funds are provided to the TMDL program.

DEQ, DCR, and DMME are investigating options for financing and administering the TMDL program. These include: alternate funding sources, a rulemaking proposing the development of a TMDL Planning regulation, and a re-examination of Virginia's Water Quality Standards.

b. Confined Animal Feeding Operation (CAFO)

The VPA general permit for confined animal feeding operations, which became effective November 16, 1994, is mandated by 62.1-44.17:1 of the *Code of Virginia*. It is applicable only to the management of animal wastes at confined animal feeding operations having 300 or more animal units and utilizing a liquid manure collection and storage system. These are typically swine and beef cattle feeding operations and dairies.

The 1999 General Assembly enacted Section 62.1-44.17:1.1 in the State Water Control Law requiring a poultry waste management program for confined poultry feeding operations. This legislation defined a confined poultry feeding operation as an operation with 200 or more animal units. This animal unit number equates to 20,000 chickens and 11,000 turkeys, regardless of age or sex. In 2000, the State Water Control Board adopted a second VPA general permit regulation that authorizes management of poultry waste at these operations.

The general permit regulations establish requirements for registering under the general permit and requirements for the design and operation of the animal feeding operations. Both of these general permits require all regulated pollutant management activities to operate without having a point source discharge of pollution to state waters, except in the case of a storm event greater than the 25-year, 24-hour storm. The permittees are also required to develop a nutrient management plan approved by the Department of Conservation and Recreation.

Table 7 provides information on the types of animals, number of farms, and number of animals covered by general permits.

Table 7. General Permit Coverage

Animal Type	# Farms	# Animals

Dairy	61	23,536
Beef	13	8,776
Swine	57	344,809
Poultry	est. 1300	est. 290,000,000

2. Virginia Cooperative Extension (VCE) NPS Pollution Control Education Program

DCR, with the cooperation of other state agencies, conducts a comprehensive NPS pollution control education program. This program provides brochures, publications, press releases, presentations and other support to the public as well as to adult and youth audiences. Working with Virginia Cooperative Extension, DCR targets NPS pollution educational programs to farmers, landowners, land managers and 4-H youth. These programs are cooperatively sponsored with Soil and Water Conservation Districts, NRCS, VCE and DCR. Outreach efforts focus on agricultural and urban field days, demonstrations, tours, workshops, seminars and other means of reaching those persons who have potential to impact water quality through land management activities.

♦ From July 1, 1999 through June 30, 2000 approximately 24,900 soil samples were analyzed by the Soil Testing Laboratory for an estimated 6,225 farmers and agribusiness personnel. Approximately 16,600 soil samples were analyzed for an estimated 4,150 individuals/businesses in the non-agricultural sector. Reports included recommendations on proper fertilizer and lime use to minimize losses to groundwater and surface water.

♦ A Virginia Tech Extension Specialist in Agricultural Economics developed a concept plan for poultry litter for grain exchange program for Virginia. The exchange would involve over 50,000 tons of litter and two million bushels of corn. Corn producers would increase their income by $2.5 million and poultry litter would be utilized in an environmentally friendly way.

♦ Through participation in Virginia Cooperative Extension workshops, 50 eastern Virginia irrigators became more aware of management decisions that will improve profit margins through savings in time, water and energy while also reducing environmental liability.

♦ 25 dairy producers received training on how to implement and use dairy advisory teams to help reduce potential pollution of the Blackwater and Shenandoah Rivers by decreasing the amount of phosphorus added to lactating dairy cattle diets. Advisory team training was provided to 52 dairy producers, nutrition consultants and herd veterinarians.

♦ Virginia Cooperative Extension conducted training for 363 feed manufacturers, nutrient management consultants, and agricultural advisors on the use of the phytase enzyme in swine feeding programs to reduce phosphorus excretion in swine manure.

- A survey of corn, soybean and small grain farmers participating in one or more of the 12 years of the Virginia Cooperative Extension Five County Agricultural Conference for producers in King and Queen, King William, Essex Middlesex and Caroline counties showed that 58% of the farmers had eliminated unnecessary fertilizer or pesticide inputs; 68% of the farmers had taken extra precautions in protecting themselves and the environment from pesticides 58% of the farmers had increased their income through better marketing or use of government programs; 58% of the farmers had eliminated unnecessary tillage practices; and 68% of the farmers had switched to improved crop varieties.

- 32 farmers and citizens in the Shenandoah Valley have become more aware of the impacts of agriculture on water quality by monitoring the quality of water in their watersheds after receiving training in the use of simple water quality monitoring kits.

- Through 5 workshops, extension specialists provided information to 220 agribusiness professionals and state regulatory officials on principles and practices of soil testing and plant analysis to improve crop productivity with a focus on enhancing water quality.

- The Henrico County BaySaver program was initiated in cooperation with the local Soil and Water Conservation District. More than 90% of the individuals contacted completed a simple survey about their water quality practices. Of the individuals who completed the survey, more than 75% indicated that they had adopted one or more of the recommended practices.

- Extension specialists worked cooperatively with personnel to develop and deliver mandatory Virginia Pollution Abatement Facility Operator Training to over 175 livestock producers (permit holders) statewide.

- A pre-sidedress nitrate soil test for corn was conducted on 24 cornfields by Orange County Extension. Eight out of the 24 fields were determined to be satisfactory, which resulted in a saving of 18,000 pounds of nitrogen not being applied because of the test.

- The 3rd Annual Poultry Production and Nutrient Management Symposium was organized and coordinated in Rockingham County. The topics covered during the symposium included balancing agricultural productivity and environmental productivity, an overview of the regulation and general permit requirements, a comparison of nitrogen and phosphorus based nutrient management plans, the fate of phosphorus in agriculture and the environment and an introduction to the phosphorus index.

- DCR coordinated a mini-grant program that funded outreach educational efforts conducted cooperatively by VCE, DCR, SWCDs and federal partner agencies. Over 60 demonstrations, field days, tours, workshops and other events reaching over 8,000 farmers, landowners, land managers and others were held for the purpose of promoting the implementation of BMPs to protect water quality.

3. Virginia State University (VSU)

Virginia State University is one of the two Land Grant universities of the Commonwealth of Virginia. Its mission is to promote and sustain academic programs that integrate instruction, research, and extension/public service in a design most responsive to the needs and endeavors of individuals and groups within its scope of influence. The University provides bachelors degrees in many areas and masters degrees in selected areas. Its overall goals are: to foster intellectual and personal development of students; to provide well-rounded liberal art education; to develop in students the mastery of fundamental knowledge in various academic areas of their choice; and to prepare students for furthering their studies at the graduate level by providing them knowledge, skills, and abilities.

The University has a strong agricultural research program in the areas of nutrient management, pesticides, horticulture, crops, meat-goat, and aquaculture. Except for the aquaculture research, which is operated by the University=s Cooperative Extension scientists, the rest of the program is under the Agricultural Research Services (ARS). The ARS is an independent department within the School of Agriculture, Science and Technology. It functions under a separate Director and operates closely with the Cooperative Extension to distribute research results to stakeholders throughout the Commonwealth. Research in the environmental field includes land application of confined animal manure, with special emphasis on nitrogen and phosphorus mobility; atrazine sorption and fate in agricultural soils and tidal river sediments; wetlands and riparian buffer establishment, and development of best management practices (BMPs) for nutrients, pesticides, and land application of confined animal manure.

Virginia State University looks forward to building a research, implementation, and outreach collaboration with Virginia Department of Conservation and Recreation (DCR), especially in area of nutrient management through the NPS pollution (EPA=s 319) program.

4. Division of Mines, Minerals and Energy (DMME)

The Department of Mines, Minerals and Energy's (DMME) Division of Mineral Mining (DMM) is responsible for: a.) regulating mineral mining and reclamation activities, and b.) reclaiming orphaned mineral mine sites in Virginia. The work accomplished by the Orphaned Lands Program in DMME/DMM encompasses three broad areas:

- inspection and survey of identified abandoned mineral mine sites,
- design of reclamation plans for abandoned mine sites, and
- administration of contracts, under Virginia procurement law, to construct the reclamation designs.

Since 1981, 583 acres of orphaned mineral mine land has been reclaimed on 76 sites in Virginia by DMME/DMM. The total value of contracts bid for orphaned mineral mine reclamation is $2,523,588.00 through Year 2000. There are approximately 3000 abandoned mineral mine sites in Virginia and DMME/DMM has completed inventories on 255. The sites occur in all geographic provinces and some have histories that extend to pre-Revolutionary War times.

The Virginia WQIF and 319 funds from the CWA support the work of the Orphaned Land Program. In 2000, the 319 grant to DMM supported the Non-point Source (NPS) coordinator

position and was responsible for completing inventory of Hydrologic Units B55, B57, A03, and A11 in Virginia. The NPS coordinator also completed the design and permitting process for reclamation of the Valzinco Mine in Hydrologic Unit F09 of the York River basin. This watershed is impaired from the development of acid mine drainage at various mines occurring along the banks of the watershed channel. Valzinco Mine occurs in the headwater area and contributes various heavy metals to the water column from acidification of mine spoils in a geologic environment void of alkalinity. The NPS coordinator also participated in reclamation contracts for 4 mine sites in Virginia located in Hydrologic Units H34 and L22. The reclamation projects covered 7 acres of land, cost $107,300.00, and resulted in the abatement of excess sediment transport through the respective watersheds as well as protection of ground water supplies.

For additional information, contact NPS Coordinator at DMME/DMM, Robert G. Sobeck, Jr., phone number (804) 951 6318, or e-mail to rgs@mme.state.va.us.

5. USDA Natural Resources Conservation Service (NRCS)

a. Environmental Quality Incentive Program (EQIP)

The EQIP Program was established in the 1996 Farm Bill and combined four USDA cost-sharing assistance programs into one that was more environmentally oriented. EQIP is now USDA's major cost-share assistance program for the installation of best management practices. It directs federal resources toward state and locally identified natural resource problems. In Virginia, the focus continues to be water quality issues.

The total allocation for Virginia for fiscal year 2000 was $2,262,312. Of this total, $1,525,245 was directed toward designated priority areas. A total of $43,000 was used for education assistance within these priority areas and $1,482,245 was used for cost-share. The USDA State Technical Committee selected the following priority areas after evaluating 19 proposals from local working groups at the county level. The top six watershed proposals were approved for funding. These were:

- Beaver Creek - $203,192 (Washington County)
- Dan River - $195,975 (Patrick County)
- Hawksbill Creek - $299,102 (Page County)
- Nansemond River - $196,756 (Isle of Wight County and Suffolk City)
- North Fork Holston River – $409,328 (Bland, Smyth and Tazewell Counties)
- North Landing River - $220,892 (Chesapeake and Virginia Beach Cities)

The following are highlights of some of the conservation practices installed this year in these EQIP priority areas:

- Cover Crop – 9,961 acres for $111,933
- Fence – 318,067 feet for $365,574
- Nutrient Management – 7,630 acres for $83,176
- Pasture and Hayland Planting – 507 acres for $63,561

- Pipeline – 131,052 feet for $147,494
- Water Troughs or Tanks – 202 for $124,412
- Waste Storage Facility – 10 for $223,983
- Waste Management Systems – 4 for $80,833
- Wells – 32 for $93,412

EQIP cost-share funds totaling $737,067 were also provided to address water quality concerns through a statewide sign-up. The Farm Service Agency administers the program and the Natural Resources Conservation Service provides the technical assistance for planning and conservation practice application. The statewide concerns addressed by the program were: (1) animal waste, (2) excessive cropland erosion and (3) improper grazing land management. The environment benefits evaluation process for Statewide Concerns was focused to hydrologic units with identified water quality concerns.

EQIP is a unique cost-share program in that it utilizes a long-term contract between USDA and the landowner. Applications that are approved begin with a complete conservation plan detailing what conservation practices are needed on all land offered. After this plan is complete, a 5 to 10 year contract is prepared. The practices are then installed over the life of the contract using the cost-share funds that were obligated to the contract. More than 170 contracts were developed during FY-2000.

For more information, contact Ken Carter, State Resources Conservationist for NRCS at (804) 287-1663.

b. Small Watershed Program

Through public laws commonly referred to as the Small Watershed Program, the USDA, Natural Resources Conservation Service provides technical and financial assistance to landowners to install needed conservation measures. In 2000, NRCS provided $999,562 in cost-share assistance to 8 watershed protection projects utilizing long-term contracts between NRCS and the landowners.

The following projects received funding in 2000:

- Chestnut Creek - $230,781 (Carroll and Grayson Counties)
- Copper Creak - $347,020 (Russell and Scott Counties)
- Cripple Creek - $173,187 (Smyth and Wythe Counties)
- Hays Creek - $66,791 (Augusta and Rockbridge Counties)
- Opequon Creek - $1,775 (Clarke and Frederick Counties)
- Linville Creek - $94,678 (Rockingham County)
- Sandy Creek- $44,662 (Halifax and Pittsylvania Counties)
- Three Creek - $40,668 (Smyth and Washington Counties)

Technical and financial assistance was provided for conservation practices such as grassed waterways, terraces, stripcropping systems, fences, water troughs, rotational grazing systems, tree planting, critical area treatment, pasture and hayland planting, and animal waste management systems.

For more information, contact Ken Carter, State Resource Conservationist for NRCS at (804) 287-1663.

6. Department of Forestry (DOF)

The Department of Forestry is the lead non-point source pollution forestry agency in the commonwealth. The department's water quality program consists of a Water Resources Unit of six compliance engineers and a program manager, that augment the law enforcement and training of all field-assigned foresters, technicians and chief forest wardens. During 2000, the Water Resources Unit became fully staffed and dedicated to enforcement of the Silvicultural Water Quality Law and water quality issues. During the year, in part due to reinforced staffing, enforcement of the law was up 60% from 1999.

The Silvicultural WQ Task Force, composed of state, university and industry officials met 4 times during the year. During 2000, several active environmental interest groups such as Virginia Forest Watch, the Chesapeake Bay Program and the Coalition for Jobs and the Environment joined the task force to discuss specific water quality concerns. During the 2-day task force summer retreat, several riparian buffer projects were visited. In addition, a harvested site was visited.

1999 program enhancement 319 funds were solicited and received to support revision of the BMP manual and comprehensive field training based on establishment of demonstration areas. This will support several strategies and tasks in the workplan. During fall, 2000, a BMP Manual committee was established to direct revision of the manual. A first draft is anticipated in early 2001. In addition, several of the planned demonstration areas have been established.

Establishment of first Virginia permanent logging BMP demonstration area in cooperation with Virginia Tech on the Fishburne School Forest, part of the land-grant university system, was pursued during the year. Initial best management practices installations focused on stream crossing structures that minimize impacts of stream crossings during harvesting. The Fishburne School Forest site is used extensively for on-site training of loggers, foresters, industry officials and landowners in proper BMP design, siting and maintenance. In addition, numerous logger training events were conducted throughout Virginia during the year.

The East Coast Sawmill and Logging Exposition was conducted in Richmond. The Department of Forestry presented several exhibits, including indoor exhibits featuring alternative harvesting systems to protect water quality and an outdoor demonstration on construction of a portable timber bridge. The alternative harvest systems exhibit prompted an article in a national logger and lumberman periodical. The exposition alternates between Richmond and Atlanta each year. The 2002 Richmond Exposition will be used to further logger and riparian priorities, strategies and tasks included in the forestry chapter of the NPS Pollution Management Plan.

7. Virginia Department of Health (VDH)

On July 1, 2000, the revised *Sewage Handling and Disposal Regulations (Regulations)* became effective. There were significant changes made including the recognition of shallower installation depths with pretreatment of the effluent. The standoff to seasonal high water table

has been increased to 18 inches for septic tank effluent. Another area of change was the requirement to manage solids within the absorption field by either installing an inspection port, having an increased size tank, or by using an effluent filter. For repairs of existing systems, if substantial compliance with the *Regulations* cannot be obtained, there is a requirement to pre-treat the effluent to secondary standards. The Department of Health is conducting a water table study initiated by a grant through the Virginia Coastal Resources Management Program. The annual cycle of water table fluctuations is being evaluated with a range of soil conditions and onsite wastewater technologies. This information will be correlated with soil and topographic site information to improve the understanding of site hydrology for nutrient management and selection/design of onsite wastewater treatment systems.

8. Virginia Department of Agriculture and Consumer Services (VDACS) Virginia Agricultural Stewardship Act

During the Virginia Agricultural Stewardship Act reporting period, the Commissioner of the Virginia Department of Agriculture and Consumer Services, along with Soil and Water Conservation Districts, completed investigations of 28 complaints alleging that specific agricultural activities were causing water quality degradation. Investigations determined that 11 of these complaints revealed insufficient or no evidence of water pollution. In 17 of the investigations, there was sufficient evidence to support allegations that agricultural activities were causing or would cause water pollution. In all but one of these cases corrective plans have been developed and implemented and a plan is underdevelopment for that complaint as well.

9. Chesapeake Bay Local Assistance Department (CBLAD)

a. Bay Act Regulations Amendment Progress

In late April 1996, the Chesapeake Bay Local Assistance Board initiated amendments to the Chesapeake Bay Preservation Act regulations. The board and CBLAD staff convened a regulatory advisory committee composed of key stakeholders, who helped develop a draft of the proposed amendments. The board approved of this draft in June 1997. Then the process stalled for several years through various levels of administrative review.

However, the regulation amendments achieved the necessary clearances in the summer of 2000 to proceed to public comment. A Notice of Public Comment was published on October 9, 2000, and a 60-day public comment period commenced, ending on December 8, 2000. CBLAD reported over 1,000 hits to the regulation page on its web site, and hundreds of public comments have been submitted through letters, email and verbal presentations at the 4 public hearings held at various locations in tidewater Virginia.

CBLAD staff are summarizing the public comments and developing official responses to them, with recommendations to the board for appropriate action. Meetings are scheduled during December and January to expedite a conclusion.

b. CBLAD Updates MOU with the DOF

The Chesapeake Bay Preservation Act (CBPA) regulations currently include an exemption from the program requirements for silvicultural activities that voluntarily implement appropriate silvicultural best management practices (BMPs) consistent with DOF guidance. Recently the two agencies have recognized that a key silvicultural BMP B the Streamside Management Zone B is often not being implemented adequately. Furthermore, such violations typically trigger the need for the local government to enforce the CBPA requirements.

Recognizing that better coordination is needed to assure that water quality is not degraded in such instances, CBLAD and DOF recently updated their Memorandum-of-Understanding (MOU) pertaining to the implementation of these programs. Key changes are:

- DOF will notify tidewater localities whenever logging activities are reported to commence, so the local governments are aware of them and their locations;
- DOF will notify tidewater localities whenever a violation of the Streamside Management Zone practice is detected through site inspections, so local enforcement can ensue; and
- DOF will notify both CBLAD and the localities when they must take the second (or a higher) level of enforcement action (Special Order) under the Silvicultural Water Quality Law.

Both agencies expect the improved coordination will enable all parties to respond more quickly to real or potential violations of their respective program requirements, resulting in significant decreases in water quality degradation from silvicultural activities.

c. CBLAD Agricultural Program Accomplishments

CBLAD annually provides grant funding to 12 local Soil and Water Conservation Districts in tidewater Virginia to develop and approve soil and water quality conservation plans on farmland subject to the Chesapeake Bay Preservation Act regulations. These conservation plans address soil erosion control, nutrient management, and pest chemical control issues, recommending BMPs where they are needed. If farmers choose to encroach into the vegetated buffer area required by the program along perennial streams, they must implement parts or all of the plan, depending on how much encroachment will occur. Most farmers are implementing BMPs anyway, even without needing to encroach in the buffer. During Fiscal Year 2000, 720 conservation plans were developed and approved by the districts under this program, covering more than 22,950 acres of land. The plans accounted for 170 miles of vegetated buffers, as well.

For more information, contact Ron Wood (804) 225-3442,

d. Polecat Creek Water Quality Monitoring Project

The Polecat Creek project has been conducted by CBLAD since 1993 in the 30,000 acre Polecat Creek watershed of Caroline County. The purpose of the project is to determine whether the regulations and policies adopted pursuant to the CBPA are actually effective in protecting

water quality from the impacts of adjacent land use and development activities. The project integrates chemical and physical monitoring of the stream system and rainwater, biological monitoring of the streams, and groundwater monitoring with a computerized database and geographic information system (GIS) which is used to track land use changes and is used for computer modeling purposes. The project also addresses the needs specified in the Chesapeake Bay Program Monitoring Strategy to determine watershed-scale responses of the implemented management actions and to monitor watersheds representing a range of physiographic and land use combinations across the bay basin. Details of the project have been described in previous NPS program updates.

The hydrologic data indicate an average annual rainfall of about 38 inches during the last 5 years, although the total rainfall during the past 12 months was nearly 40 inches. Approximately 25%-62% rainfall is converted to surface runoff within the watershed. Out of the total runoff, 35%-95% was contributed by the storms events. The chemical analysis of water samples (1999-2000) show generally low levels of sediment, nitrogen and phosphorous concentrations at the monitoring stations. The nitrate levels were within the EPA=s recommended limits. However, the phosphorous levels indicated that slightly over 1% of all samples collected from the watershed exceeded the 0.1 mg/L criterion established for preventing eutrophication (algae growth in the streams). The sediment and total phosphorous levels at the watershed outlet were significantly greater, compared to other stations within the watershed. The bacteria concentrations were generally low during fall and winter, but higher at one station in summer season with low flow rates. The biological study has indicated no consistent temporal trends in the fish community scores. However, analysis of the macroinvertebrate metric data have shown few consistent trends among matrices and monitoring sites. It indicated declining water or habitat quality. This may be due to either changes in land use or low rainfall and stream flow conditions during 1999-2000 project period. Nitrate concentrations in groundwater have changed little seasonally or from year to year in water samples collected from most wells since groundwater monitoring started in June 1997. This may be, in part, due to slow rate of groundwater flow and slow rate of change in land use in the watershed. Age-dating of groundwater, however, indicates that nitrate levels in water recharged through agricultural fields has increased over the last 30 years. This increase may be due to increased use of commercial fertilizers in the watershed.

The watershed is currently passing through a transient stage where significant land use changes are occurring. During the year 2000, many land parcels have been logged throughout the watershed. A significant multi-use development is being considered in the upper part of the watershed for local government approval. These land use changes are crucial and will impact hydrological behavior, surface and groundwater quality, and the biological status of the Polecat Creek.

Dr. Ram Gupta manages the project and coordinates the activities of the various contractors from Virginia Tech, VCU, the USGS, and DEQ. Dr Gupta also conducts data analysis to describe the spatial and dynamic changes in the hydrologic behavior and water quality, and to develop a NPS pollution model for the watershed. The findings of the project are very encouraging and will be used as baseline data to make a comprehensive comparison with the future monitoring data as land use changes occurs within the watershed.

For more information contact Dr. Ram Gupta at CBLAD, (804) 692-0429.

e. CBLAD=s Better Site Design Initiative

CBLAD has undertaken a "Better Site Design" initiative to provide information to local governments and the design community on cost-effective ways to reduce the impacts of development on water quality. The Better Site Design concept was developed by the Center for Watershed Protection for a national Site Planning Roundtable. In cooperation with the center, and the Virginia Coastal Program, the Department has developed a publication entitled, *Better Site Design: An Assessment of the Better Site Design Principles for Communities Implementing Virginia=s Chesapeake Bay Preservation Act*. This publication focuses on 16 design principles and illustrates their water quality and economic benefits through 4 Virginia case studies. The principles are organized around the topics of conservation of natural areas, lot development and residential streets and parking lots. When used, these principles can help meet the Chesapeake Bay Act criteria for minimizing impervious surfaces and land disturbance, and preserving native vegetation. As demonstrated through the case studies, the principles also reduce stormwater runoff and its associated nutrient loads, and result in significant construction cost savings. Several national development trends incorporate many of the Better Site Design Principles. These include trends toward both open space/clustered development and traditional neighborhood/transit oriented developments. The Department has been promoting the use of these principles by holding a number of workshops for local government officials and design professionals in tidewater, Virginia and plans to continue this outreach effort. The department will also be moving forward to identify, and where possible remove, local and state impediments to implementing these principles.

For more information, contact Martha Little at CBLAD, (804) 371-7504.

10. USGS Nutrient Trend Analyses

During the past year, the U.S. Geological Survey (USGS) completed an analysis of the factors affecting the trends in nutrient concentrations and loads in the Rappahannock, York, and James River basins. In cooperation with the Virginia Department of Environmental Quality, the USGS has been collecting streamflow and water-quality data in these basins since the mid-1980's to calculate loads and trends of nutrients entering Chesapeake Bay.

This latest assessment, contained in *USGS Water-Resources Investigations Report 00-4218*, includes information on changes in contributions from major nutrient sources from the Chesapeake Bay Program's Watershed Model and additional spatial detail on the distribution of nutrient yields in the basins from the USGS Spatially Referenced Regressions on Watershed attributes (SPARROW) model. In addition, data on nutrient sources, basin characteristics, implementation of management practices, and ground-water inputs to surface water were analyzed to help explain the trends in the monitoring data.

The major factors affecting the trends were found to be changes in nutrient sources and natural variations in streamflow. The dominant source of nitrogen and phosphorus from 1985 to 1998 in these basins was determined to be of agricultural origin. As a result, changes in agricultural nutrient sources such as manure and fertilizer, combined with decreases in agricultural acreage and implementation of best management practices, led to many downward trends in flow-adjusted nutrient concentrations –

trends unaffected by natural variations in streamflow. Urban acreage and population, however, were noted to be increasing in these basins and, as a result, delivered loads of nutrients from urban areas increased during the study period.

While the effect of nutrient management is evident in these downward trends in flow-adjusted concentrations, there have been relatively few significant reductions in the load of nutrients entering the Bay from these basins, which is due in large part to natural increases in streamflow during the study period.

For more information please contact Lori Sprague (lsprague@usgs.gov) at (804) 261-2635.

III. FUTURE FUNDING NEEDS

As required by the WQIA, this report presents information related to future funding needs. Estimating these needs is a complex endeavor that requires extensive information about the health of waters throughout the commonwealth. Within the Chesapeake Bay watershed, Virginia is fortunate to have tributary strategies completed. As a result, it is possible to estimate, at a basin level, the costs of addressing nonpoint source pollution management. **Table 8** summarizes the funding needs presented in each tributary strategy document. It should be noted that actual implementation costs could vary considerably from these estimates depending on the exact mix of pollution control actions.

Table 8. Tributary Strategy Implementation Costs

Basin	*Implementation Cost*
Rappahannock	$39,366,000
York	$23,142,000
James	$135,000,000
Eastern Shore Coastal	$2,800,000
Total	$200,308,000

In addition to these costs, cooperating parties are required to provide matching funds. As a result, total implementation costs will be higher.

Within the Shenandoah and Potomac Rivers, tributary strategy implementation has been completed. Therefore, the focus of nonpoint source pollution control will be on maintaining nutrient reductions that have already been achieved and on addressing any additional pollution reductions needed for the health of the Potomac River estuary.

A cooperative nonpoint source pollution control program and watershed-based approach, as described in the Cooperative Watershed Initiatives section of this report, is being implemented in the Southern Rivers. Prior to this initiative, the Southern Rivers area of the commonwealth did not have a comprehensive process, such as Tributary Strategies, that would bring stakeholders together to establish goals and objectives for controlling nonpoint source pollution. The focus on developing cooperative programs in the Southern Rivers area is expected to increase interest from localities to apply for grant

funds to implement water quality improvement projects. The watershed basin plans that result from these efforts will provide information that will assist in determining future funding needs.

The Department of Environmental Quality completed a ten-year Implementation Plan in November 2000 for developing and implementing the Total Maximum Daily Load (TMDL) Program in Virginia. The study identified 600 impaired waters in Virginia that will require TMDL action by the year 2010. Among the 600 impaired waters are 260 impaired shellfish waters. The study estimated in excess of $33 million in personnel and contractual costs for DCR for developing TMDLs and their associated implementation plans. In addition, the study estimated the cost for implementing Best Management Practices (BMPs) to attain water quality standards at $400,000 to $800,000 per watershed. Excluding shellfish TMDLs, overall TMDL implementation could be in the range of $150 million to $300 million. The costs for implementation are very preliminary, are based on limited information, and are primarily based on agricultural watersheds. Implementation costs in urban areas on a per watershed basis could be much higher

DCR staff anticipates ever increasing public interest in groundwater issues and encourages the incorporation of groundwater data into watershed plans and TMDL studies. Virginia does not yet have a network for collecting groundwater data on a statewide basis and needs funding for demonstration projects aimed at adequately and cost-effectively monitoring land uses suspected of contributing nonpoint source pollution to groundwater in karst areas as well as in other parts of the state.

Future funding requirements for the Division of Mines, Minerals and Energy are projected as follows:

- Year 2001 NPS Coordinator position funding (319 funds) ~ $75,000.00
- Year 2001 mine reclamation (WQIF) ~ $250,000.00

As evidenced in this annual report, DCR is committed to carrying out its responsibilities as outlined in the WQIA. DCR commends the continual commitment of Governor James S. Gilmore III, Secretary of Natural Resources John Paul Woodley, Jr., and the Virginia General Assembly to the improvement of water quality as one of the commonwealth's priority environmental issues.