REPORT OF THE DEPARTMENT OF CONSERVATION AND RECREATION

2008 FEDERAL CLEAN WATER ACT SECTION 319 NONPOINT SOURCE POLLUTION MANAGEMENT PROGRAM ANNUAL REPORT

and

2008 PROGRESS REPORT ON THE 'CHESAPEAKE BAY AND VIRGINIA WATERS CLEANUP PLAN'

COMMONWEALTH OF VIRGINIA
RICHMOND
Final August 2009

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EXECUTIVE SUMMARY

This report fulfills the Department of Conservation and Recreation's (DCR) legislative requirement under § 319(h)(8) and (11) of the Federal Clean Water Act (33 USC 1329). This report describes the nonpoint source pollution management program activities undertaken by DCR and cooperating agencies during 2008. These activities include nonpoint source pollution management program implementation, agricultural cost-share funding allocations and BMP implementation, support for other NPS programs, 2008 grant awards for nonpoint source programs and projects, and planned use of recent funding.

- In 2008 Virginia developed 8 implementation plans. Since 2000, Virginia has completed 32 TMDL implementation plans addressing 102 impaired stream segments and over 128 impairments. Currently Virginia is working on the development of an additional 9 implementation plans addressing 33 impaired stream segments.
- During 2008, there were 11 active §319(h) funded implementation projects. Collectively these projects implemented 349 agricultural and residential Best Management Practices (BMPs) that resulted in the reduction of 1.27E+16 colony forming units (CFU) of fecal coliform bacteria, 3,7684 pounds of nitrogen, 871 pounds of phosphorous, and 341 tons of sediment. In July 2006, 17 state funded TMDL implementation projects were started. Through June, 2008 these projects implemented 161 agricultural BMPs that resulted in the following 'edge-of-field' pollution reductions: 300,221 lbs/year nitrogen, 59,619 lbs/year phosphorous and 55,188 tons of sediment.
- Virginia has reduced its pollution loadings to the Chesapeake Bay significantly. Between 1985 and 2007, Virginia has reduced nitrogen loadings by 18.4 million pounds/year (MPY), phosphorous loadings by 4.57 MPY, and sediment loadings by 480 tons per year.
- Analysis of TMDL Implementation Project water quality data show that five projects may be candidates for de-listing based on having bacteria violation rates below 10.5% for the 235 CFU/100 ml standard. These include: Willis River, Buckingham and Cumberland Counties, 16.68 miles; Big Otter River, Bedford and Campbell Counties, 13.98 miles; Maggodee Creek, Franklin County, 4.40 miles; Stroubles Creek Middle, Montgomery County, 2.20 miles; Deep Creek, Nottoway County, 5.59 miles; and Lynnhaven River in the City of Virginia Beach., 1,462 acres.
- Land conservation and preservation has been a major endeavor. Protecting land, particularly riparian lands, is a critical element of Virginia's Chesapeake Bay Tributary Strategies and will help restore and protect waters. From FY2001-FY2006 an average of 56,000 acres per year had been protected. In 2006 the Commonwealth set an ambitious goal of protecting 400,000 acres by 2010. From July 1, 2007 through November 30, 2008, approximately 89,283.23 acres were protected statewide, due largely to donations made by landowners seeking to take advantage of generous tax incentives. As of June 2008, approximately 250,810 acres have been protected (or 63% of the original goal) since 2006.
- In November 2007 State Health Commissioner Robert B. Stroube of the Virginia Department of Health lifted the shellfish condemnation of 1,462 acres within Lynnhaven River, Broad Bay, and Linkhorn Bays of Virginia Beach. These waterbodies are now fully attaining their designated shellfishing use for which the watersheds were condemned in 1998. The dedicated efforts of the City of Virginia Beach and its partners improved the water quality conditions have to the point that these waters are now achieving the bacteria standard for shellfish waters and will be candidates for delisting on the 2010 303(d) list of impaired waters.
- In 2008 the Valzinco Sulfide Mine Reclamation Project was recognized by EPA with a Success Story. This orphaned mine land reclamation project was implemented to abate acid mine drainage (AMD) sulfide mine in Spotsylvania County, Virginia on Knights Branch. Following reclamation, pH levels in Knights Branch rose back to conditions natural for the Virginia Piedmont (>5.0) and dissolved metal concentrations fell by 75-99.5%

INTRODUCTION: NONPOINT SOURCE POLLUTION MANAGEMENT PROGRAM

Nonpoint Source Pollution Management Program

Virginia's Nonpoint Source (NPS) Pollution Management Program is a diverse network of state and local government programs. Collectively, these programs help prevent water quality degradation and restore the health of our lakes, rivers and bays by promoting and funding state and local watershed planning efforts, stream and wetland restoration and protection, education and outreach, and other measures to reduce, prevent and track NPS pollution reduction from impacting waters of the Commonwealth. Statewide NPS pollution control programs and services support both individual natural resource stewardship and assist local governments with resource management. These statewide programs are funded through state agency budgets, non-general fund revenues and federal granting programs. There are several state and federal laws that result in comprehensive programs that address the management of NPS pollution in the Commonwealth of Virginia. Collectively these state and federal programs and laws make up the legislative backdrop to Virginia's comprehensive Nonpoint Source Pollution Management Program.

Federal Clean Water Act – Section 319 – Nonpoint Source Pollution

Section 319 of the 1987 Federal Clean Water Act requires that states develop and implement NPS pollution management programs. Section 10.1-104.1 of the Code of Virginia designates the Virginia Department of Conservation and Recreation (DCR) as the lead agency for the Commonwealth's NPS pollution management programs. This section assign responsibility to DCR for the distribution of assigned funds, identification and establishment of priorities of NPS related water quality problems, and the administration of an NPS advisory committee. A decade ago, the Environmental Protection Agency (EPA) approved Virginia's Nonpoint Source Pollution Management Program Plan. This Plan summarizes the State's effort to prevent and control NPS pollution. The 1999 plan identifies programs and initiatives to achieve long-term statewide NPS goals. The Program utilizes partnerships to advance long and short-term goals for the reduction of nonpoint source pollution; through financial, technical, and outreach assistance, and local capacity building to achieve specific nonpoint source pollution control targets. The original plan was intended to provide five-year achievable goals and activities, updated at five year intervals. As of 2007 the plan had not been updated and was very out of date; as a result DCR began to evaluate the need to update the 1999 plan to make it more relevant to current NPS activities and priorities.

It was determined that 2006 state legislation (House Bill 1150) directing the Commonwealth to develop a plan to address water quality impairments and protect the waters of the commonwealth from further degradation was sufficient in addressing NPS activity in Virginia and could be utilized to fill the need for an updated NPS Pollution Management Plan. In fact, it was decided that the new legislation "Chesapeake Bay and Virginia Waters Clean-up Plan" referenced in the following section should serve as the Commonwealth's NPS plan. During 2008, Virginia officially adoptied the "Chesapeake Bay and Virginia Waters Clean-up Plan" as the Commonwealth's NPS Pollution Management Plan update. In 2009 DCR will continue to work with the US Environmental Protection Agency (EPA) to recognize the Cleanup Plan as the Commonwealth's official NPS Management Plan

Chesapeake Bay and Virginia Waters Clean-Up and Oversight Act of 2006 – HB1150

The *Chesapeake Bay and Virginia Waters Clean-up and Oversight Act (HB1150)* was passed during the 2006 legislative session of the Virginia General Assembly and signed into law on April 3, 2006 (Title 62.1, Chapter 3.7, section 62.1-44.117-62.1-44.118). The Act established the requirement to develop a plan for the cleanup of the Chesapeake Bay and Virginia's waters designated as impaired by the U.S. Environmental Protection Agency. Subsequently the plan also addresses the protection of water resources not yet impaired by pollution. The resulting "Chesapeake Bay and Virginia Waters Clean-Up Plan" provides clear objectives, well-developed strategies, predictable time frames, realistic funding needs, common-sense mitigation strategies, and straightforward recommendations to the General Assembly for its consideration for stream restoration and protection. The initial plan was presented to the General Assembly in 2007. The plan is updated ever year and was last updated in June 2008. A progress report is produced annually as well; the latest status report was submitted on December 16, 2008 by L. Preston Bryant, Jr., Secretary of Natural Resources of the Commonwealth of Virginia to members of the General

Assembly of Virginia. It should be noted that this plan is very comprehensive in nature and actually addresses both point and nonpoint pollution sources, as well as air pollution. There are, however, very specific elements of the plan related to nonpoint source pollution and as noted the above section on the CWA Section 319 program, the relevant portions of Clean-up plan are now considered Virginia's Nonpoint Source Pollution Management Plan. Throughout this document the progress of this plan will be highlighted; for the full plan refer to the website: http://www.naturalresources.virginia.gov/Initiatives/WaterCleanupPlan/

The Virginia Water Quality Improvement Act of 1997

The *Virginia Water Quality Improvement Act (WQIA)* was passed during the 1997 legislative session of the Virginia General Assembly and signed into law on March 20, 1997. This Act establishes a comprehensive statewide program to address point and non-point sources of water pollution. It creates the Virginia Water Quality Improvement Fund (WQIF) to provide assistance for water quality improvements to a broad array of entities, including local governments, soil and water conservation districts, and landowners. The fund is the principal source of state cost-share money for agricultural practices and to implement the nutrient and sediment reduction "Tributary Strategies" prepared pursuant to the Chesapeake 2000 Agreement and the *Code of Virginia.* The fund also provides grants for practices to control NPS pollution in "Southern Rivers"; which are watersheds in Virginia that drain to waters other than the Chesapeake Bay. The non-point source efforts will also focus in part on nutrient reduction. Technical and financial assistance will be provided to local governments, soil and water conservation districts, and individuals through the Fund. In addition, provisions for water quality assessment and state and local cooperation are provided.
DCR is charged in assisting in the development of local cooperative NPS pollution programs and programs to implement Virginia's nonpoint source pollution management program, in accordance with the Water Quality Improvement Act, Section 10.1-2124.B of the *Code of Virginia*. The purpose of the cooperative nonpoint source pollution program is to maintain and/or restore water quality standards in stream segments where NPS pollution is a significant loading factor. NPS pollution programs 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.

Summary of the 2008 Virginia NPS Pollution Management Program Annual Report

As stated previously, Virginia has a NPS planning document call the "Chesapeake Bay and Virginia Waters Clean-up Plan" that has progress reports and strategy updates submitted to the Virginia Commonwealth General Assembly on an annual basis. It should be noted that the Chesapeake Bay and Virginia Waters Clean-up Plan (CBVWCP) is a comprehensive planning document that outlines the Commonwealth's strategy for cleaning up, restoring and protecting Virginia's waters from nonpoint source and point source issues. Although it was not developed based on EPA guidance, the Clean-Up Plan effectively supersede and updates the Commonwealth's NPS Management Plan. During 2009, Virginia will work with EPA Region 3 to formally adopt this plan as the Commonwealth's NPS Management Plan. As a result, the annual NPS report requirement will be fulfilled by the annual progress report for the *Chesapeake Bay and Virginia Waters Clean-up Plan*. The latest status report was submitted on December 16, 2008 by L. Preston Bryant, Jr., Secretary of Natural Resources of the Commonwealth of Virginia to members of the General Assembly of Virginia. For the 2008 NPS Management Program Annual Report, the above referenced progress report on the "Chesapeake Bay and Virginia Waters Clean-up Plan" will be utilized. Please note that the Cleanup Plan report, in its entirety contains references to point sources and air quality (Chapter II, portion of section A and all of section D). Though the entire report is included in this NPS report, only the pertinent nonpoint elements of the Cleanup Plan report are serving as Virginia's NPS Annual Report. Contained in this report is a summary of activities in core program areas of the Chesapeake Bay and Virginia Waters Clean-up Plan and NPS Management Plan. In addition to the Cleanup Plan progress update, this report contains two appendices that details Virginia's progress in its TMDL program. Appendix I provides general details regarding the TMDL Development, TMDL Implementation Plan Development, TMDL Implementation as well as water quality improvements. Appendix II provides detailed case studies for active Section 319 funded TMDL Implementation projects.

Chesapeake Bay and Virginia Waters Clean-Up Plan

- Progress Report -

Submitted by
The Honorable L. Preston Bryant, Jr.
Secretary of Natural Resources
Commonwealth of Virginia

To
House Committee on Agriculture, Chesapeake and Natural Resources
House Appropriations Committee
Senate Committee on Agriculture, Conservation and Natural Resources
Senate Finance Committee

December 2008

COMMONWEALTH of VIRGINIA

Office of the Governor

P.O. Box 1475
Richmond, Virginia 23218

L. Preston Bryant, Jr.
Secretary of Natural Resources

December 16, 2008

TO: Chairman and Members, House Committee on Agriculture, Chesapeake and Natural Resources
Chairman and Members, House Appropriations Committee
Chairman and Members, Senate Committee on Agriculture, Conservation and Natural Resources
Chairman and Members, Senate Finance Committee

FROM: L. Preston Bryant, Jr., Secretary of Natural Resources

SUBJECT: Progress Report on the Chesapeake Bay and Virginia Waters Clean-up Plan (House Bill 1150; 2006)

I am pleased to present this year's Progress Report for the *Chesapeake Bay and Virginia Waters Clean-up Plan*. This report is submitted per Chapter 204 of the 2006 Acts of Assembly. The directive for the construction of the Clean-up Plan – and this progress report – resulted from House Bill 1150 (2006), which was sponsored by Delegate L. Scott Lingamfelter of Prince William County and signed into law by Governor Timothy M. Kaine on April 3, 2006.

This report describes progress in implementing the Clean-up Plan for 2008. Clean-up activities are the responsibility of many state agencies, including the Virginia Department of Environmental Quality (DEQ) and the Virginia Department of Conservation and Recreation (DCR). In addition to reporting on progress, this report also identifies significant impediments to plan implementation – seeking to efficiently communicate both progress and challenges.

Although there is not a direct correspondence, this report generally follows the structure and elements of Clean-Up Plan as updated in June 2008. To ensure efficient reporting, we focused on the specific Objectives and Performance Measurements included in that plan. To efficiently communicate relative levels of progress, we have assigned graphic indicators for goals and objectives of the plan:

 indicates substantial progress toward the goal;

 indicates progress toward the goal; and,

 indicates limited progress during this reporting cycle.

We also have combined some statutory reporting elements within this report per Chapter 637 of the 2007 Acts of Assembly. We continue to work toward full integration of all relevant reporting in an efficient and effective manner.

We look forward to continuing to work with your committees, other interested legislators, and all Virginia citizens who understand the need for us to do all that is practicable to prevent pollution and restore the health of our Commonwealth's streams, rivers, lakes, and estuaries.

An electronic version of this document may be viewed on the website of the Office of the Secretary of Natural Resources, which is located at: www.naturalresources.virginia.gov/Initiatives/WaterCleanupPlan. Should you have questions or desire additional information, please let me know.

LPBJr/cbd

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I. Measurable Environmental Outcomes

The Department of Environmental Quality (DEQ) reports on the status of the water quality in all of Virginia's waters through the biennial Water Quality Assessment. The final 2008 Assessment has been submitted to EPA for approval. The following table compares the impaired waters identified in the 2008 Assessment with the 2006 results.

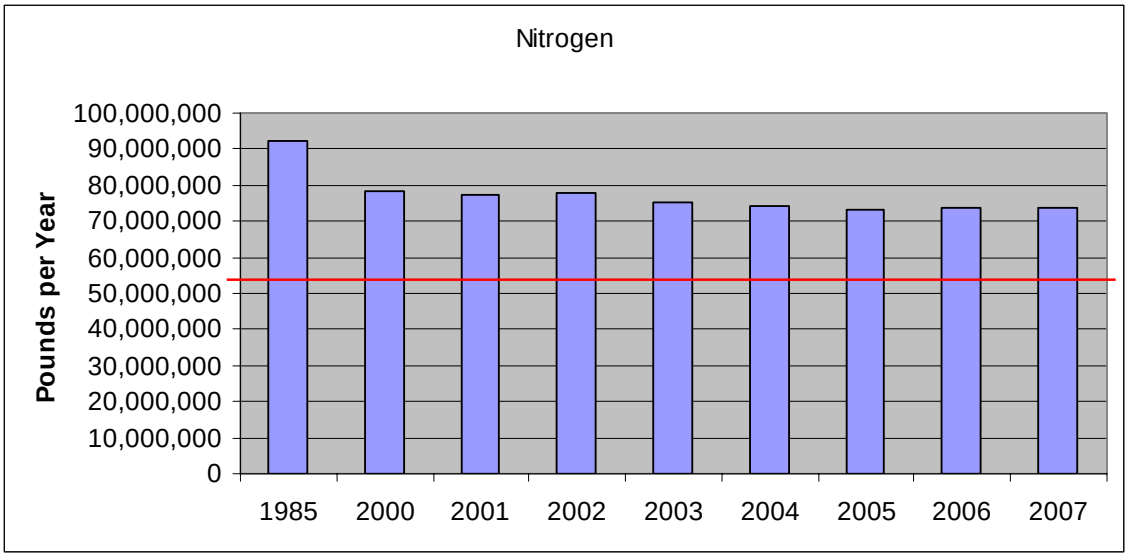
Virginia Waters - Types and Dimensions	Impaired Waters Assessment		Top Reasons for Impairments	Uses Lost or Impaired
	2006	2008		
Rivers - 50,016 miles	9,002	10,543	High Bacteria Levels	Recreational
Lakes - 115,835 acres	109,201	94,044	Low dissolved oxygen and high PCB levels in fish tissue	Aquatic Life and Edible Fish
Estuaries - 2,305 sq. miles	2,212	2,182	Low dissolved oxygen (nutrient pollution) and high PCB levels in fish tissue	Aquatic Life and Edible Fish and Shellfish

New impairments were identified in 2008, primarily due to DEQ's assessment of waters which had not previously been monitored, or due to the adoption of more stringent water quality criteria. While the 2008 list includes additional impaired river miles, the good news is that 343 river miles were removed from the list because the 2008 assessment showed that these waters, previously listed as impaired, were now meeting water quality standards. In addition, another 403 river miles, while they remain on the 2008 list for other pollutants, have shown partial improvement since they meet standards they failed to meet previously. The 2008 results also show a significant reduction in the acreage of impaired lakes due mainly to verification that these previously documented impairments were due to natural causes.

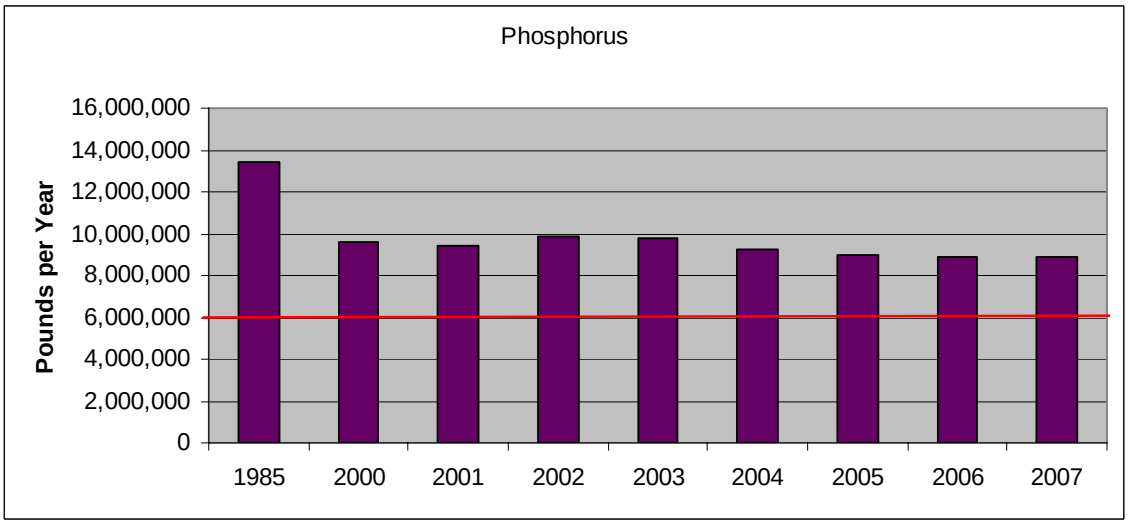
Pollution Reductions

The most recent estimates for the quantity of nutrients and sediments entering the Chesapeake Bay from Virginia's point and non-point sources through 2005 are shown in the following charts and are compared to Virginia's allocation caps.

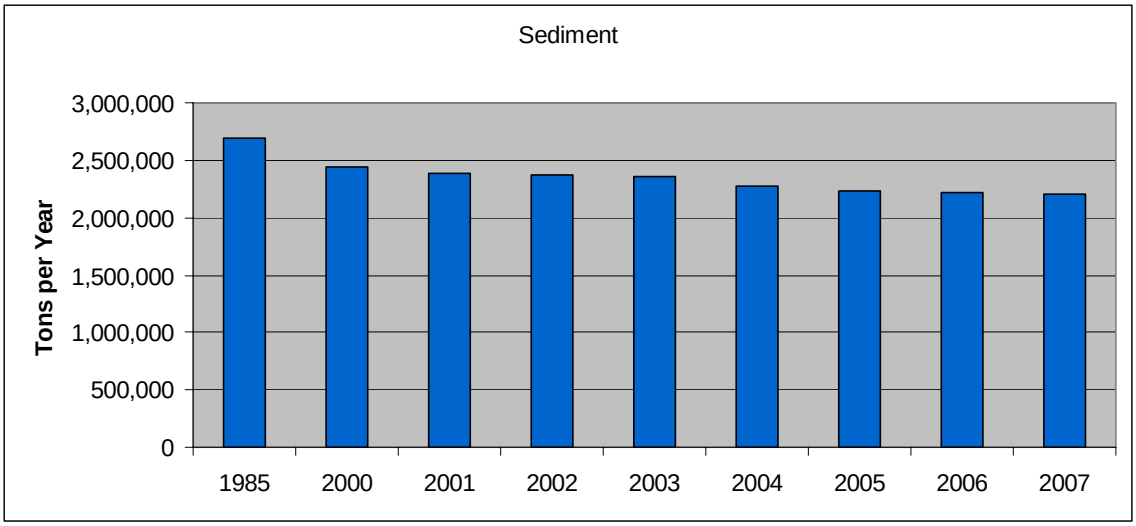
For nitrogen, Virginia has reduced its loadings by 18.4 million pounds/year [MPY] between 1985 and 2007, but still needs to reduce loads by another 22.4 million MPY to meet the assigned allocation of 51.4 MPY.



For phosphorus, Virginia has reduced its loadings by 4.57 MPY between 1985 and 2007, but still needs to reduce loads by another 2.9 million MPY to meet the assigned allocation of 6.0 MPY.



For sediment, Virginia has reduced its loadings by 480,000 tons per year [TPY] between 1985 and 2007, but still needs to reduce loads by another 270,000 TPY to meet the assigned allocation of 1,941,000 TPY.



II. Clean-Up Strategy Components

A. Wastewater Category

Wastewater Dischargers of Nutrient Pollution into the Chesapeake Bay

Performance Measurement: Continuous tracking of upgrades underway at municipal and industrial wastewater facilities, with annual compilations of the nutrient reductions achieved.

The Chesapeake Bay Watershed General Permit, which became effective on January 1, 2007, authorizes nutrient discharges from wastewater facilities within the Chesapeake Bay watershed. All of the 125 individual significant dischargers who were required by law to register for coverage under the Watershed General Permit have done so, along with several smaller non-significant dischargers, either because of a planned expansion or to be included as part of an owner's "bubbled" allocation. Mandatory annual Compliance Plan Updates were received from the affected dischargers by the February 2008 deadline. **A review of those submittals has reaffirmed previous estimates that the January 1, 2011 compliance date will be met for the aggregate annual point source nutrient waste load allocations in all Bay tributaries**.

The following table presents the 2007 delivered loads of nitrogen and phosphorus pollution from point sources within each of Virginia's river basins compared to the point source allocations (Waste Load Allocation – WLA) to be achieved by January 1, 2011:

Table II-1. Delivered Point Source Nutrient Loads – 2007 vs. Waste Load Allocations

River Basin	Total Nitrogen Delivered Load (lbs/yr)		Total Phosphorus Delivered Load (lbs/yr)	
	2007	WLA	2007	WLA
Shenandoah-Potomac*	3,623,742	3,407,870	269,177	187,948
Rappahannock	517,612	497,721	56,716	41,792
York	1,412,097	963,875	140,302	161,536
James	14,131,305	13,898,522	1,115,532	1,351,775
Eastern Shore	179,466	31,370	4,002	1,780
TOTALS =	19,866,229	18,799,358	1,587,736	1,744,831

*Note: figures do not include VA Portion of Blue Plains.

Summary of Water Quality Improvement Fund (WQIF) Point Source Program Activities

There are currently 36 signed WQIF agreements, obligating $422.7 million in State cost share, for design and installation of nutrient reduction technology at the Bay watershed point source discharges. This is critical support for compliance with the nutrient discharge control regulations and achieving Chesapeake Bay nitrogen and phosphorus waste load allocations. A summary of active grant projects is accessible via the DEQ-WQIF webpage at this Internet address: www.deq.virginia.gov/bay/wqiflist.html#SGA.

Since its formation in 1998, the WQIF Point Source Program has received a total of $385.92 million in appropriations and accrued interest. The following table summarizes these deposits:

Table II-2: WQIF Point Source Program Appropriations

Period	WQIF Reserve (million dollars)	Funds for Bay Point Source Projects (million dollars)
FY 1998	$0.00	$10.00
FY 1999	$0.00	$37.10
FY 2000	$0.00	$25.24
FY 2001	$0.00	$10.30
Interest Earned (through FY04)	NA	$11.71
FY 2005	$0.68	$13.25
Interest Earned (FY05)	NA	$0.29
FY 2006	$3.91	$67.21
Interest Earned (FY06)	$0.08	$1.57
FY 2007	$0.09	$197.33
Interest Earned (FY07)	$0.23	$8.46
FY 2008	$0.00	$5.00
Interest Earned (FY08)	$0.14	$13.46
Funds Transferred to DCR (7/08)	NA	($15.00)
TOTALS	$5.13	$385.92

Of the $385.92 million made available, $95.37 million was used for twenty-five voluntary/cooperative "BNR" grants prior to adoption of nutrient discharge control regulations. A total of $3.88 million was awarded as Technical Assistance grants, for projects such as Basis of Design Reports, Interim Optimization Plans, and support for the Nutrient Credit Exchange Association. The $286.67 million balance has been made available for recent grants to meet the Bay nutrient waste load allocations. With $422.7 million obligated for these additional projects, and an available balance of $286.67 million, **the WQIF has been over-obligated by about $136.03 million.**

The 2007 General Assembly authorized $250 million in bonds, available after July 1, 2008, to capitalize the WQIF. Bond proceeds are to be added to the WQIF upon certification by the DEQ Director that anticipated grant reimbursements in a given fiscal year will exceed the amount available in the WQIF. This certification will be made for the 2009 General Assembly session, with an estimate that $137.61 of the $250 million is needed to cover grant reimbursement requests through FY 2010.

Based on WQIF applications received to date and grant agreements being negotiated, it is estimated that the following additional grant amounts are needed to achieve the nutrient waste load allocations by the January 1, 2011 deadline and maintain compliance into the future:

a. 21 applicants are ready-to-proceed with grant agreements expected to be signed in FY09, obligating $218.98 million.
b. 26 applications are pending submission of a Preliminary Engineering Report, or were withdrawn and are likely to be resubmitted in the near future, requesting $177.94 million.
c. 16 eligible significant dischargers have not yet applied. Based on facility size and level of nutrient control technology needed to meet their limits, it is estimated that $141.61 million in grant funds will be needed for their projects in the near future.

These additional projects total $538.53 million in needed grant funds. The projected balance of bond proceeds after covering the existing, signed agreements is $113.97 million. Therefore, it is estimated that an additional $424.56 million is needed for all expected projects, beyond existing signed agreements, to meet and maintain the point source nutrient waste load allocations. If no additional funds are added to the WQIF beyond current appropriations and the bond authorization, reimbursements from the WQIF are projected to expend the available funds during FY2012, assuming all expected projects from 'a', 'b' and 'c' above are added to the "signed agreements" list.

Estimated Nutrient Reductions from WQIF-Funded Projects

The current deadline for compliance with the point source nitrogen and phosphorus waste load allocations in the Chesapeake Bay watershed is January 1, 2011.

Table II-3 below shows estimated pollution reductions resulting from the 36 projects with signed WQIF grant agreements (3 projects with "NA" values are non-significant dischargers that must only maintain their "permitted design capacity", not achieve reductions from existing loads). It illustrates the nutrient load each facility delivered to the Bay and tidal rivers in 2007, compared

to the maximum nutrient load they are allowed to deliver (WLA), and what they are projected to deliver in 2011. As can be seen, by 2011 these projects will reduce the amount of nutrients being delivered to the Bay and tidal rivers by approximately 1,199,000 pounds of nitrogen and 148,000 pounds of phosphorus compared to the 2007 loads.

Table II-3. Estimated Nutrient Reductions from WQIF-Funded Projects

Facility	Delivered Total Nitrogen Load (lbs/yr)			Delivered Total Phosphorus Load (lbs/yr)		
	2007	WLA	2011	2007	WLA	2011
Onancock STP	3,549	9,137	6,944	1,070	685	521
Craigsville STP	NA	NA	NA	NA	NA	NA
Farmville STP	10,370	16,665	16,665	5,487	1,572	1,572
HRSD-Army Base STP	862,073	610,000	940,503	23,208	54,820	58,606
Lex-Rockbridge Reg. STP	7,618	16,446	9,356	12,665	4,568	8,576
RWSA-Moores Crk. STP	413,956	167,201	222,340	120,228	22,842	23,195
Culpeper WWTP	59,411	33,440	24,300	7,443	4,112	3,984
Orange STP	23,406	22,293	8,174	4,370	2,741	1,005
Tappahannock STP	15,085	9,746	6,091	1,254	731	457
Warrenton STP	61,777	18,578	18,578	5,516	2,284	2,284
Warsaw STP	10,522	3,655	1,827	2,700	274	244
ACSA-Fishersville STP	21,340	21,441	11,846	9,744	2,814	1,555
ACSA-Middle River STP	37,510	36,449	26,855	10,503	4,784	3,525
Alexandria S.A.	506,436	493,381	493,381	5,384	29,603	22,202
Arlington Co. WPCF	619,020	365,467	365,292	5,485	21,928	7,306
Broadway STP	34,723	15,671	13,059	17,228	1,351	1,351
Clarke Co. SA-Boyce STP	NA	NA	NA	NA	NA	NA
Colonial Beach STP	33,867	18,273	18,273	5,977	1,827	1,827
Dale Service Corp. #1 STP	30,995	42,029	34,719	1,013	2,522	2,083
Dale Service Corp. #8 STP	28,901	42,029	34,719	957	2,522	2,083
FCW&SA-Vint Hill STP	2,902	3,180	2,685	268	241	76
FWSA-Opequon STP	56,564	75,724	113,390	7,286	5,910	9,439
FWSA-Parkins Mill STP	106,666	45,074	26,594	28,051	3,517	2,767
HRRSA-North River STP	74,419	111,492	71,826	18,458	14,633	9,427
K. Geo. Co-Dahlgren STP	6,778	9,137	7,675	230	914	672
K. Geo. Co-Fairview Beach	836	1,827	822	323	183	82
LCSA-Broad Run STP	0	101,113	44,085	0	2,345	1,022
Luray STP	8,759	8,576	8,576	2,859	1,126	1,126
Middletown STP	NA	NA	NA	NA	NA	NA
Mt. Jackson STP	4,597	5,713	4,081	775	493	352
Pr. Wm. Co.-Mooney STP	238,112	219,280	150,755	3,073	13,157	9,045
Purcellville STP	9,333	15,167	12,285	308	1,055	760
Stafford Co.–Aquia STP	85,882	73,093	57,470	1,887	4,386	3,448
Waynesboro STP	68,905	21,441	16,643	24,246	2,814	2,718
Woodstock STP	12,268	16,324	16,324	3,844	1,407	1,407
HRSD-York STP	752,766	274,100	223,762	22,906	31,978	22,376
Totals =	4,209,346	2,923,142	3,009,895	354,746	246,139	207,093

Other Wastewater Discharges and Sources

Performance Measurement: Report semi-annually on: (1) the amount of loans and grants used to address TMDL implementation; and (2) the permitting and compliance actions taken in accordance with TMDL Implementation Plans.

The Virginia Clean Water Revolving Loan Fund completed loan closings procedures on 69 loans in FY 08 totaling $193,548,590. This includes 54 non-point source improvement projects and 15 wastewater treatment plant or sewer system improvement projects. Approximately 76.7% ($148,374,905) of this funding was for projects improving the water quality of impaired streams and/or addressing the impairment of the Chesapeake Bay (see table on next page).

FY 08 Virginia Clean Water Revolving Loan Fund Project List

Name	**Loans**	**Stream Impairment**	**Bay Impairment**	**Total Funding for Impaired Waters**	**Purpose**
Augusta County Service Authority	$17,028,808		$8,514,404	$8,514,404	Reduce Nutrients to the Bay
City of Lynchburg	$12,350,000	$12,350,000		$12,350,000	Reduce CSO/SSO
City of Newport News	$3,200,000	$3,200,000		$3,200,000	Reduce SSO
City of Norfolk	$17,000,000	$17,000,000		$17,000,000	Reduce SSO
City of Richmond	$6,900,000	$6,900,000		$6,900,000	Reduce CSO/SSO
City of Staunton	$9,528,519	$9,528,519		$9,528,519	Reduce Nutrients to the Bay
City of Waynesboro	$14,594,900		$14,594,900	$14,594,900	Reduce Nutrients to the Bay
County of Hanover	$616,206	$0		$0	New collection system to eliminate existing residential septic tank/drainfields
Harrisonburg Rockingham Regional Service Authority	$30,000,000		$15,000,000	$15,000,000	Reduce Nutrients to the Bay
Mercury Mall Associates	$1,500,000	$0		$0	Brownfield Clean Up
Town of Chilhowie	$1,584,125	$1,584,125		$1,584,125	Improve local water quality
Town of Colonial Beach	$2,671,606		$2,671,606	$2,671,606	Reduce Nutrients to the Bay
Town of Orange	$16,177,744		$8,088,872	$8,088,872	Reduce Nutrients to the Bay
Town of Tappahannock	$4,564,119		$4,564,119	$4,564,119	Reduce Nutrients to the Bay
Truxton Development LLC	$900,000	$900,000		$900,000	Improve local water quality
Cafferty/ARC	$1,000,000	$0		$0	Brownfield Clean Up
Woodstock	$13,917,296		$13,917,296	$13,917,296	Reduce Nutrients to the Bay
Town of Purcellville	$24,944,377		$17,461,064	$17,461,064	Reduce Nutrients to the Bay
Crows Nest - Stafford County	$9,500,000		$9,500,000	$9,500,000	Reduce Nutrients to the Bay
AgBMP	$5,570,890	$2,600,000		$2,600,000	Eliminate Non-Point Source Pollution
Total Value	$193,548,590	$54,062,644	$94,312,261	$148,374,905	
To Impaired Non-Bay Waters		$54,062,644	27.9%		
To Impaired Bay Waters		$94,312,261	48.7%		
Total Impaired Assistance		$148,374,905	76.7%		

Discharges from Boats

Performance Measurement: Report semi-annually on outreach efforts and No Discharge Zone designations being pursued.

A No-Discharge-Zone designation covering the Lynnhaven River, Broad Bay and Linkhorn Bay in Virginia Beach was approved by EPA, with final adoption by the State Water Control Board in March of 2007. Through efforts by the City of Virginia Beach, Hampton Roads Sanitation District, and Lynnhaven River Now, and other stakeholders, this watershed has been restored for shellfish harvesting. No Discharge Zone designation, agricultural BMPs, sanitary sewer system improvements, stormwater programs, and erosion and sediment controls were effectively implemented. EPA has selected the Lynnhaven Bay restoration project as a highlighted success story. Consideration is being given to pursuing expansion of this designation to other waters in the area.

Based upon the recommendations in completed TMDLs and the positive support from marina operators and local citizenry, DEQ has completed the outreach and application to designate Broad Creek, Jackson Creek, and Fishing Bay as No Discharge Zones. They are located in Middlesex County. The application should be submitted to EPA for approval November '08.

Discharges of Toxic Substances

Performance Measurement: Report semi-annually on TMDL clean-up plan development and implementation for waters impacted by toxic contamination.

DEQ is working to identify and quantify sources of fish mercury contamination in the waters of the North Fork Holston River. The "impaired" stream segments total approximately 81 miles from Saltville (VA) to the Tennessee state line. DEQ announced a study to restore water quality. Additional monitoring was completed by Olin in 2008. The first Technical Advisory Committee and public meetings are scheduled for November (2008) in Saltville and Hilton (VA)**.** In order to meet the consent decree schedule, this TMDL is to be completion by May 1, 2010.

The Total Daily Maximum Load (TMDL) addressing Polychlorinated Biphenyl (PCB) contamination is actively under development for the Roanoke (Staunton) River. The final TMDL report is due May 2010. Results from two rounds of monitoring have led to improved characterization of PCBs in the river and to the identification of on-going PCB sources.

Failing on-site septic systems and illegal straight pipe (untreated) discharges

Performance Measurement: Report semi-annually on the amount of funds appropriated to local governments and property owners, with estimates of the number of failing systems or straight pipes that have been addressed.

The 2007 General Assembly allocated $17 million from the Water Quality Improvement Fund to be provided as grants to communities located outside the Chesapeake Bay watershed for construction of mandated water quality improvement facilities at publicly owned treatment works, correction of onsite sewage disposal problems, and other planning activities. These funds are now being administered by the Department of Housing and Community Development, with several projects now underway to utilize these funds.

- As announced by the Governor's Office in October 2007 and May 2008, under the "Southern Rivers Watershed Enhancement Program" over $14.8 million was previously awarded, mostly as wastewater treatment system construction grants to localities in 16 counties outside the Chesapeake Bay watershed. Combined, these projects will connect over 700 households to public wastewater services and install more than 45,000 linear feet of sewer line thus reducing the amount of sewage flowing into a number of impaired waterbodies.
- $1.44 million in additional construction grants were announced in August 2008, along with one $20,000 planning grant. These grants will allow four localities to eliminate urgent health hazards and provide public sewer service to households now using individual septic systems, many of which are failing and discharging inadequately treated wastewater to State waters. These projects will benefit 66 homes currently relying on failing septic systems or "straight pipes", and also replace 2 community drainfield systems serving public schools, municipal buildings and several commercial operations.
- The balance of approximately $740,000 in grant funds will be awarded under a future solicitation.

B. Agriculture and Forestry Category

Widespread adoption of cost-effective agricultural best management practices ("Priority Practices")

Objective: By 2013 fully implement priority agricultural best management practices in the Chesapeake Bay watershed in order to significantly advance the Commonwealth's nutrient and sediment pollution goals.

An action of the 2008 Virginia General Assembly established the Natural Resources Commitment Fund (NRCF) as a new "Subfund" of the Water Quality Improvement Fund for the purpose of more directly addressing agricultural nonpoint source pollution. The Assembly placed $20 million in the NRCF for fiscal year 2009 and codified requirements that 5% of monies placed in the subfund are to be distributed to soil and water conservation districts (SWCDs) for technical assistance, 57% will be directed to agricultural BMPs in the Chesapeake Bay basin and the remaining 38% balance is directed to implement agricultural BMPs on other lands outside the Chesapeake Bay basin. DCR is administering these monies through the state-wide Agricultural BMP Cost-Share Program which is implemented locally by the state's 47 SWCDs. Portions of the funds are enabling established "TMDL" projects in targeted watersheds to continue to address the most serious water quality problems that are attributed to agricultural operations.

Five suites of best management practices have been identified as priority practices by Virginia, they include: nutrient management, conservation tillage, cover crops, riparian buffers, and livestock stream exclusion.

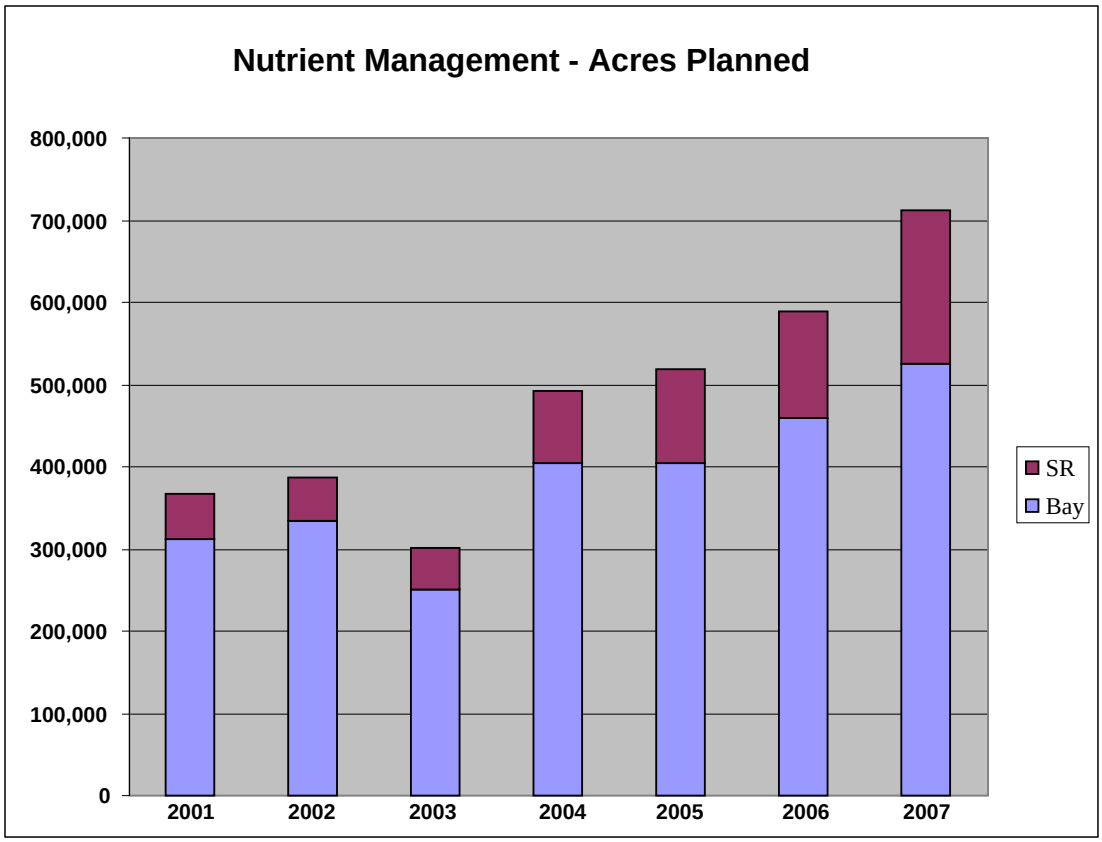
Over eighty three percent ($13.820 million of $16.525 million) of the total cost share allocations from the NRCF were committed to soil and water conservation districts for cost-sharing on priority practice BMPs in fiscal year 2009.

Performance Measurement: Pounds of nitrogen and phosphorus reduced through the implementation of priority practices as reported to the EPA Chesapeake Bay Program.

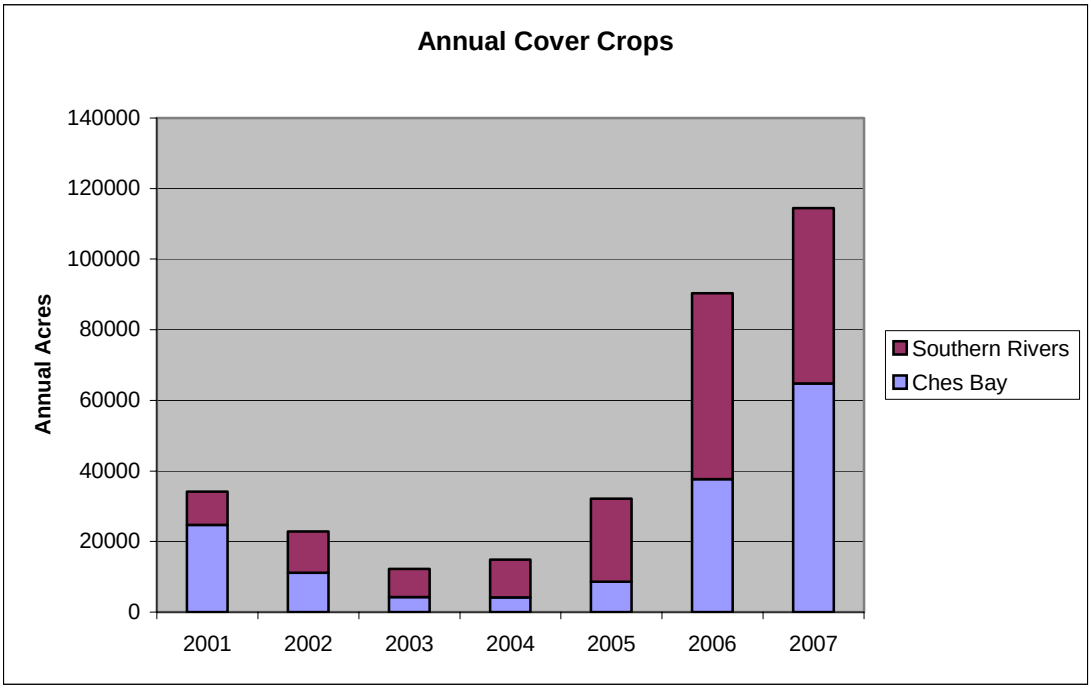
Potential Nutrient Reductions Calculations from Priority Practice implementation in Calendar Year 2007

Practice	**Total Nitrogen Pounds Reduced**	**Total Phosphorus Pounds Reduced**
Nutrient Management	964,856	85,678
Cover Crops	441,500	9,603
Livestock Exclusion	112,934	25,060
Stream Buffers	32,378	2,918
Continuous No-Till	166,616	45,430

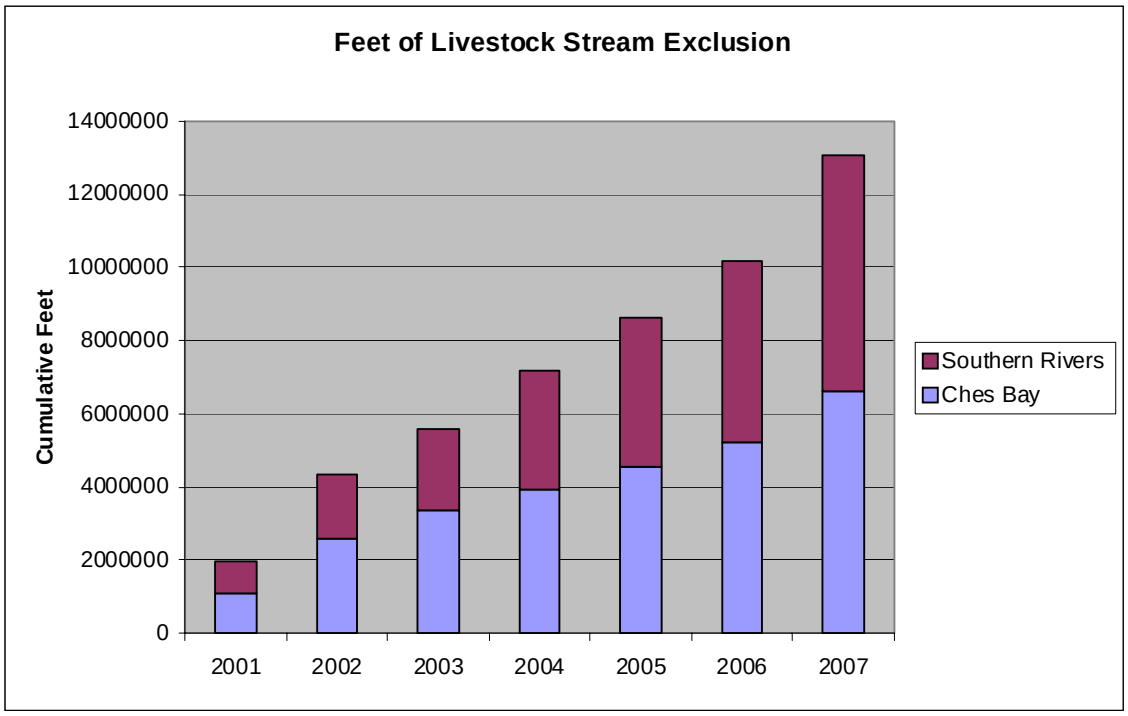
Summary graphs of the priority practice implementation levels are included on the next pages:



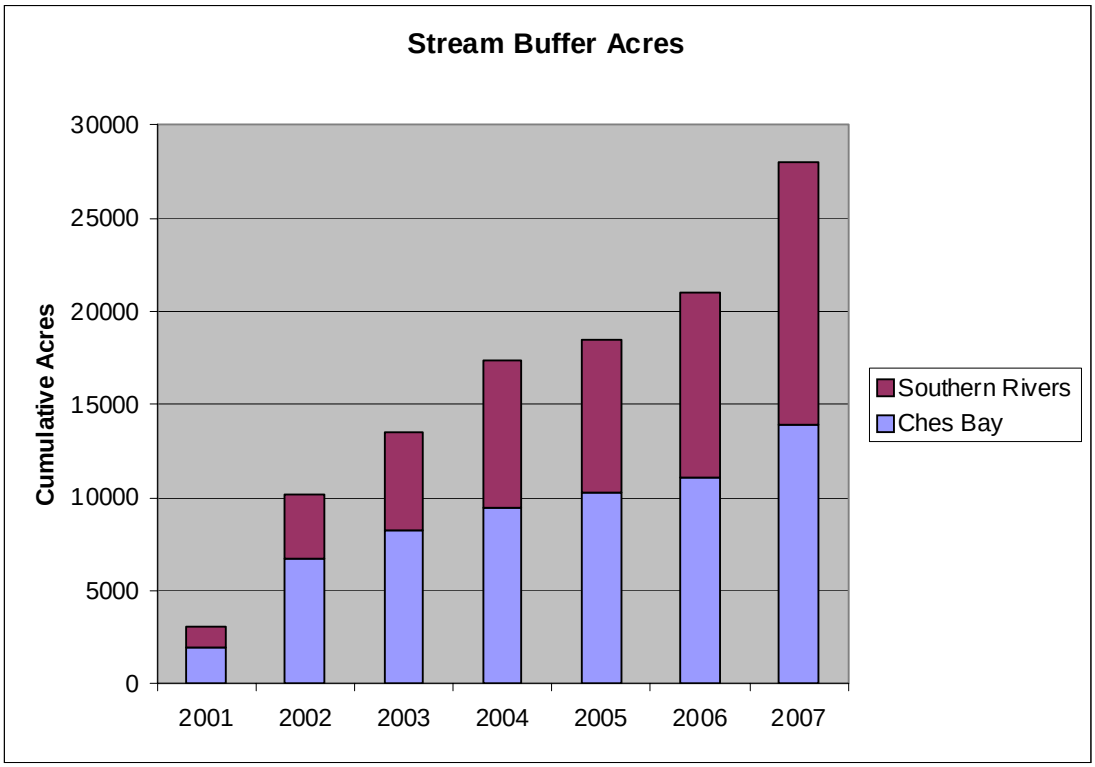
Tributary Strategies Based Bay Goal:	***1,009,595 Acres***
Progress: 524,197 Acres	***52%***



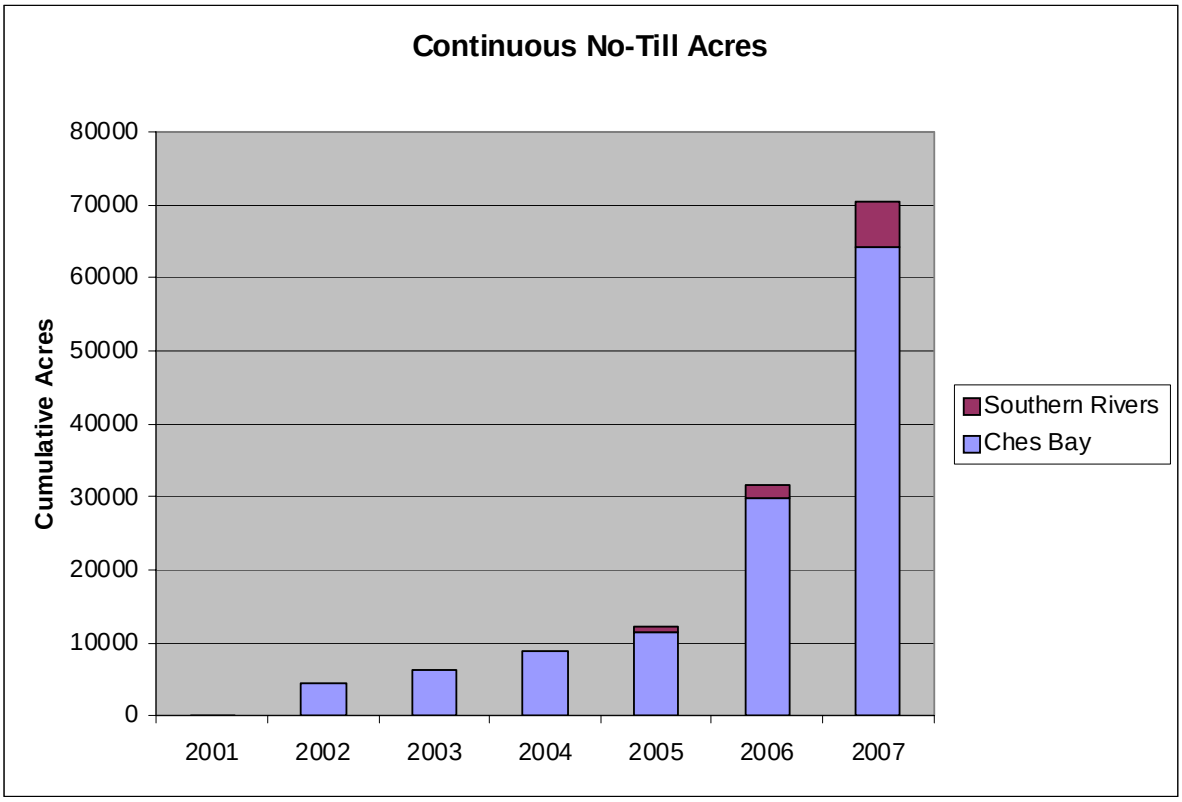
Tributary Strategies Based Bay Goal:	***413,232 Acres***
Progress: 64,811 Acres	***16%***



Tributary Strategies Based Bay Goal:	***54,754,946 Linear Feet***
Progress: 6,604,337 Linear Feet	***12%***



Tributary Strategies Based Bay Goal:	***312,523 Acres***
Progress: 13,927	***4%***



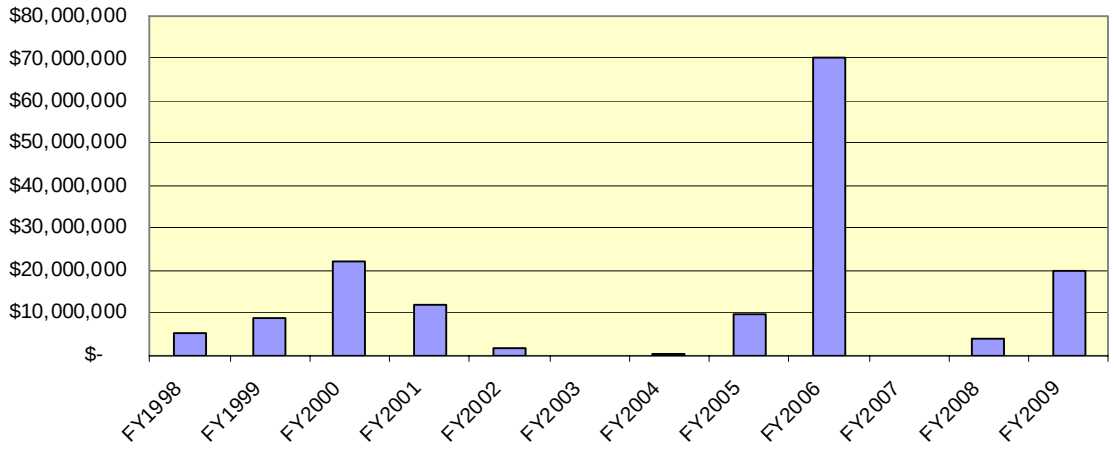
Tributary Strategies Based Bay Goal:	***41,686 Acres***
Progress: 64,083	***150%***

The Tributary Strategies Goals for Continuous No-till (a form of conservation tillage) were set as a placeholder since at the time of the strategies development this practice was not officially recognized by the Chesapeake Bay Program as a quantifiable nutrient and sediment reduction practice. Virginia is working toward having a much higher percentage of overall conservation tillage being implemented via Continuous No-till since this BMP has a 5-year lifespan and is considered to produce higher reductions than other forms of conservation tillage. Therefore, future progress reports will likely include a significantly increased Tributary Strategies Based Bay Goal for this practice and a proportionally significant reduction in the progress achieved to date.

The following graph depicts the total WQIF funding (for nonpoint source projects) from 1998 through 2007. Significant fluctuations in funding amounts have jeopardized farmer commitment and compromised Soil and Water Conservation District staff resources.

Virginia Department of Conservation and Recreation
Water Quality Improvement Fund (WQIF)

Fluctuations in Appropriations to WQIF for Nonpoint Source Reduction Practices
FY1998 to FY2008



An unprecedented level of funding (approximately $69 million) was made available during fiscal year 2006 from actions taken by the 2005 and 2006 sessions of the Virginia General Assembly. This collective funding supported Cooperative Nonpoint Source Pollution Program Projects with local governments, the Conservation Reserve Enhancement Program, priority water quality initiatives, and the Virginia Agricultural BMP Cost-Share Program. The monies were planned and apportioned for FY06, FY07 and FY08 to enable greater stability and consistency with financial incentives directed to the Agricultural BMP Cost-Share Program. The 2008 session of the General Assembly established the Natural Resources Commitment Fund within the WQIF. The Commitment Fund received $20 million for implementation of agricultural BMPs for FY09 (this funding included 5% technical assistance for soil and water conservation districts).

The Department of Conservation and Recreation's latest estimates indicate that the Commonwealth will need to appropriate approximately $409 million over the ensuing five years to implement sufficient levels of the five priority practices and other agricultural BMPs needed to meet our Bay clean-up goals. An additional $219 million in costs will also be incurred by the farmers.

Implement nutrient management on lands receiving poultry litter

Objective: Revise the current poultry litter management program to assure that all land application of poultry litter will be done in accordance with prescribed nutrient management planning practices.

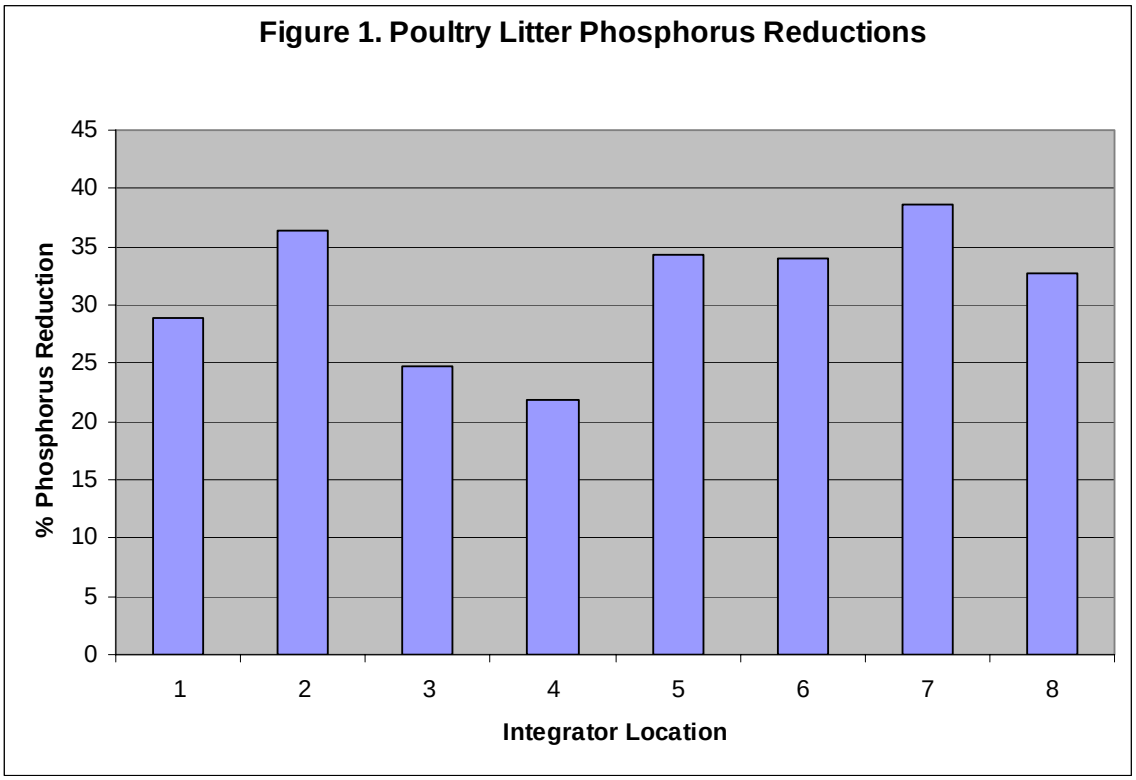
Two efforts continue to be pursued relative to this objective. First, the Department of Conservation and Recreation and the Virginia Poultry Federation initiated a cooperative effort to cost-share the transport of poultry litter from areas of concentrated poultry production where soils are phosphorus rich to outlying areas where soil analyses indicate that crops need additional phosphorus. This effort began late in 2007. The Commonwealth and the Virginia Poultry Federation will each contribute up to $100,000 per year in transport cost-share funding. The program pays $5 per ton of poultry litter transferred from either Page or Rockingham counties to outlying areas within the Chesapeake Bay watershed, and $12 per ton for areas outside the Bay watershed. As of November, 2008, 4,419 tons of litter had been transported outside phosphorus rich areas utilizing $30,454 of cost-share money. Nutrient management plans submitted with applications for this program have been reviewed by Department of Conservation and Recreation staff, and all litter that has been transferred with the help of cost-share dollars from this program has been applied in accordance with the approved nutrient management plan.

The second effort was to consider potential regulatory or legislative changes to the poultry waste management law or regulations to ensure proper nutrient management practices by end users of poultry litter continues to progress. The Department of Environmental Quality formed a Technical Advisory Committee (TAC) to pursue the recommendations of the stakeholder committee previously formed by the Secretary of Natural Resources. It was the recommendation of the stakeholder group that existing regulations be revised to include additional safeguards for the off-site application of poultry litter. The TAC held meetings with representatives from the poultry industry, growers, litter brokers, and other government agencies throughout 2008. The final draft of revisions to the existing poultry waste management regulations that came out of the TAC meetings included adding a technical regulation for poultry waste end users that gives several options for them to apply litter in ways that will reduce nutrient pollution. A key part of the draft revised regulations also addressed the improvement of tracking poultry waste transfers from growers to brokers and end users. The regulations addressing end users of poultry litter will go to the water board in March 2009 for their approval to go to public notice. The regulations are expected to be final by fall of 2009.

Significantly reduce the phosphorus content of poultry, swine and dairy manures through aggressive diet and feed management

Objective: Reduce the phosphorus content in poultry litter and swine manure by 30% through wide-spread adoption of feed supplements throughout Virginia's poultry and swine industries and achieve a 20% phosphorus content reduction in dairy manure through improved diet and feed management.

Memorandums of Agreement were signed with eight poultry integrators in November, 2007. These Memorandums established a goal of a 30% reduction in phosphorus in litter for each integrator as compared to baseline data. Monitoring of each poultry integrator's phosphorus reduction began on July 1, 2008, and will continue annually. DCR staff will meet with each integrator individually to inform them of the results of the monitoring and discuss with them any needed adjustments for them to achieve full compliance with the 30% reduction goal. The July 1, 2008, monitoring results are shown in Figure 1.



Efforts to establish a Memorandum of Agreement with swine integrators in Virginia are being investigated.

The Department of Conservation and Recreation continues to fund a Dairy Precision Phosphorus Feeding program to help reduce phosphorus in dairy feed. DCR contributed $400,000 of Water Quality Improvement Fund (WQIF) funds to create this pilot incentive program for dairy producers. An additional $880,000 in federal grant funds were leveraged through the use of these state funds. Farmers who meet performance targets for phosphorus in their rations are eligible to receive incentive payments. Producers who participate in the program also receive free feed and manure analyses. At the beginning of 2008, 215 farms, or 29% of all dairy farms in the Commonwealth of Virginia, were enrolled in this program. Dairies have qualified for over $56,000 in incentive programs, and over $114,000 in grant money has been spent to run 5,500 feed analyses. Monitoring of phosphorus reduction is ongoing. In the 128 herds which completed a total monitoring cycle, their reduction in phosphorus fed was 109 lbs/day over a year. This equals a reduction in phosphorus fed and excreted of 19.9 tons from the 18,994 cows in those groups. These numbers show a significant decline in over-feeding of phosphorus due to

the implementation of this program. As enrollment continues to increase, further reduction is expected. However, the rise in cost of feed supplements that are low in phosphorus, primarily due to the demand for crops for ethanol production, has been somewhat detrimental to the program over the last year, and may cause future difficulties.

Accelerate land conservation efforts

Objective: The Commonwealth will, in conjunction with private and public partners, preserve for conservation purposes 400,000 acres of land statewide by 2010.

Rationale: In April of 2006, Governor Kaine announced an ambitious land conservation goal, to preserve an additional 400,000 acres in Virginia by the end of the decade. Those additional acres encompass and extend a commitment made by Virginia and its Bay partner states in 2000 to protect 20% of the lands in the Chesapeake Bay watershed by 2010. The 400,000-acre goal is based on both achieving the Chesapeake Bay commitment and in advancing important preservation in Virginia's southern river watersheds. In addition to meeting water quality objectives, protecting land helps meet goals related to outdoor recreation and quality of life.

Of all the development that has occurred in the last 400 years, more than a quarter of it has taken place in the last 15 years. Protecting land, particularly riparian lands, is a critical element of Virginia's Chesapeake Bay Tributary Strategies and will help restore and protect waters statewide. Permanently preserving land not only benefits water quality, but it also protects Virginia's natural, historic, recreational, scenic and cultural resources. Statewide in the last six years (FY2001-FY2006), an average of 56,000 acres per year has been protected in Virginia, counting the combined efforts of both private and public organizations and agencies. In Fiscal Year 2006, 65,764 acres were protected in 26 the Commonwealth, and an ambitious goal of protecting 400,000 acres by 2010 has been set. As of November 2008, approximately 263,390 acres of the goal had been met.

Strategy:

1. Maximize the use of existing state land conservation tools and incentives including the Virginia Land Conservation Foundation, the Virginia Outdoors Foundation, the Virginia Land Preservation Tax Credit program, the Virginia Coastal Program, Farmland Preservation and the Clean Water Revolving Loan Fund;
2. Identify opportunities of additional state land holding for parks, natural areas, wildlife management areas and state forests;
3. Continue coordination among state agencies and private, federal and local partners on land conservation priorities;
4. Support currently established local purchase of development rights and encourage the creation of new programs where they currently do not exist;
5. Employ geographic information based systems to identify lands with multiple

conservation values to maximize water quality and other benefits;
6. Work with the Virginia Liaison Office and Virginia's Congressional Delegation in securing federal funding for land conservation in the Commonwealth; and
7. Work with Virginia Conservation Coalition to secure state funding for land conservation.

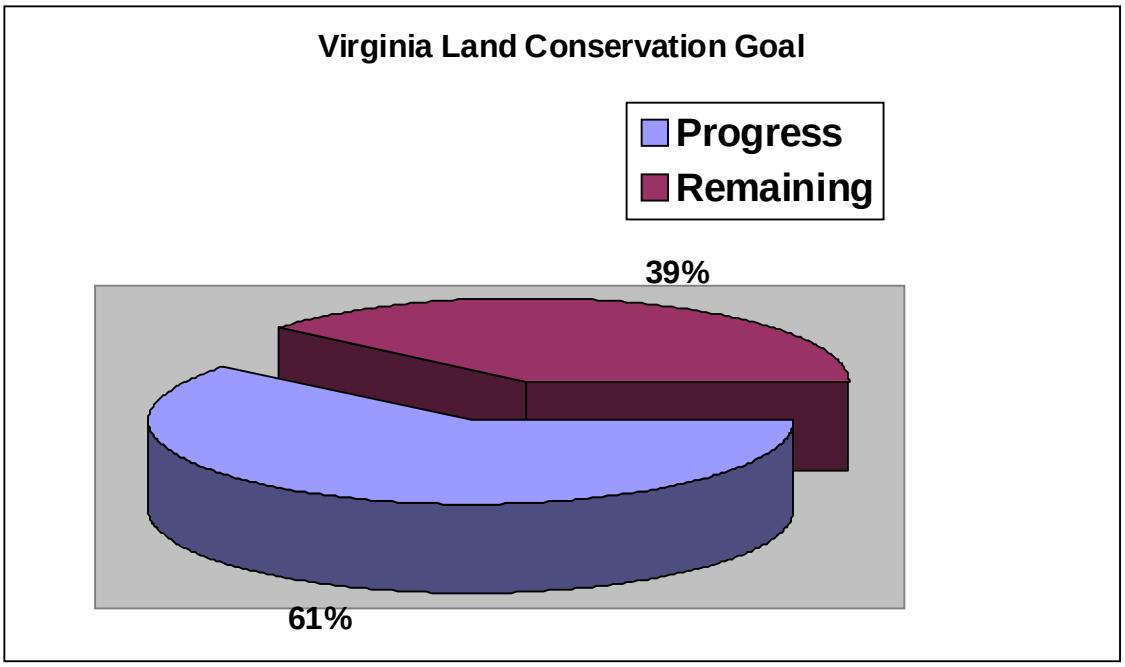
Potential Problem Areas:

1. Lack of consistent and dedicated source of funds for PDR, matching grants and acquisition programs;
2. Inflated land prices in some areas of the Commonwealth make preservation difficult;
3. While programs and tax incentives that promote conservation easements are important tools in Virginia, they do not meet the increasing public demand for parks, natural areas, wildlife management, forests, trails, and water access; and
4. Additional agency staffing capacity to handle expanded land preservation and stewardship activities is greatly needed. Staff is needed at the Virginia Outdoors Foundation, the Department of Conservation and Recreation and the Department of Historic Resources.

Risk Mitigation Strategy:

1. Work to secure a dedicated source of funding for land conservation;
2. Increase targeting of conservation lands based on a competitive review of grants and enhanced data analysis and mapping;
3. Working with Virginia's congressional delegation, the enhanced federal land preservation income tax deduction that was set to expire at the end of the 2007 tax year was extended through 2009 as part of the federal farm bill;
4. Encourage local review of the 2007 Virginia Outdoors Plan and Virginia's Wildlife Action plan to promote local efforts to address land conservation and outdoor recreation needs; and
5. Continue efforts through the biennial budget to secure necessary staff resources.

Performance Measurement: Number of acres conserved by 2010 as reported monthly and annually by the Department of Conservation and Recreation within the Chesapeake Bay and Southern Rivers watersheds (www.dcr.virginia.gov/land_conservation/index.shtml); and percentage of land preserved towards the 20% Chesapeake Bay watershed goal.



August 15, 2008 Annual Report Summary

January 1, 2008 – June 30, 2008 Permanently Protected Acres via recorded instruments/deeds			
Entity Level	**Fee Simple**	**Easement**	**Totals**
Federal	245.10	96.87	341.97
State	7,619.59	1,205.85	8,825.44
Private/Land Trust	114.12	585.22	699.34
Local	369.22	1,675.72	2,044.94
VOF	0.00	8,617.91	8,617.91
Jan 08-June 08 Totals:	8348.03	12,181.57	20,529.60
2008 Fiscal Year:	89,282.24		
Acres Remaining on the 2010 400,000 acre goal	400,000 - 67,325.76 (FY06) – 94,201.09 (FY07) – 89,283.23 (FY08) = 149,189.92		

C. Developed and Developing Lands Category

Progress on two of the five policy areas under the Developed and Developing Lands Category has been good, with measurable gains made towards full implementation and compliance of erosion and sediment control programs statewide and full compliance with septic maintenance and pump-out and BMP monitoring and inspection requirements. Reviews of local erosion and sediment control programs and Chesapeake Bay Preservation Act implementation have progressed, and will continue until these two areas have been fully addressed. Progress in these

two areas has been steady due, in part, to the regulatory nature of these two areas and the availability of state staff to undertake these reviews.

Progress on revising local codes and ordinances so as to not conflict with water quality is ongoing, with two localities having initiated a review of their codes to maximize water quality protection. DCR is continuing to develop standards for review the of 84 Tidewater localities. By the end of 2008, it is expected that DCR will begin reviewing the 84 Tidewater localities for compliance in this area.

Progress on the remaining area – establishing jurisdictional nutrient pollution targets in the Bay watershed – has been limited, due in large part, to the unavailability of jurisdiction-specific land use data from the Chesapeake Bay Program and the inability to secure grant funds (National Fish & Wildlife Foundation Small Watershed grant program) for a pilot project to be undertaken in Richmond County.

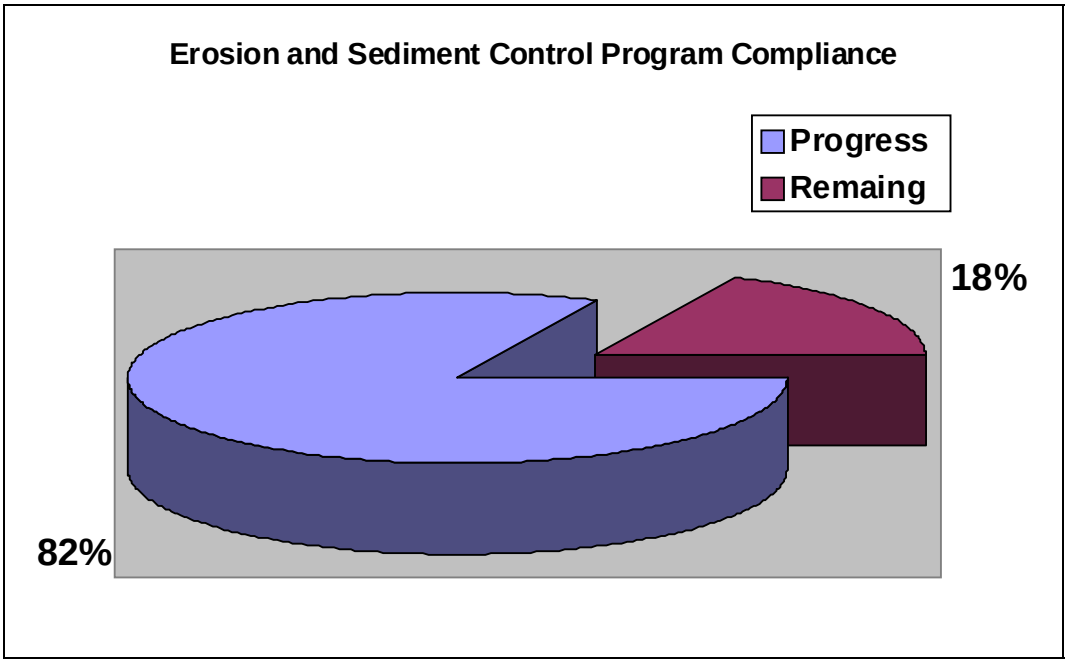
Measurable improvement toward full implementation and compliance of erosion and sediment control programs statewide

Objective: By the end of 2010, 90% of the 166 local erosion and sediment programs will be consistent with the requirements of the Virginia Erosion and Sediment Control Law.

Performance Measurement: Number of local program reviews completed annually and percentage or programs reviewed in compliance with state standards.

Current status:

The Virginia Soil and Water Conservation Board (VSWCB) adopted revised local program review criteria effective July 1, 2004. Utilizing the revised review process, DCR staff has completed 131 local program reviews as of September 24, 2008. The remaining 34 local programs are scheduled for review in FY09. As of September 24, 2008, the VSWCB has recognized 107 local programs as being consistent with law and regulations. Programs found to be not consistent with the law and regulations are required to develop and implement corrective action agreements. These programs are then considered as being conditionally consistent with corrective action pending.



Establish jurisdictional nutrient pollution targets in the Chesapeake Bay watershed

Objective: Establish jurisdictional nutrient loading caps utilizing a collaborative process, involving the U.S. EPA's multi-jurisdictional Chesapeake Bay Program, local governments with the Chesapeake Bay watershed and other public and private agencies and institutions.

Performance Measurement: Performance measures will be developed as this process moves forward.

Current status:

1. DCR coordinated a review of land use data from the Bay Program through the Phase 5 computer model with the localities in cooperation with the Planning District Commissions.
2. The Commonwealth received substantial funding through a National Fish and Wildlife Foundation Small Watershed Grants and a pilot project has been initiated in Richmond County to evaluate the relationship between pollutant loads and land use. This project should inform future discussions regarding jurisdictional nutrient pollution caps.

Fully achieve local government compliance with septic maintenance and pump-out requirements and BMP monitoring and inspection requirements of the Chesapeake Bay Preservation Act

Objective: Achieve 100% Chesapeake Bay Preservation Act compliance by Tidewater localities with septic pump-out requirements by 2010 in order to reduce impairments caused by high levels of fecal coliform bacteria.

Performance Measurement:

1. *Number of localities in compliance with local septic pump-out programs;*
2. *Number of systems pumped with estimated resulting nutrient reductions; and*
3. *Numbers of BMPs installed along with pollutants removed and acres treated.*

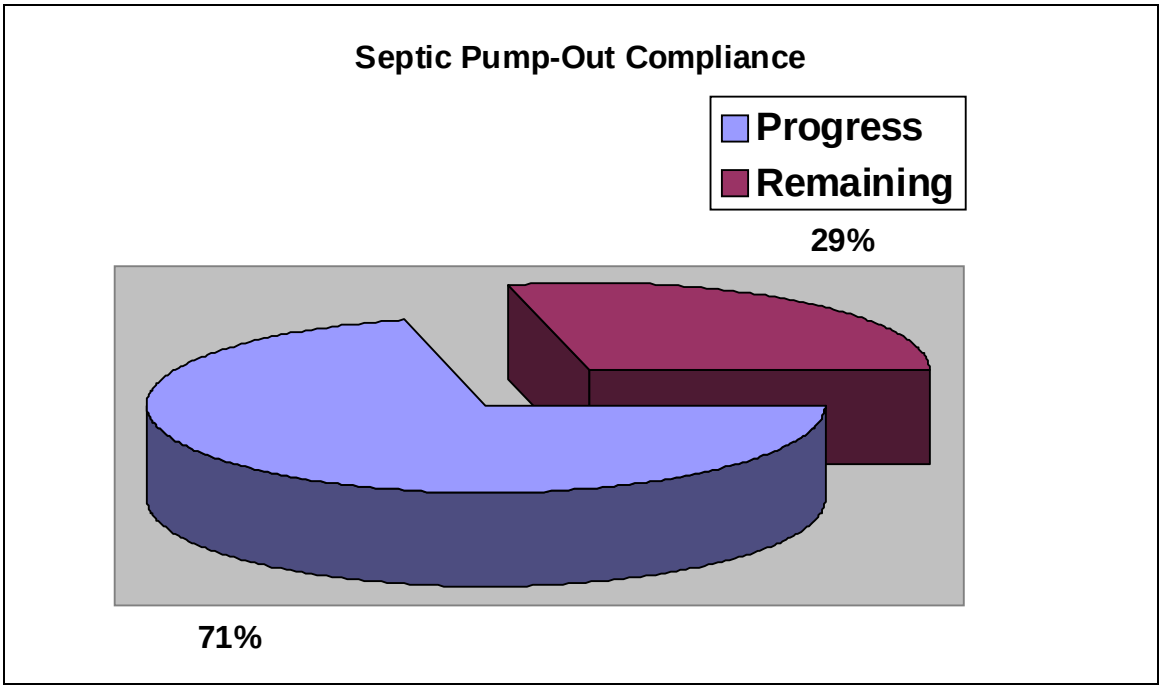
Current status: As of September 30, 2008, 60 of the 84 Tidewater localities have been found by the Chesapeake Bay Local Assistant Board, to have met the septic tank pump-out requirements. An additional 5 are known to have programs; however, a formal Board evaluation has not yet been completed. This is an increase from 37 in 2007.

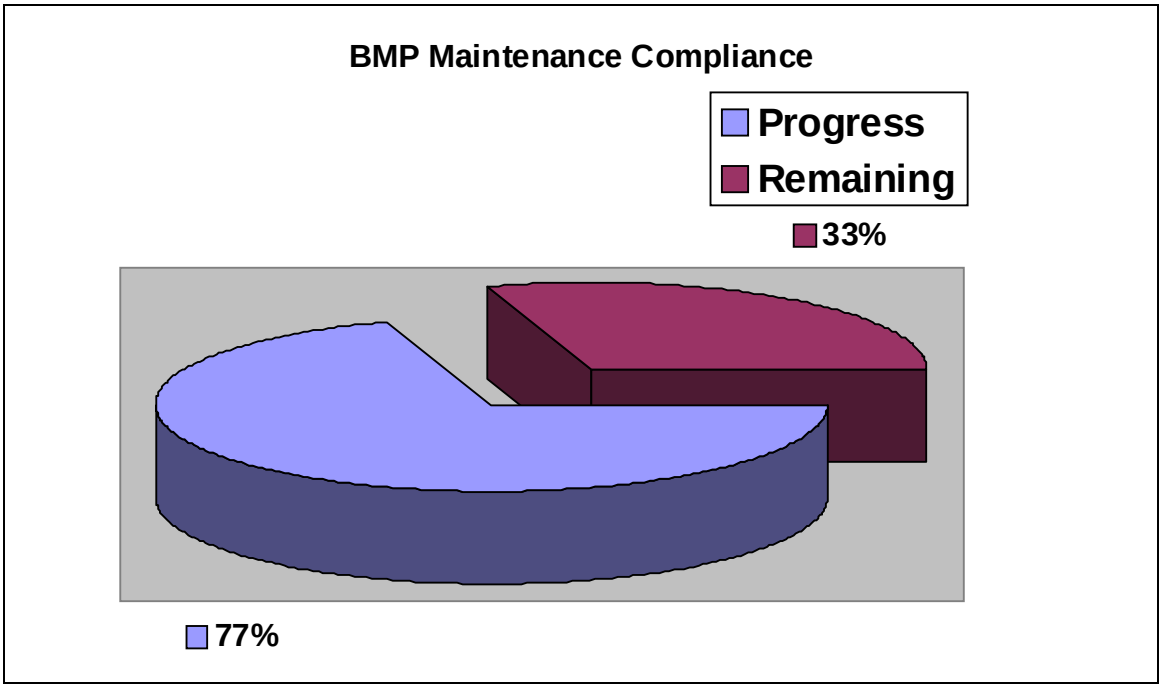
In Chesapeake Bay Preservation Areas, 13,904 septic systems are known to have been pumped out during Fiscal year 2007-08. This is based upon survey responses from 39 localities. These pump-outs translate to estimated nutrient reductions of 6,952 pounds of nitrogen (based on ½ pound per system). An additional 2047 septic systems were documented to have been inspected and 1278 were documented to have been fitted with a plastic filter.

As of September 30, 2008, 65 of the 84 Tidewater localities have been found by the Chesapeake Bay Local Assistant Board, to have met the BMP maintenance requirement. An additional 6 are known to have programs however a formal Board evaluation has not yet been completed. This is an increase from 40 in 2007.

In Chesapeake Bay Preservation Areas, 594 water quality BMPs currently are tracked, treating runoff from 10,598 acres of land.[1] These data are based upon July 2008 survey responses from 39 localities. An estimate of pollutant removal resulting from these BMPs is not currently available and will be provided in a future update.

[1] Two localities were unable to determine the acreage served by a total of 88 BMPs





Potential Legislation

There appears to be legislative interest to address the significant issue of financing septic system replacements and upgrades throughout the Commonwealth. Proposed legislation will likely allow for 'betterments loans,' a type of creative financing tool that certain other states are using where the state has a compelling interest in mitigating environmental and/or public health risks. For example, since failing home septic systems represent a source of nutrient pollution loading to

Virginia waters, betterments financing could be used to help homeowners faced with the substantial expense of having to replace failing septic systems. Such a mechanism has a dual benefit of both providing homeowners with affordable financing options and furthering the Commonwealth's goal of cleaning up polluted waters.

As envisioned, the betterments statute would likely be structured to address the following key components:

1. Provide state agencies (*i.e.,* Department of Health, Department of Environmental Quality, and Department of Conservation and Recreation) and local governments the authority to qualify a private party to receive a betterments loan for a specific purpose;

2. Ensure that there is no 'debt' to the Commonwealth, state agencies, or local governments;

3. Allow credit providers to compete in the marketplace, thereby allowing borrowers multiple sources of financing options; and

4. Avoid unfunded mandates on local governments by allowing localities to receive minor compensation for helping to facilitate the financing.

Revise local codes and ordinances so as not to conflict with water quality protection measures

Objective: Incorporate specific water quality protection measures into local land development codes, ordinances, and processes.

Performance Measurement:

1. *Number of local governments with compliant programs; and*
2. *Levels of impervious cover for new commercial and residential development.*

Current status: At least two localities in the Bay Act area have initiated a review of development codes to maximize water quality protection. DCR review of the remaining programs will commence when they complete all local government compliance reviews.

Implement Revised Stormwater Management Program

Objective: Complete the revision of Virginia's stormwater management regulations, implement the regulations statewide and maximize government adoption of the program.

Performance Measurement: Upon completion of the regulatory revision process, progress will be tracked semi-annually through future revisions to the Clean-Up Plan.

Current status: The Virginia Soil and Water Conservation Board (VSWCB), through DCR staff, has developed, undertaken, and completed two regulatory actions to amend and modify the Virginia Stormwater Management Program (VSMP) Permit Regulations. One regulatory action addressed 2 separate parts of the regulations: Part II - Stormwater Management Program Technical Criteria and Part III - Local Programs. The second regulatory action addressed Part XIII: Fees.

The VSWCB and DCR established a Technical Advisory Committee (TAC) to provide public participation in the development, modification and amendment of Parts II, III, and XIII of the regulations. The TAC was very active and developed proposed draft regulations. The TAC has proposed enhancements to the water quantity and quality criteria for proposed projects, new procedures for localities and DCR to follow when implementing a stormwater management program and modifications to the fees to cover the costs associated with the program. The proposed draft regulations were approved by the VSWCB at the September 24, 2008 meeting.

Next steps in the regulatory development process include:

- Preparing a fiscal analysis of the proposed regulations for submittal to the Department of Planning and Budget for review and approval.
- Submit proposed regulations to the Secretary of Natural Resources for review.
- Submit proposed regulations to the Governor for review.
- Submit approved regulations to the Registrar for publishing.
- Complete a 60-day public comment period.
- Revise regulations based on public comment.
- Submit regulations to VSWCB for final approval.
- Submit regulations to the Department of Planning and Budget, the Secretary of Natural Resources, the Governor, and the U.S. Environmental Protection Agency for final approval.

D. Air Category

Performance Measurement: The DEQ will report annually on the implementation and progress of the programs related to air deposition.

On July 11, 2008 U.S. Court of Appeals for the D.C. Circuit has vacated the U.S. EPA's Clean Air Interstate Rule (CAIR). This is now the second utility control program struck down by this court, joining the Clean Air Mercury Rule (CAMR) decision. All the impacted states, including Virginia, are currently evaluating the impact of this latest court decision. However, it is too early to determine the possible impacts of this decision on the projected emission reductions listed in the Clean-Up Plan. The EPA is appealing the CAIR decision. The CAMR decision is also still involved in the appeal process. Additional revisions to the emission reduction projections in this plan will not be made until the full impact of these court decisions is determined.

The Virginia mercury deposition study has been completed and the final report has been posted to the DEQ website at: www.deq.virginia.gov/regulations/reports.html.

III. State and Local Coordination

Objective: Develop a networked approach to delivering technical assistance to requesting localities as it relates to land conservation, water quality protection and community development in the context of protecting the Commonwealth's natural resources for future generations.

Performance Measures:

1. *Number of localities requesting and utilizing the NEMO approach.*
2. *Number of participating partners utilizing the NEMO approach (growing the network).*

There was significant progress in advancing a Networked Education for Municipal Officials (NEMO) approach in 2008. As anticipated, the demand for support has grown rapidly and the likely impediment for advancing this approach will be staffing and funding limitations.

In addition and in concert with the NEMO approach, the Coastal Zone Management Program has focused available resources on sustainable communities planning. Working with Planning Districts, the program has focused technical and financial assistance on adaptation to climate

change and blue and green infrastructure planning. These focal areas are mutually dependant and complement conservation of vital land and water resources.

IV. Healthy Waters Initiative

Background: The Commonwealth is concerned about the widening gap between impaired and restored waters. This concern has also been expressed by the U.S. EPA, Region III through its Healthy Waters priority which seeks to accelerate restoration of impaired waters and to advance preventative approaches to protect existing healthy waters.

The Department of Conservation and Recreation and the Department of Environmental Quality are implementing the following healthy waters elements as part of a pilot healthy waters grant initiative funded by EPA. The goal of this initiative is to establish a comprehensive Healthy Waters Strategy for the Commonwealth.

- Building Capacity for Conserving Healthy Streams: This project element utilizes ecological assessment data to identify and communicate the importance of protecting high quality or ecologically rich streams that are increasingly at risk. This data base has been developed as part of the Interactive Stream Assessment Resource (INSTAR) by Virginia Commonwealth University in partnership with DCR and DEQ. Significant progress has been made of developing outreach material and web-based decision support tools.
- Integrated Watershed Management Planning: The goal of this project element is to enhance local government acceptance of TMDL implementation. The Smith Creek TMDL implementation planning process has been initiated and an extensive effort has been made to better integrated local government officials into the planning process.
- Watershed Protection Planning: Developing a pilot watershed protection plan for an identified healthy water body is the goal of this project element. Discussions are underway with local government representatives for a couple of candidate watersheds.

V. Significantly accelerate removal of waters from the impaired waters list

Objective: Improve the quality of waters located outside of the Chesapeake Bay watershed ("Southern Rivers" region) through development and implementation of individual clean-up plans.
Performance Measurement:

- *Number of Waterbodies removed from the list of impaired waters; and*
- *Measurable improvements in waters not removed from the impaired waters list.*

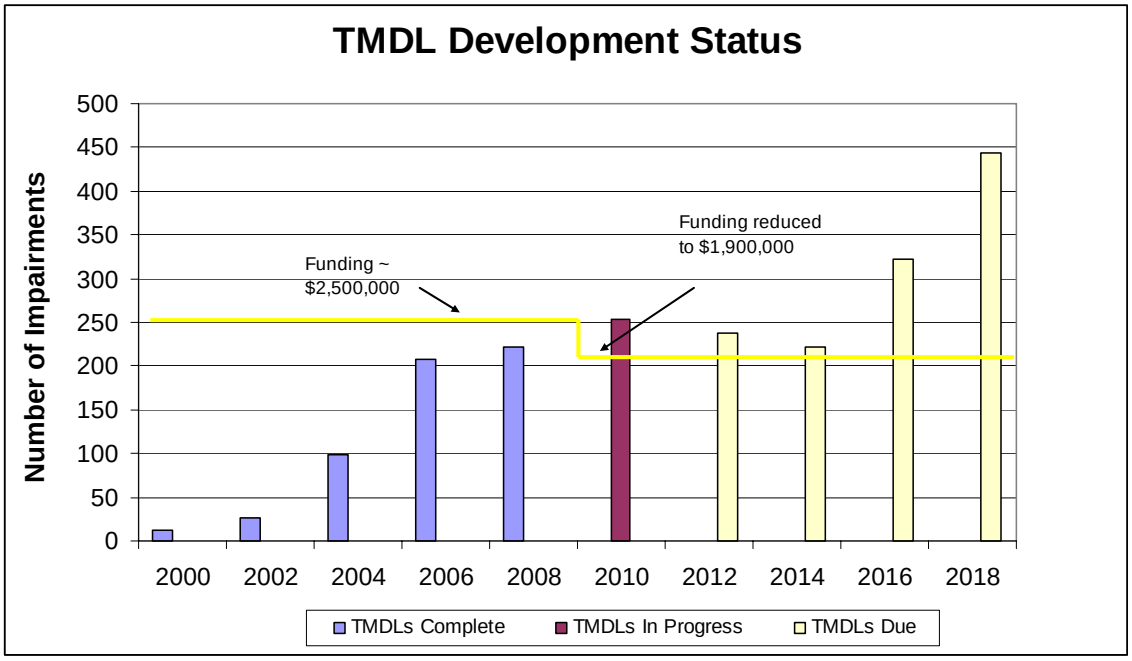
Following the completion and approval of the Total Maximum Daily Load (TMDL) for a pollutant for a particular waterbody, a TMDL Implementation Plan (IP) is required by the Virginia Water Quality Monitoring, Information and Restoration Act of 1997. While TMDL development is pollutant specific, IP's are designed to address multiple water quality problems

within a watershed at one time. IP's describe the actions (*i.e.*, best management practices) required to achieve the allocations contained in the TMDL.

To meet the May 1, 2008 Consent Decree (CD) requirements, Virginia submitted TMDLs covering 138 shellfish and non-shellfish CD impairments, and 77 non-CD impairments. The 2010 CD schedule is currently underway, with 216 CD and 75 non-CD impairments contracted for TMDL completion.

Virginia is working with EPA Region III and Maryland to complete the TMDL for the Chesapeake Bay and Tributaries. This TMDL is covered under the Consent Decree, and is scheduled for completion by December 2010.

Annual program funding is decreasing from $2.5 million to $1.9 million. TMDL development will be completed to meet the consent decree requirements through May 1, 2010. For the years beyond 2010, increased funding will be necessary to maintain the development pace. A new MOU is being developed with EPA to establish future TMDL and Implementation Plan goals.

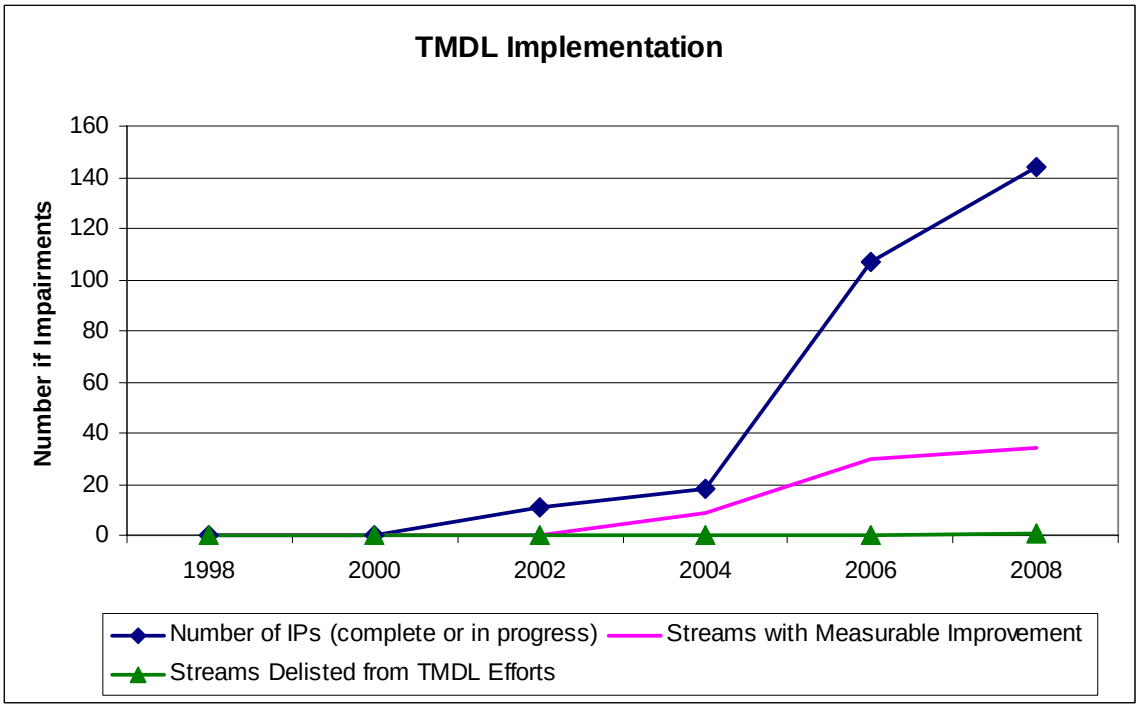


* 2012 – 2018 numbers updated as of 2006 305(b)/303(d) Integrated Report.

Development of TMDL Implementation Plans [IPs] has not progressed nearly as quickly as development of the TMDLs, largely due to lack of funding. In fact, only Six IPs have been completed since the 2007 progress report that address 14 impaired stream segments. Seven additional IPs were started that address 22 impaired stream segments.

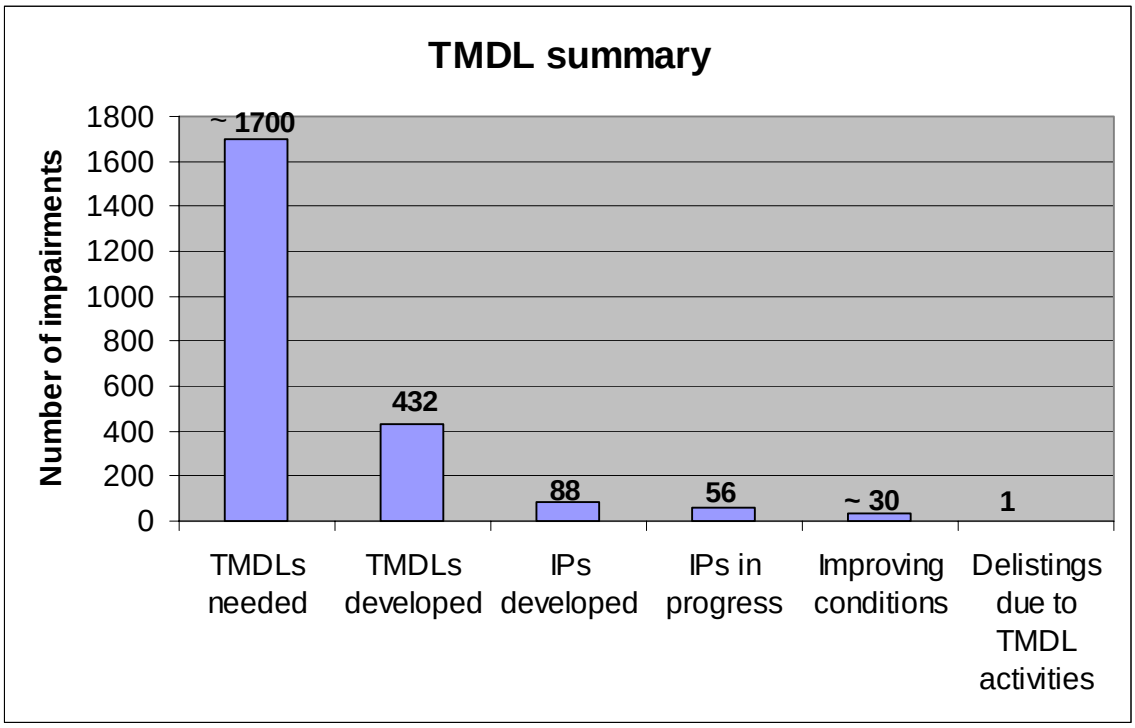
Several of Virginia's streams are showing measurable improvements following TMDL implementation activities in the watersheds or implementation in headwater streams resulting in downstream improvements. These include the Willis River in Buckingham and Cumberland Counties and the North River in Rockingham County based on the Virginia's 2006 Water

Quality Assessment Report that indicated that these previously impaired stream and river were attaining the bacteria standard. In the 2008 Assessment Report five additional stream segments were listed that have received targeted federal and state implementation funding and are attaining water quality standards. These include: Willis River, Buckingham and Cumberland Counties, 16.68 miles; Big Otter River, Bedford and Campbell Counties, 13.98 miles, Maggodee Creek Upper, Franklin County, 4.40 miles; Stroubles Creek Middle, Montgomery County 2.20 miles, Deep Creek, Nottoway County, 5.59 miles, and the Lynnhaven River in the City of Virginia Beach.



Prior to July 2006, the only targeted funding available for TMDL implementation in Virginia was from EPA's 319 program. This funding is used to implement agricultural, urban, and residential best management practices and technical assistance funding to hire staff through Soil and Water Conservation Districts and local Health Departments to work with landowners. Starting in July 2006, DCR began targeting a portion of the Water Quality Improvement Fund (WQIF) to an additional eight soil and water conservation districts for TMDL implementation. In addition to targeting WQIF agricultural cost-share funding, an allocation of general funds was made to support technical assistance staff in these districts. Approximately $5.6 million of WQIF, 319, and general funds were spent or obligated for contracted BMPs and to provide technical assistance in TMDL implementation during 2007.

The figure on the next page summarizes the current status in all steps of the TMDL process. The figure highlights the large number of TMDLs required due to the number of impaired waters throughout Virginia. While progress in Virginia continues in TMDL development, additional impairments continue to be added with each assessment cycle. The figure clearly shows the challenge of moving from the study and planning phase into implementation. To date, there is only one stream that has been fully restored through the TMDL process.



EPA Funded TMDL Initiatives:

Smith Creek Implementation Plan: The goal of this initiative is to integrate water quality improvements that will be developed as part of the TMDL Implementation Plan (IP) with local land use priorities within the Smith Creek watershed, located in Rockingham and Shenandoah Counties. In order to accomplish this objective, the IP must reflect the needs of the community with respect to both development and water quality, and the IP must be well-integrated with existing planning efforts, including local comprehensive plans.

Accotink Benthic TMDL: The Accontink Creek Benthic TMDL is within a highly urbanized watershed in Fairfax County. This innovative TMDL is addressing the impact of increased storm flows resulting from large areas of impervious surfaces. Very little of the sediment responsible for the benthic impairment is being transported from the watershed. Instead the exacerbated stream flows (volume & velocity) produce bottom scour and bank erosion resulting in periodic re-suspension of the bottom sediment responsible for the degraded benthic community. The goal of the TMDL is address reasonable options to reduce the extreme stream flows that cause the physical destruction of benthic habitat. This TMDL will serve as the prototype for future urban TMDLs in Virginia.

Measureable Improvements:

It is generally too early to show water quality improvements and results for projects in the early stages of implementation (those less than two years old). It should be noted that since 2001 when the two (2) pilot projects were initiated in the Southern Rivers (Middle Fork Holston and Upper

Blackwater River), the State's water quality bacteria standard has been modified twice, and a third revision was approved through the State Water Control Board's Triennial Review of Water Quality Standards. In the case of the two previous modifications, the revisions have been more conservative and this has impacted the achievement of measurable progress for water quality improvements.

There are several implementation projects that are showing marked improvement in water quality, but for many of the TMDL implementation projects it is still too early in the process to assess the degree of water quality improvement. The Willis River, however, may be an exception. This project has shown remarkable success in the 30 months it has been active. In 1996, the Willis River (part of the James River Basin, located in Cumberland and Buckingham Counties) was placed on the Commonwealth of Virginia's 1996 303(d) list because of violations of the fecal coliform bacteria water quality standard. In 2005, DCR and Peter Francisco Soil and Water Conservation District, with extensive public input, started a five-year TMDL project to reduce fecal coliform levels in the Willis River through implementation of agricultural and residential BMPs in accordance with an approved TMDL implementation plan.

As of June 2008 numerous implementation actions had occurred to address the Willis River impairment, including: (1) 18 miles of livestock exclusion stream fencing installed, resulting in removal of 2,577 livestock from having direct stream access, (2) one loafing lot management system for a dairy was installed, (3) ten septic tanks have been pumped out, an additional three are contracted, (4) one septic system has been repaired and three repairs are contracted, (5) one septic system has been replaced and two more are contracted, and (6) an alternative waste treatment system is contracted. As a result of these actions, the bacteria standard violation rate has been reduced to 10% or less for portions of the Willis River resulting in a partial de-listed from the Impaired Waters List.

APPENDIX I: TMDL IMPLEMENTATION PROGRAM SUMMARY REPORT

Since 2000, Virginia's Total Maximum Daily Load (TMDL) Program has made great strides in the development of TMDLs to meet the EPA consent decree, the development of implementation plans (IPs) and the implementation of TMDLs through watershed restoration. In February 2007, the Department of Environmental Quality (DEQ), in cooperation with the Department of Conservation and Recreation (DCR) and the Department of Mines, Minerals and Energy (DMME), released a report describing the 6-year progress, issued March 2007, of TMDL development, implementation plans and the application of best management practices in Virginia's TMDL program. The report is available on DEQ's website at: http://www.deq.virginia.gov/tmdl/pdf/06prgrpt.pdf.

To meet the NPS Annual Reporting requirement for 2008 and to summarize the activities from July 1, 2007 through December 31, 2008; DCR has developed this ***TMDL Implementation Program Summary Report.*** This report summarizes the successes and accomplishments of the TMDL program during 2008. Additional information regarding this program can be found in Appendix 2 which contains case studies of the Section 319 funded TMDL implementation projects; summarizing their progress from conception through December 31, 2008. Please note that Chapter V (Page 28) of the progress report for the "Chesapeake Bay and Virginia Waters Cleanup Plan" detailed the progress of the TMDL development program by the Virginia Department of Environmental Quality. This Appendix will not include detailed information on the status of TMDL development, but instead focus on TMDL implementation plan development and TMDL implementation.

TMDL Program Background

Virginia's goal is that all rivers, lakes, streams and tidal waters attain the appropriate beneficial uses. These beneficial uses are described by the following use goals: drinking water, primary contact/swimming, fishing, shellfishing, and aquatic life. These uses are protected by application of the state's numeric and narrative water quality criteria. When the beneficial uses are not being met these waters are considered "impaired" and the state must take steps to meet water quality standards to ensure that water quality is restored. One very important step in restoring water quality in the impaired streams is the development of Total Maximum Daily Loads, or TMDLs.

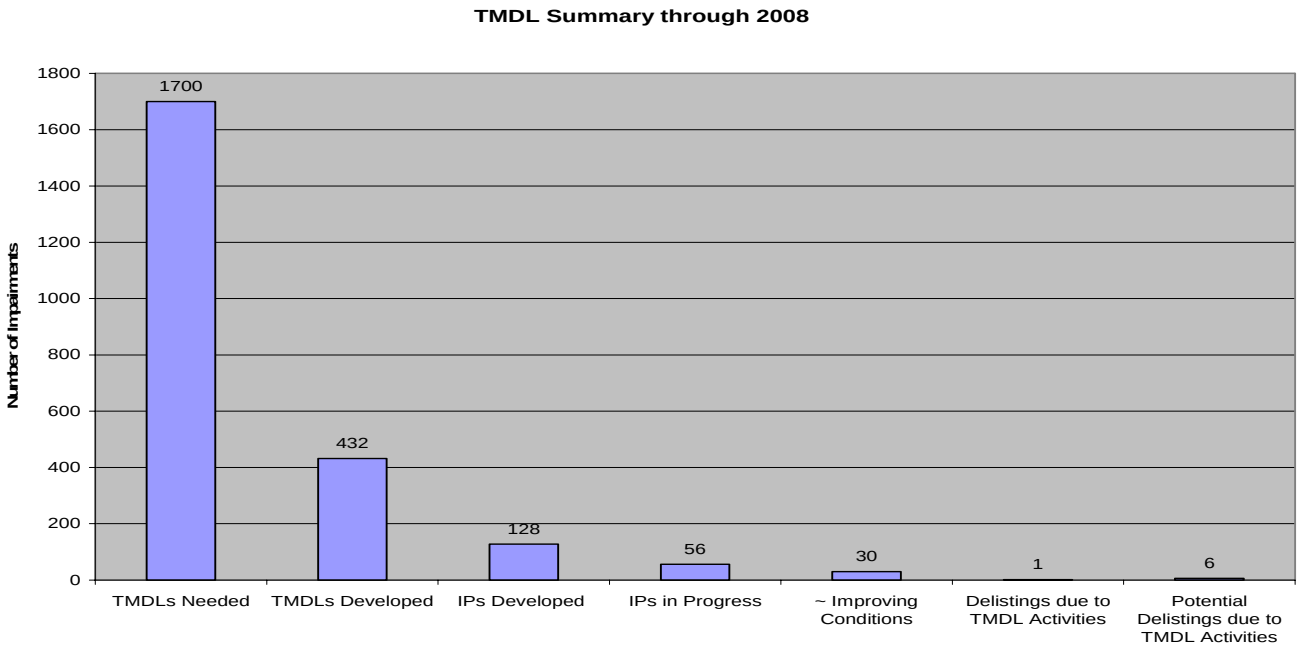
The goal of Virginia's Total Maximum Daily Load (TMDL) program is to achieve attainment of water quality standards. The Commonwealth achieves this goal by means of a three-phase process: TMDL development, development of TMDL implementation plans (IP) and/or permit conditions, and implementation of permit conditions and/or best management practices. TMDL reports, implementation plans and implementation progress updates are available on the Department of Environmental Quality's (DEQ) TMDL website at https://www.deq.virginia.gov/TMDLDataSearch'ReportSearch.ispx.

TMDLs are required for water bodies that are determined to be impaired. In general, TMDL development is required under Section 303(d) of the Federal Clean Water Act and the U.S. Environmental Protection Agency's (EPA) Water Quality Planning and Management Regulations (40 CFR Part 130). The Virginia TMDL program is also governed by a federal court Consent Decree that lays out a schedule for TMDL development through 2010 for waters identified as impaired as of 1998. For all other water bodies, TMDL development will be scheduled within 8-12 years of finding the water body impaired. Upon completion of a TMDL usually a TMDL Implementation Plan is developed and then upon completion of that plan implementation can begin.

Summary of 2008 TMDL Implementation Program

In 2008, DCR and DEQ, along with other agency and non-agency partners, continued to develop TMDLs and TMDL implementation plans and to implement these plans throughout Virginia. As a result of the work of these agencies Virginia has developed 16 implementation plans (IPs) since December 31, 2007. Since 2000 Virginia has completed 31 TMDL IPs addressing 54 impaired stream segments and 102 impairments. In addition IPs are in progress for an additional 9 plans addressing 21 stream segments and 33 impairments. In addition, to date and as a result of the program water quality conditions are improving in 30 stream segments and 7 stream segments have either been delisted or are candidates for delisting due to TMDL activities. Table I-1 summarizes the accomplishment of the TMDL Program.

Table I-1 Progress Summary of Virginia's TMDL Program through 2008



During 2008, there were 11 active §319(h) funded implementation projects. Collectively these projects implemented 379 agricultural and residential best management practices (BMPs) that resulted in the reduction of 1.27 E+16 colony forming units (CFU) of fecal coliform bacteria, 3.769 pounds of nitrogen, 871 pounds of phosphorous, and 341 tons of sediment. In July 2006, 17 additional TMDL implementation projects were started, utilizing State funding for agricultural practices. In 2008 these projects implemented 161 agricultural BMPs that resulted in the following 'edge of field' pollution reductions: 300,221 lbs/year nitrogen, 59,619 lbs/year phosphorous and 55,188 tons sediment.

During 2008 DEQ, DCR and their partners have been very busy developing TMDL plans/studies, developing TMDL implementation plans and then making sure the implementation plans are initiated and BMPs are installed. Figure I-1 provides a statewide perspective of TMDL status that was developed for Virginia's 2008 NPS assessment. The figure shows the watersheds where a TMDL study is under development, where studies have been completed; watersheds where a TMDL implementation plan is under development (based on the approved TMDL study); and those watershed where the TMDL implementation plan is complete.

Figure I-2 shows further detail in the progress of TMDL implementation plan development as well as implementation. In almost all cases, watersheds that have a completed implementation plan have current and active TMDL implementation projects on-going. In some specialized cases, TMDL implementation is active even if the implementation plan is under development.

Figure I-1: Status of Nonpoint Source, Non-shellfish TMDLs by Watershed in Virginia

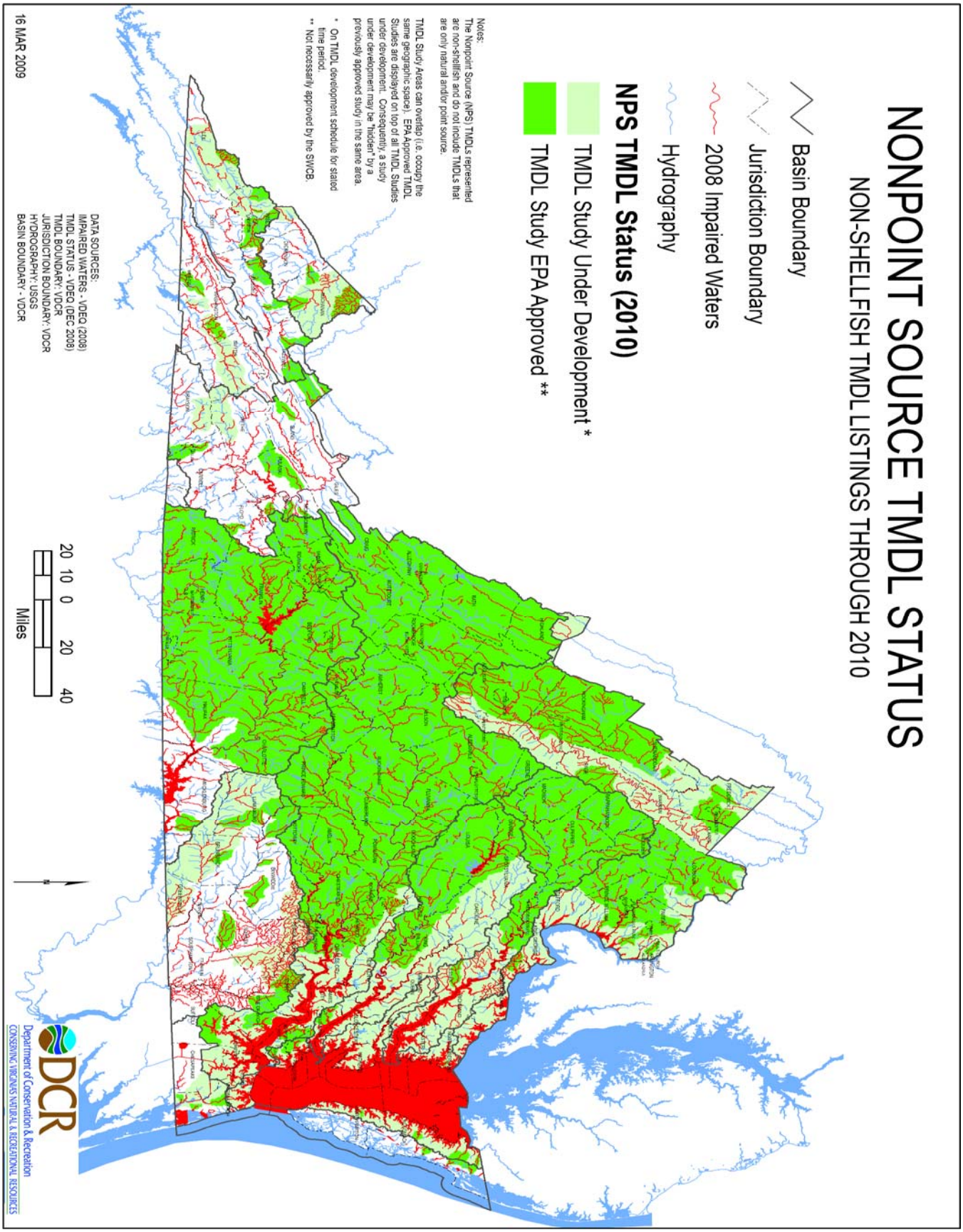


Figure I-2: Status of TMDL Implementation Status in Virginia

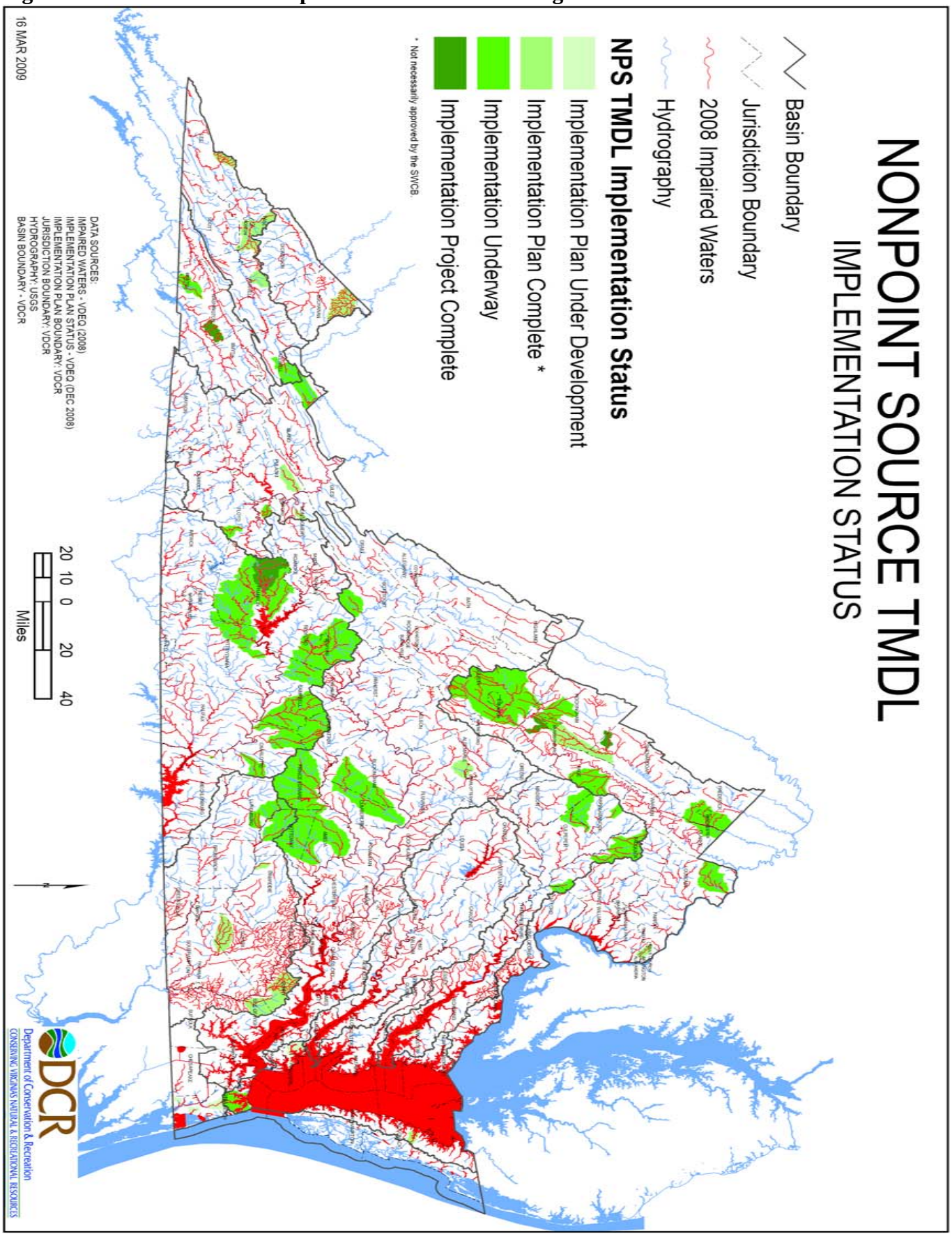
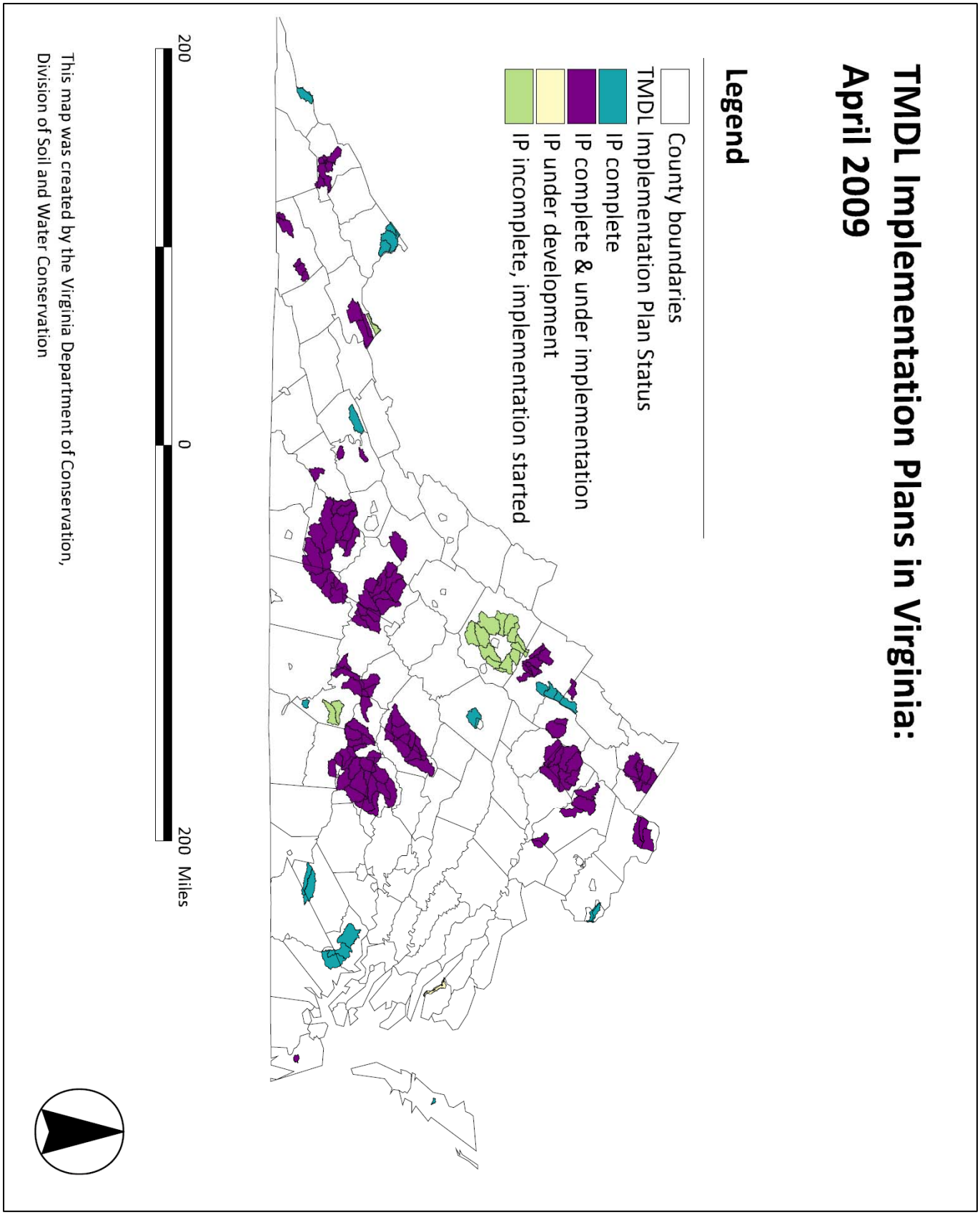


Figure I-3: Status of TMDL Implementation Plan Development in Virginia



TMDL Implementation Plans

Once the TMDL is developed the report is submitted to EPA for approval. Virginia state law (1997 Water Quality Monitoring, Information, and Restoration Act (§62.1- 44.19:4 through 19:8 of the Code of Virginia), or WQMIRA, requires the development of a TMDL implementation plan (IP) after a TMDL is developed and approved. There is not a mandated schedule for IP development; however local or state agencies, as well as community watershed groups, can take the lead in developing TMDL IPs. The IP describes the measures that must be taken to reduce pollution levels in the stream, and includes a schedule of actions, costs, and monitoring. DCR and DEQ have both worked on the development of approved IPs. In 2008 DCR and DEQ completed 7 implementation plans covering 14 impaired segments and have drafts ready for an additional 5 implementation plans covering 18impaired segments. To date 32 IPs have been completed, covering over 84 TMDL segments and 102 impairments. During 2008 (and continuing into 2009), DCR along with DEQ staff, have been working on an additional nine TMDL implementation plans; which cover 33 segments (Table I-2), this includes the 5 IPs that were in draft form at the time of this report and analysis. It is anticipated that most of these will be completed or under development by the middle of 2009.

Table I-2: Summary of Completed Implementation Plans (IP)

Watershed (# of impaired segments)	Location	Impairment	Lead	Complete
Middle Fork Holston (3)	*Washington Co.*	*Bc*	*DCR*	*2001*
North River (Muddy, Lower Dry, Pleasant, & Mill Creek) (4)	*Rockingham Co.*	*Bc, Be, NI*	*DCR*	*2001*
Upper Blackwater River (4)	*Franklin Co*	*Bc*	*DCR*	*2001*
Catoctin Creek (4)	*Loudoun Co.*	*Bc*	*DCR*	*2004*
Holmans Creek (2)	*Shenandoah Co.*	*Bc, Be*	*DCR*	*2004*
*Four Mile Run (1) **	*Arlington & Alexandria*	*Bc*	*DEQ*	*2004***
Willis River (1)	*Cumberland & Buckingham*	*Bc*	*DCR*	*2005*
*Chowan Study Area (8)**	*(Multiple counties)*	*Bc*	*DEQ*	*2005***
*Moore's Creek (1) **	*Charlottesville, Albermale Co.*	*Bc*	*DEQ*	*2005***
*Guest River (5) **	*Wise, Scott, Dickenson*	*Be*	*DEQ*	*2005***
*Lower Blackwater, Maggoddee & Gills Creek (3)**	*Franklin Co.*	*Bc*	*DCR*	*2005*
*Lynnhaven (Shellfish) (1)**	*VA Beach*	*Bc , Be*	*DEQ*	*2005***
Cooks Creek and Blacks Run (4)	*Rockingham Co., City of Harrisonburg*	*Bc , Be*	*DCR*	*2006*
Thumb, Deep, Carter & Great Runs (4)	*Fauquier and Stafford Counties*	*Bc*	*DCR*	*2006*
Big Otter (5)	*Bedford & Campbell Co.*	*Bc*	*DCR*	*2006*
Dodd Creek and Mill Creek (2)	*Floyd & Montgomery Co.*	*Bc*	*DCR*	*2006*
Little Creek and Beaver Creek (3)	*Bristol, Washington Co.*	*Bc, Be*	*DCR*	*2006*
*Stroubles Creek (1) **	*Montgomery Co*	*Be*	*DEQ*	*2006***
*Back Creek (2) **	*Pulaski Co.*	*Bc , Be*	*DEQ*	*2006/07***
*Abrams & Opequon Creek (5)**	*Frederick & Winchester Co*	*Bc , Be*	*DEQ*	*2006***
*Knox & PawPaw Creek (2) **	*Buchanan Co.*	*Bc , Be*	*DEQ*	*2007***
Hawksbill & Mill Creek (2)	*Page Co.*	*Bc*	*DCR*	*2007*
Looney Creek (1)	*Botetourt Co.*	*Bc*	*DCR*	*2007*
Upper Clinch River (1)	*Tazewell Co.*	*Be*	*DCR*	*2008***
Occahannock Creek (Shellfish) (1)	*Accomack*	*BC*	*DCR*	*2008 CNP*
Falling River (1)	*Campbell and Appomattox*	*Bc*	*DCR*	*2008***
*Dumps Creek (1)**	*Russell Co.*	*TSS,TDS*	*DEQ*	*2008***
Bluestone River (1)	*Tazewell & Bluefield Co*	*Bc, Be (Sed)*	*DCR*	*2008***
*Smith Creek (1)**	*Rockingham & Shenandoah Co.*	*Bc, Be (Sed)*	*DEQ*	*2008***
Appomattox River - Spring Creek, BrieryCreek, Bush River, Little Sandy River and Saylers Creek (5)	*Prince Edward and Amelia Co.*	*Bc*	*DCR*	*2008***
Appomattox River - Flat, Nibbs, Deep and West Creeks (4)	*Amelia and Nottoway Co.*	*Bc*	*DCR*	*2008***
*Back Bay Watershed (1)**	*Virginia Beach*	*Bc*	*DEQ*	*Draft*
*North Landing Watershed (2)**	*Virginia Beach*	*Bc*	*DEQ*	*Draft*
Pigg River and Old Womans Creek (8)	*Franklin, Henry and Pittsylvania Counties*	*Bc*	*DEQ*	*Draft*
Cub, Turnip, Buffalo and UT Buffalo Creeks (5)	*Appomatox and Charlotte Counties*	*Bc*	*DCR*	*Draft*
Hazel River Watershed (4)	*Culpepper, Madison and Rappahannock*	*Bc*	*DCR*	*Draft*

TOTAL IPs Completed = Plans (31), Segments (84), impairments (102). In addition 5 IPs are in draft form that cover 21 impairmed segments. [Bc=Bacteria, Be = Benthic, Ni= Nitrogen], TSS=Total Suspended Solids, TDS=Total Dissolved Solids, Sed=Sediment

Note: All IPs were funded by §319(h), except those done in-house by either DCR or DEQ, indicated by a (*). For all completed IPs, except those indicated with (**), implementation is being partially or fully funded by Section 319(h) funds.

Watershed Restoration and TMDL Implementation:

The goal of the TMDL Implementation Program is to implement targeted, on-the-ground activities, through TMDL watershed implementation plans, that result in watershed restoration and increased water quality improvements and ultimate delisting of impaired stream segments. Virginia uses a staged approach to many TMDLs, which provides opportunities for periodic evaluation of the effectiveness of the implementation actions and adjustment of efforts to achieve water quality objectives in a timely and cost-effective manner.

History of TMDL Implementation Program

The history of TMDL implementation in Virginia dates back seven years ago when DCR started three pilot TMDL implementation projects: North Fork (Cedar Creek, Pleasant Run, Mill Creek and Lower Dry River), Middle Fork Hoston River (Three Creeks), and the Upper Blackwater River. Since that time DCR has started another 10 projects with Section 319 funds and 17 projects with state funding. In addition several other projects have been initiated throughout Virginia using other sources of funds other than Section 319 or State WQIF cost-share. Today there are more than 28 active TMDL Implementation Projects.

§319(h) Projects: DCR's first TMDL implementation projects, also known as "Pilot Projects" were funded through federal section 319 beginning in 2001 with the following watersheds: Upper Blackwater River, Middle Fork Holston River, and North River. The first two projects ended in 2006 and 2007 after 5 or 6, years respectively. The North River finished in June 2007 (after almost 7 years). To keep the momentum going for implementation activities DCR started additional projects over the years, including: three projects in 2005 (Catoctin Creek, Holmans Creek and Willis River), four projects in 2006 (Lower Blackwater River, Cooks Creek & Blacks Run, Big Otter River, and Thumb, Deep Carter and Great Runs), 2 projects in 2007 (Little and Beaver Creeks and Mill and Dodd Creeks) and one project in 2008 (Hawksbill and Mill Creeks). 2008 was the last year of implementation for both the North River project as well as Holmans Creek. DCR will begin implementation of two additional projects (Looney Creek and Hazel River) in 2009. In addition, 2009 will be the last year of federal 319 funding for the Catoctin Creek project which will have completed its fifth year.

For the most part these projects are funded with Section 319 federal funds. However several of these projects have received non-federal grants to fund urban BMP installation (Cooks Creek and Blacks Run, Little and Beaver Creek, etc.). In addition in 2007 DCR was successful in securing a source of state WQIF funds to augment federal 319 funds to be used for the installation of agricultural BMPs. Starting in 2008 two projects (Big Otter River and Mill and Dodd Creeks) began utilizing state funds for agricultural practices. In 2009 a total of 11 projects will be implemented using Federal 319 funds; of these projects five of the projects (Big Otter, Mill and Dodd Creeks, Little and Beaver Creeks, Lower Blackwater River and Hazel River) will receive some state WQIF money to fund their agricultural practices. DCR is moving in the direction that eventually all agricultural practices for TMDL Implementation projects will be funded using non-319 sources (state cost-share or federal Farm Bill funds) and that section 319 will fund residential septic and urban/residential and petwaste projects identified in TMDL implementation plans.

State funded WQIF Targeted TMDL Projects: In 2006 DCR started implementation projects for 46 impaired segments utilizing state funding through the Water Quality Improvement Fund (WQIF). These projects were the start of the state's "WQIF Targeted TMDL" program. These projects are progressing with adequate installation of BMPs related to the TMDL studies. Currently these projects only receive consistent funding for agricultural practices through the state cost-share program. However several of these projects have also received grant funds to work on urban and septic issues. In 2009 DCR will include a project in its Section 319 application to EPA that provides a source of consistent funding for residential septic BMPs, pet waste programs as well as some urban BMPs. DCR hopes that eventually it will be able to identify and secure consistent funding for all aspects of the TMDL implementation plans for these project areas.

As of December 2008, the program consists of 34 organized implementation projects funded through a variety of federal, state, local and non-profit sources (Table I-3).

Table I-3:Status of TMDL/ Watershed Implementation Projects

Watershed Area	TMDL Segment	Status	Year Implementation	Lead Agency	Funds Used
Projects 1-2 received 5-7 years of continuous funding from 319(h) administered by DCR. These projects are no longer receiving 319 funds, but may continue to receive funding from other sources.					
1-Middle Fork Holston River	VAS-O05R	MI	2001-2007	DCR	§319(h)
2-Upper Blackwater River	LAW-L08R	SI	2001-2006	DCR	§319(h)
Projects 3-15 are being funded by Federal 319(h) as well as State WQIF administered by DCR					
3-North River	VAN-B21R, B22R, B27R & B29R	I, CFD	2001-2008	DCR	§319(h)
4-Catoctin Creak	VAN-A-02R	I, CFD	2005-2009	DCR	§319(h)
5-Holmans Creek	VAV-B45R	SI	2005-2008	DCR	§319(h)
6-Willis River	VAC-H36R	I, CFD, D2008	2005-2010	DCR	§319(h)
7-Lower Blackwater River	VAW-L09R, L10R and L11R	SI, CFD	2006-2010	DCR	§319 & WQIF
8-Cooks Creeks & Blacks Run	VAV-B25R & B26R	TETD	2006-2011	DCR	§319 & WQIF
9-Thumb, Great, Carter & Deep Runs	VAN-E01R, E02R & E10R	TETD	2006-2011	DCR	§319(h)
10-Big Otter River	VAW-L23R, L25R, L27R, & L28R	I, CFD, D2008	2006-2011	DCR	§319 & WQIF
11-Mill and Dodd Creeks	VAW-N20R & N21R	TETD	2007-2012	DCR	§319 & WQIF
12-Little and Beaver Creeks	VAS-O07	TETD	2007-2011	DCR	§319 & WQIF
13- Hawksbill and Mill Creeks	VAN-B38R, B39R	TETD	2008-2012	DCR	§319(h)
14 – Looney Creek	VAW-I26R	TETD	2009-2013	DCR	§319 & WQIF
15 – Hazel River	VAN-E03R, E04R, E05R	TETD	2009-2013	DCR	§319 & WQIF
Projects 16-19 have received some WQIA RFP funds (and other funds as well)					
16-Moore's Creek	VAV-H28R	TETD	2005+	N/A	RFP
17-Guest River	VAS-P11R	TETD	2005+	N/A	RFP
187-Abrams & Opequeon Creeks	VAV-B08R & VAV-B09R	TETD	2006+	DCR/DEQ	WQIF-RFP
19-Stroubles Creek	VAW-N22R	TETD	2006+	N/A	RFP
Projects 20-23are not receiving designated funding from WQIF, RFP or 319(h)					
20-Four Mile Run	VAN-A12R	D	N/A	DEQ	OTHER
21- Middle Creek/Tazewell County	VAS-P03R	D 2006	N/A	DMME	OTHER
22-Quail Run/Rockingham County	VAV-B35R	D 2005	N/A	DEQ	OTHER
23-Lynnhaven (Shellfish)	VAT-V08E	D/SFB 2008	2005-2008	VA Beach	OTHER
Projects 24-35 have received some WQIA RFP funds (and other funds as well)					
24-Chowan Study Area	VASC-K14R, K15R, K16R, VAP-K22R, K24R, K25R and K32R	TETD	2005+ (Ag only)	DEQ	WQIF
25-Falling River	VAW-L34R	TETD	2007+ (Ag only)	DCR	WQIF
265-Mossy & Naked Creeks, Long Glade Run	VAV-B19R, B24R, B28R	TETD	2007+ (Ag only)	DCR	WQIF
27-Pigg River (Blue Ridge SWCD)	VAW-L14R, L15R, L16R, L17R	TETD	2007+ (Ag only)	DCR	WQIF
28-Pigg River (Pittsylvania SWCD)	VAW-L13R, L17R, L18R	TETD	2007+ (Ag only)	DCR	WQIF
29-Twittys and Ash Camp Creeks	VAC-L39R	TETD	2007+ (Ag only)	DCR	WQIF
30-Cub, Turnip and Buffalo Creek	VAC-L36R, L37R, L40R	TETD	2007+ (Ag only)	DCR	WQIF
31-Appomattox:Flat, Nibbs, Deep, West Creeks	VAP-J08R, J09R, J11R	TETD	2007+ (Ag only)	DCR	WQIF
32-Moffett Creek, Middle River, Polecat Draft	B10, B13, B15	TETD	2007+ (Ag only)	DCR	WQIF
33-Christians Creek & South River	B14, B30	TETD	2007+ (Ag only)	DCR	WQIF
34-Upper Clinch River	VAS-P01R	TETD	2007+ (Ag only)	DCR	WQIF
35 – Bluestone River	VAS-N36R	TETD	2007+ (Ag only)	DCR	WQIF
36- Appomattox: Briery, Little Sandy, Spring, Saylers Creeks and Bush River	VAC-J02, J03, J04, J05 and J06R	TETD	2007+ (Ag only)	DCR	WQIF

TOTAL IP implemented 36, under implementation w/ 319 funds 15, implemented with WQIF 14, Not implemented or implemented with other funds 8

TETD=To early to determine, I=Improvement, SI=Some improvement, MI=Moderate Improvement, , NI= No Improvement, D=Segment Delisted, CFD=Segment candidate for delisting, SFB= Shellfish beds were reopened

Funding of Implementation:

As the agency taking the lead in nonpoint TMDL watershed implementation, DCR utilizes both state general funds and §319(h) funds to pay for DCR regional staff to provide project management and technical support to watershed stakeholders to implement these projects. As a match to Federal 319(h) funds, DCR provides state funds for operational support of the 47 Soil and Water Conservation Districts to work with landowners by providing technical assistance for the design and installation of agricultural BMPs

Prior to July 2006, the only targeted funding available for TMDL implementation in Virginia had been from EPA's 319 program. Incremental Section 319 funding is used to pay for agricultural, urban, and residential BMPs (such as failing on-site septic systems), technical assistance (provided through Soil and Water Conservation Districts and local Health Departments) and outreach/technology transfer. In 2005 approximately $1.1 million was spent on 6 TMDL implementation projects. In 2006, over $1.84 million was spent on TMDL implementation for 10 projects. In 2007 over $1.83 million was spent on 12 TMDL Implementation projects. From July 1, 2007 thru June 30, 2008 over $1,536,500 million Federal 319 funds were spent on 11 TMDL implementation projects. Due to the limited amount of §319(h) funds available, Virginia identifies and leverages other sources of funding to fully implement the TMDLs, especially with regard to agricultural BMPs. Starting July 2007 DCR allocated approximately $1.1 million of state WQIF funds over 2 years to fund agricultural cost-share practices of the above referenced Section 319 projects.

Starting in July 2006, DCR began targeting a portion of the Water Quality Improvement Fund (WQIF) agricultural cost-share funds to eight (8) Soil and Water Conservation Districts to fund 'WQIF Targeted TMDL' projects for and additional 46 impaired segments. Approximately $4,822,500 was contracted to Districts for Agricultural BMP installation during state fiscal year 2006-2008, and it is anticipated that another $2-3 million will be available through 2009. In addition, DCR allocated $2 million (over 4 years) in state general funds to provide staff for these 8 districts to offer technical assistance to land owners in order to utilize the cost-share funds and get projects on the ground. From July 1, 2007 thru June 30, 2008 $1,022,824 was spent on agricultural cost-share BMPs using these special, targeted state funds.

BMP Implementation and Pollution Reductions:

The TMDL program and its partners work to achieve water quality standards by reducing pollution through installing the BMPs that are established in the implementation plan and the eventual de-listing of a particular stream. Documenting success and results is important for tracking progress. BMPs are effective and practical ways to prevent or reduce pollution from nonpoint sources to ensure water quality. They can range from repairing and/or installing septic systems, stream fencing, and planting riparian buffers. Hundreds of voluntary and government funded BMPs are also used throughout the watersheds. For the most part all projects were very successful in continuing their installation of BMPs.

WQIF Targeted TMDL Projects:

In 2006, 17 WQIF Targeted TMDL implementation projects were started, utilizing State funding. From July 1, 2006 – June 30, 2007 these projects implemented 23 agricultural BMPs that resulted in the following 'edge-of-field' pollution reductions: 210,091 lbs/year nitrogen, 42,113 lbs/year phosphorous and 38,620 tons/year sediment. From July 1, 2007 – June 30, 2008 these projects implemented 161 BMPS involving 97 farmers and that resulted in the following 'edge-of-field' pollution reductions: 300,221 lbs/year nitrogen, 59,619 lbs/year phosphorous and 55,188 tons/year sediment (Table I-5).

Table I-5: WQIF Targeted TMDL Projects – Extent and Pollution Reduction July 1, 2007-June 30, 2008

BMP	# Practices Installed	# of Farmers	Acres	Sediment Tons	Nitrogen Lbs	Phosphorous Lbs	$ State Cost-share Spent
FR-1	1	1	2	2	11	2	$ 350.00
FR-3	1	1	76	19	103	21	$ 600.00
SL-1	14	8	214	556	3,024	547	$ 34,211.27
SL-6	63	47	3,931	50,467	274,538	54,721	$809,355.97
SL-11	1	1	1	2	11	2	$ 2,040.00
SL-8B	32	14	856	1,711	9,308	1,802	$ 28,099.00
SL-8H	33	17	1,181	2,362	12,847	2,430	$ 23,616.00
WP-1							
WP-2A							
WP-2T	14	6	488	70	380	94	$ 64,176.07
WP-3							
WP-4	2	2	-				$ 60,375.50
WP-4B							
TOTAL	**161**	**97**	**6,748**	**55,188**	**300,221**	**59,619**	**$1,022,823.81**

FR-1 Reforestation of Erodible Crop and Pastureland	WP-1 Sediment Retention, Erosion or Water Control Structures
FR-3 Woodland Buffer Filter Area	
SL-1 Permanent Vegetative Cover on Cropland	WP-2A Streambank Stabilization
SL-6 Grazing Land Protection	WP-2T Stream Protection
SL-11 Permanent Vegetative Cover on Critical Areas	WP-3 Sod Waterway
SL-8B Small Grain Cover Crop for NM	WP-4 Animal Waste Control Facility
SL-8H Harvestable Cover Crop	WP-4B Loafing Lot Management System

Note: These values are reported "edge-of-field" numbers and not calculated/modeled 'edge-of-stream' or 'stream loading' numbers. These numbers are not consistent with the Chesapeake Bay Model.

Federal Section 319 Projects.

During 2008, there were 11 active §319(h) funded implementation projects. These projects utilized Federal 319 funds as well as State WQIF funds to implement agricultural, residential and urban BMPs. These TMDL implementation projects all achieved various levels of success in implementing BMPs, on-the-ground activities, and progress towards full implementation of their IPs to achieve the ultimate goal of delisting.

Table I-6 provides a list of the BMP names of the practices implemented during 2008. Collectively these projects implemented 349 best management practices (BMPs), including 231 residential septic system practices and 118 agricultural practices (Table I-7). The implementation of these BMPs resulted in almost 35 miles of stream exclusion fencing (Table I-8) excluding 4,568 animals (Table I-9) from access to the stream. In addition these practices resulted in the establishment of 164 acres of riparian buffers (assuming 35 foot buffer) and 873 acres of cover crop.

Table I-6: Key for BMP Codes and names of BMPs

CP-22	CREP Riparian Forest Buffer (Rental only)
FR-1	Reforestation of Erodible Crop & Pasture Land
CRFR-3	CREP Riparian Forest Buffer
NM-3	Sidedress Application of Nitrogen on Corn
RB-1	Septic Tank Pumpout
RB-2	Septic connection to public sewer system
RB-3	Septic System Repair
RB-4	Septic System Installation/Repair
RB-4P	Septic System Installation with Pump
RB-5	Alternative On-Site Septic System Installation
SL-1	Permanent Vegetative Cover on Cropland
SL-6	Grazing Land Protection
SL-6B	Alternative Water System

SL-8B	Small Grain Cover Crop for Nutrient Management
SL-8C	Small Grain Cover Crop for Nutrient Management (3-year, state)
SL-8H	Harvestable Cover Crop
SL-11	Permanent Vegetative Cover on Critical Areas
WP-2	Stream Protection
WP-2A	Streambank Stabilization
WP-2T	Stream Protection
WP-4	Animal Waste Control Facility
WP-4B	Loafing Lot Management System
WP-4C	Composting Facilities
WQ-4	Legume Cover Crop
WQ-11	Agricultural Sinkhole Protection

Table I-7: Section 319(h) TMDL Implementation Projects – BMP Installation

Number of BMPS Installed in TMDL Implementation Project Areas from January 1 thru December 31, 2008

Project	CP-22	CRFR-3	Fence Rep.	RB-1	RB-2	RB-3	RB-4	RB-4P	RB-5	SL-1	SL-6	SL-8B	SL-8H	WP-2T	WP-4	WP-4B	Grand Total
Beaver Creek and Little Creek				85		1					10	5				1	102
Big Otter River Project	8	2		10	3	5	15	1	2		30						76
Blacks Run and Cooks Creek									1			15	4				20
Catoctin Creek				2		4	6		1		3			2			18
Dodd Creek and Mill Creek				16		1	2				7						26
Hawksbill Creek and Mill Creek				16													16
Holman's Creek Watershed												1	1				2
Lower Blackwater River, Maggodee Creek, Gills Creek		1		26		1	1				7			2	1		39
Thumb, Deep, Carter and Great Runs			1	18		4	3			4							30
Willis River				6		1					13						20
Grand Total	**8**	**3**	**1**	**179**	**3**	**17**	**27**	**1**	**4**	**4**	**70**	**21**	**5**	**4**	**1**	**1**	**349**

Table I-8: Section 319(h) TMDL Implementation Projects – Extent of BMP Installation

Extent (size) of BMPS Installed in TMDL Implementation Project Areas from January 1 thru December 31, 2008

Project	CP-22	CRFR-3	Fence Rep.	RB-1	RB-2	RB-3	RB-4	RB-4P	RB-5	SL-1	SL-6	SL-8B	SL-8H	WP-2T	WP-4	WP-4B	Grand Total
Beaver Creek and Little Creek				85		1					6900	156.4				1	7,143
Big Otter River Project	82.7	8		10	3	5	15	1	2		94846						94,973
Blacks Run and Cooks Creek									1			380.3	141.1				522
Catoctin Creek				2		4	6		1		1253			2370			3,636
Dodd Creek and Mill Creek				16		1	2				18802						18,821
Hawksbill Creek and Mill Creek				16													16
Holman's Creek Watershed												151.9	12.3				164
Lower Blackwater River, Maggodee Creek, Gills Creek		3.8		26		1	1				27856			9900	1		37,789
Thumb, Deep, Carter & Great Runs			715	18		4	3			31							771
Willis River				6		1					22807						22,814
Grand Total	**82.7**	**11.8**	**715**	**179**	**3**	**17**	**27**	**1**	**4**	**31**	**172464**	**688.6**	**153.4**	**12270**	**1**	**1**	**186,650**
	Acres	Acres	Feet	System	System	System	System	System	System	Acres	Feet	Acres	Acres	Feet	system	System	

Table I-9: Section 319(h) TMDL Implementation Projects – Livestock and Stream Access

Number of livestock animals fenced out of the stream from Stream Protection Practices in TMDL Implementation Project Areas from January 1 thru December 31, 2008

Project	Beef Cattle	Dairy Cattle	Horses	Sheep/Beef Cattle	Grand Total
Beaver Creek and Little Creek	389	195			584
Big Otter River Project	1076	460	20		1556
Blacks Run and Cooks Creek					
Catoctin Creek	30		16		46
Dodd Creek and Mill Creek	720				720
Hawksbill Creek and Mill Creek					0
Holman's Creek Watershed					0
Lower Blackwater River, Maggodee Creek, Gills Creek	380	380		15	775
Thumb, Deep, Carter and Great Runs					0
Willis River	887				887
Grand Total	**3482**	**1035**	**36**	**15**	**4568**

The BMPs installed in 2008 resulted in the reduction of 1.27E+16 colony forming units (CFU) of fecal coliform bacteria, 3,769 pounds of nitrogen, 871 pounds of phosphorous, and 341 tons of sediment. Table I-10 summarizes the pollutant loads from BMPs implemented during the years 2002-2008 that were funded through 319(h) Federal Fiscal Year Grants FFY01-FFY07.

Table I-10: Section 319 TMDL Implementation Projects – Pollution Reduction 2002-2008

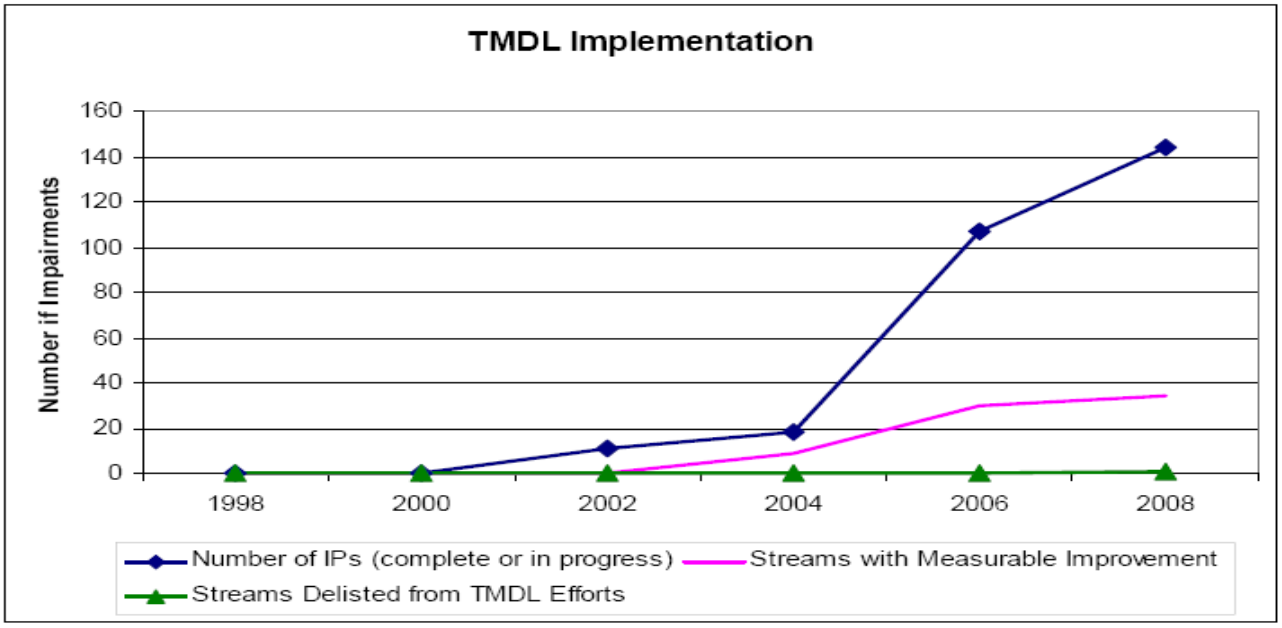
Section 319(h) - Pollutant Load Reductions By Project and Program Year July 1 2002-December 31, 2008					
Project Title	**Calendar Year**	**Pathogens (Coliform) CFU**	**Nitrogen lbs/yr**	**Phosphorus lbs/yr**	**Sedimentation-Siltation tons/yr**
North River TMDL Project	2002-2004	3.36E+15	319.24	25.99	26.88
	2005	1.02E+15	1,686.10	307.50	192.00
	2006	4.76E+14	5,756.60	1,145.90	498.70
	2007	1.74E+14	3,767.80	806.77	427.20
	2008	2.38E+14	296.90	137.60	2.80
	Sub-Total	**5.27E+15**	**11,826.64**	**2,423.76**	**1,147.58**
Catoctin Creek TMDL Project	2005	3.15E+13	225.90	43.20	27.70
	2006	1.07E+14	84.48	1.71	0.59
	2007	5.40E+14	50.72	4.65	1.64
	2008	7.19E+13	255.38	11.05	6.26
	Sub-Total	**7.50E+14**	**616.49**	**60.62**	**36.20**
Holmans Creek TMDL Project	2005	4.73E+10	924.50	181.90	110.00
	2006	3.47E+14	88.76	0.10	0.03
	2007	9.35E+14	1,566.81	276.21	221.70
	2008	0.00E+00	417.07	83.74	50.90
	Sub-Total	**1.28E+15**	**2,997.14**	**541.96**	**382.64**
Willis River TMDL Project	2005-2006	2.70E+15	43.59	7.56	1.76
	2007	3.20E+15	428.68	158.76	6.36
	2008	2.13E+15	57.68	9.00	2.08
	Sub-Total	**8.03E+15**	**529.94**	**175.32**	**10.20**
Cooks Creek and Blacks Run TMDL Project	2006	2.44E+11	851.46	79.31	50.82
	2007	1.39E+11	1,742.14	346.65	210.71
	2008	3.73E+10	988.56	171.11	104.01
	Sub-Total	**4.21E+11**	**3,582.16**	**597.06**	**365.53**
Lower Blackwater River, Maggodee Creek and Gills Creek TMDL Project	2006	9.56E+14	188.49	10.58	2.66
	2007	8.52E+14	303.11	135.58	1.74
	2008	1.70E+15	395.21	150.65	5.50
	Sub-Total	**3.51E+15**	**886.81**	**296.81**	**9.90**
Thumb, Deep, Carter and Great Runs TMDL Project	2006	1.91E+14	15.65	6.08	4.48
	2007	1.53E+15	76.46	12.79	2.96
	2008	5.72E+14	222.40	26.66	12.56
	Sub-Total	**2.29E+15**	**314.51**	**45.53**	**20.00**
Big Otter River TMDL Project	2006	9.35E+14	39.14	7.04	1.62
	2007	4.78E+15	200.51	27.71	6.39
	2008	5.03E+15	375.22	65.13	48.95
	Sub-Total	**1.07E+16**	**614.87**	**99.87**	**56.97**
Little and Beaver Creeks TMDL Project	2007	1.63E+14	22.59	1.25	0.29
	2008	1.85E+15	727.14	214.41	107.15
	Sub-Total	**2.02E+15**	**749.72**	**215.66**	**107.44**
Mill and Dodd Creeks TMDL Project	2007	5.20E+14	10.24	0.81	0.19
	2008	1.11E+15	24.78	1.65	0.38
	Sub-Total	**1.63E+15**	**35.02**	**2.46**	**0.57**
Hawksbill and Mill Creeks TMDL Project	2008	7.96E+10	8.24	0.00	0.00
	Sub-Total	**7.96E+10**	**8.24**	**0.00**	**0.00**
TMDL 2008 Total	**TOTAL**	**1.27E+16**	**3,768.58**	**870.99**	**340.59**
TMDL 2002-2008	**Grand Total**	**5.60E+16**	**32,180.49**	**6,293.46**	**3,577.20**

Water Quality Improvements, Watershed Restoration, Delisting and Future Actions

A growing challenge for the program is the transition from developing TMDLs to actual water quality improvements. Virginia has been implementing TMDLs using existing nonpoint source programs and funding sources despite inadequacies in staff and funding to handle the volume of TMDLs. Existing resources include regulatory permitting programs from DEQ, DCR and DMME that limit discharges to state waters. These programs are utilized when stream impairments are attributed to a permitted facility. For non-permitted activities, Virginia's approach has been to use incentive-based programs such as the Virginia Agricultural Cost Share Program and Section 319 grant funds and the State Revolving Loan Fund. Virginia also offers grant funding for the implementation of best management practices and technical assistance in watersheds with approved implementation plans.

Despite the challenges, Virginia's TMDL program has shown that properly applied and maintained best management practices result in measurable improvements in water quality (Table I-10). It will be the goal of Virginia's natural resource agencies to work with the general public to take this success to the next level by successful remediation of some impaired streams within the next few years.

Table I-10: Summary of TMDL Implementation versus measurement of water quality improvement



(Table excerpted from the "*Chesapeake Bay and Virginia Waters Clean-Up Plan 6 month Progress Report*")

Measurable Environmental Results:

Most of the NPS TMDL implementation that is taking place in Virginia is only several years old and therefore it is generally too early for the projects to result in water quality improvements; however in some case these improvements do exist (Table I-3). There are several projects that are showing marked improvement in water quality. Willis River has shown remarkable success in the short 2.5 years it has been active and in 2008 several segments were nominated by DEQ to be candidates for delisting in the 2008 305(b)/303(d) Integrated Report. A full description of this project can be found in the Case Studies Section of this report.

Water Quality Improvements:
Virginia has 34 projects in various stages of implementation, either having finished more than 5 years, projects with 2-4 years and projects which have been underway less than 2 years. It is generally too early to show water quality improvements and results for projects in the early stages of implementation (those less than two years old). For the older projects it is possible to track water quality improvements as the level of implementation increases and the number of BMPs that are installed increases.

It should be noted that since 2001 when the two (2) pilot projects were initiated in the Southern Rivers (Middle Fork Holston and Upper Blackwater River), the State's water quality bacteria standard has been modified twice, and a third revision was approved through the State Water Control Board's Triennial Review of Water Quality Standards. In the case of the two previous modifications, the revisions have been more conservative and this has impacted the achievement of measurable progress for water quality improvements.

There are several implementation projects that are showing marked improvement in water quality, but for many of the TMDL implementation projects it is still too early in the process to assess the degree of water quality improvement.

Delisting:
As of 2008, 92 free-flowing segments have been approved by EPA for de-listing from the Consent Decree since 2002. It is possible, as outlined previously, 6 segments that were nominated for delisting in 2008. VADCR will work with VADEQ to see if these delistings are possible. Water quality monitoring by DEQ is indicating that water quality is improving in a number of streams where TMDL targeted implementation is ongoing in the watershed. In the 2008 305(b) Report DEQ identified portions of five streams that are eligible for delisting from the Impaired Water List due to attaining the bacteria water quality standard, these include:

1. Willis River, Buckingham and Cumberland Counties, 16.68 miles;
2. Big Otter River, Bedford and Campbell Counties, 13.98 miles;
3. Maggodee Creek, Franklin County, 4.40 miles;
4. Stroubles Creek Middle, Montgomery County, 2.20 miles;
5. Deep Creek, Nottoway County, 5.59 miles. and
6. Lynnhaven River in the City of Virginia Beach., 1,462 acres

Success Stories:
Throughout the year information is gathered regarding the successes of various projects. In 2008 three success stories were written as a result of the implementation activities of the Commonwealth. These projects are discussed in thorough detail in Appendix II – Case Studies.

1) **Willis River TMDL Implementation**: The Willis River has been active for three years and has shown remarkable success in the 36 months it has been active. In 2005, DCR and Peter Francisco Soil and Water Conservation District, with extensive public input, started a five-year TMDL project to reduce fecal coliform levels in the Willis River through implementation of agricultural and residential BMPs in accordance with an approved TMDL implementation plan. As of December 2008 the project had accomplished the installation of 53 best management practices, including: (1) 18 miles of livestock exclusion stream fencing installed, (2) removing 2,577 livestock from direct stream access, (3) pumping out of 13 septic tanks, (4) three septic systems repaired and four repairs are contracted, and (5) replacement of one septic system and four are contracted to be replaced, three with a conventional system and one with an alternative waste treatment system. As a result of these actions, the bacteria standard violation rate has been reduced to 10% or less for portions of the Willis River resulting in a partial de-listed from the Impaired Waters List. In the 2008 305(b)/303(d) Integrated Report DEQ recommended that 16.68 miles of stream in Willis River (Buckingham and Cumberland Counties) be removed from the impaired waters list as these areas were meeting the water quality standard for pathogens.

2) **Lynnhaven River Shellfish**: In November 2007 State Health Commissioner Robert B. Stroube of the

Virginia Department of Health lifted the shellfish condemnation of 1,462 acres within Lynnhaven River, Broad Bay, and Linkhorn Bays of Virginia Beach. These waterbodies are now fully attaining their designated shellfishing use for which the watersheds were condemned in 1998. The dedicated efforts of the City of Virginia Beach and its partners improved the water quality conditions have to the point that these waters are now achieving the bacteria standard for shellfish waters and will be candidates for delisting on the 2010 303(d) list of impaired waters.

3) **Valzinco Sulfide Mine**: Orphaned mine land reclamation project implemented to abate acid mine drainage (AMD) sulfide mine in Spotsylvania County, Virginia on Knights Branch. Following reclamation, pH levels in Knights Branch rose back to conditions natural for the Virginia Piedmont (>5.0) and dissolved metal concentrations fell by 75-99.5%

EPA Performance Measures:

EPA has issued targets to each state to achieve various program activity measures that will help us track our progress towards watershed restoration. **Goal 2**: Safe and Clean Water - Ensure drinking water is safe. **Objective 2**: Protect Water Quality. **Program Measure**: WQ-17 Waterbodies identified by States (in 2000 or subsequent years) as being primarily NPS-impaired that will be partially or fully restored (cumulative) by 2008 and 2012. As of the end of 2008, Virginia was still working on meeting these goals.

APPENDIX 2: CASE STUDIES

This chapter provides more detailed information on the on-going status of TMDL implementation throughout the Commonwealth of Virginia including a summary of the best management practices currently in place and water quality changes over the past 10 years (approximate).

Background

This appendix provides information on two success stories recognized by the Environmental Protection Agency, Valzinco Mine Reclamation and Lynnhaven Shellfish Recovery. In addition this appendix provides updated progress reports on the TMDL Implementation projects, including: Catoctin Creek, Holman Creek, Willis River, Lower Blackwater River, Cooks Creek and Blacks Run, Thumb-Deep-Carter-Great Runs, Big Otter River, Little and Beaver Creek, Mill and Dodd Creeks, and Hawksbill and Mill Creeks; which are largely rural watersheds (except for Blacks Run and Beaver Creek) dominated by urban non-point source pollution.

Contents of Case Studies of Success Stories and Progress Reports

1) SUCCESS STORY - Valzinco Mine Orphaned Land Project: Mine Site Reclamation Reduces Impacts of Acid Mine Drainage, Knights Branch, VA
2) SUCCESS STORY: Shellfish Beds in the Lynnhaven are reopened after being closed to fishing for decades Lynnhaven River, Broad Bay and Linkhorn Bay / VA
3) PROGRESS REPORT: Catoctin Creek TMDL Implementation Project 2004-2008 (On-going)
4) PROGRESS REPORT: Holmans Creek TMDL Implementation Project 2004-2008 (Complete)
5) PROGRESS REPORT and SUCCESS STORY: Willis River TMDL Implementation Project 2005-2008 (On-going)
6) PROGRESS REPORT: Lower Blackwater River, Maggodee Creek and Gills Greek TMDL Implementation Project 2006-2008 (On-going)
7) PROGRESS REPORT: Blacks Run and Cooks Creek TMDL Implementation Project 2006-2008 (On-going)
8) PROGRESS REPORT: Big Otter River TMDL Implementation Project 2006-2008 (On-going)
9) PROGRESS REPORT: Thumb, Deep, Carter and Great Runs TMDL Implementation Project 2006-2008 (On-going)
10) PROGRESS REPORT: Little and Beaver Creeks TMDL Implementation Project 2006-2008 (On-going)
11) PROGRESS REPORT: Mill and Dodd Creeks TMDL Implementation Project 2006-2008 (On-going)
12) PROGRESS REPORT: Hawksbill and Mill Creeks TMDL Implementation Project 2006-2008 (On-going)

SUCCESS STORY - Valzinco Mine Orphaned Land Project: Mine Site Reclamation Reduces Impacts of Acid Mine Drainage, Knights Branch, VA

WATERBODY IMPROVED

This success story highlights the design and evaluation of the reclamation project implemented to abate acid mine drainage (AMD) from the Valzinco sulfide mine in Spotsylvania County, Virginia (VA). Established to support the war efforts in World Wars I and II, the Valzinco mine, a zinc, lead, and copper mine, left behind a denuded landscape, open mine shafts, and a legacy of AMD. Although never formally listed on the U.S. Environmental Protection Agency's (USEPA) Clean Water Act § 303(d) List of Impaired Waters, the Knights Branch had ambient pH and dissolved metal concentrations far enough below natural regional conditions that native flora and fauna could not survive on the site. However, a collaborative group of participants from various state and federal agencies, as well as from the mineral mining industry, private contracting companies, and the public, were able to take advantage of multiple funding sources and greatly improve the ecological integrity of the historically degraded Valzinco Mine site. Following reclamation, pH levels in Knights Branch rose back to conditions natural for the Virginia Piedmont (>5.0) and dissolved metal concentrations fell by 75-99.5%.

Knights Branch and Valzinco Mine Site after Reclamation

PROBLEM

Valzinco mine is situated at the headwaters of the Knights Branch watershed in VA, part of the York River basin that discharges into the Chesapeake Bay. The mine workings consisted of multiple levels extending as much as 450 feet deep, and 1,500 feet horizontally beneath the valley. Mine processing operations sent mine spoils and waste processing chemicals to a tailings pond created with a dam constructed across the incised channel and floodplain of the valley. Although the Valzinco Mine remained abandoned and unused for mining purposes from the 1940's until 2001, it was continuously used as a dumping site for trash. In addition, failure of the dam spillway enabled fluvial transport of mine wastes down the watershed, a substantial mass of previous mine spoils laden with crushed pyrite and heavy metals from the ore and chemical residue from the treatment process remained on the upstream side of the dam on the Valzinco Mine site. These sulfide-rich spoils from mining operations resulted in AMD that contaminated the soil and water of surrounding ecosystems through lowered ambient pH and increased levels of dissolved metals to the extent that the soil chemistry, water quality, vegetation, and animals of the Knights Branch watershed were severely adversely affected.

Knights Branch and Valzinco Mine Site Before Reclamation

USEPA's compilation of national recommended water quality criteria for the protection of aquatic life and human health in surface water are published pursuant to Section 304(a) of the CWA and provide guidance for states and tribes in adopting water quality standards and setting remedial goals for contaminated sites. These criteria for 150 pollutants can be found at http://www.epa.gov/waterscience/criteria/wqctable/. Based on a pre-reclamation assessment of seasonal variations of acid and metal concentrations in Knight's Branch done by the U.S. Geological Survey (USGS), baseline data for evaluating the success of the reclamation project collected downstream of the mine site revealed that these USEPA acute and chronic water-quality criteria for aquatic ecosystem health were exceeded due to high dissolved levels of acids and metals (iron, aluminum, zinc, lead,

copper, cobalt and sulfate) (Seal et al, 2002). In particular, the pH of the water in Knights Branch ranged from 2.6 to 3.9, well below the ambient pH typical for the VA Piedmont region, and mean concentrations of a number of metals in the stream were one or two orders of magnitude above USEPA criteria (**Table 1**). As a result of decreased pH and increased metal concentrations, approximately 11 acres of on-site land were almost completely denuded; vegetation was sparse to non-existent, and woody vascular plants rarely survived for more than a year on the spoils and were usually represented by only their standing-dead remains. The positive feedback between decreased pH / increased metal concentrations in soil and water and loss of vegetative cover, subsequently resulted in further release of the spoils, increased downstream drainage, and exacerbated water quality conditions (*i.e.,* pH and metal concentrations) up to several hundred feet downstream, due to the loss of stabilizing vegetative root systems.

PROJECT HIGHLIGHTS

Oxidation of pyrite or pyrrhotite in mine waste generates acid that can attack other sulfide and aluminosilicate minerals in the waste material and release base metals. Since the high levels of acids and dissolved metals in AMD are generated via geochemical and microbial reactions that occur in the presence of sulfur-containing minerals, free oxygen, and water, the main environmental goals for the reclamation project was to isolate the mine spoils from atmospheric oxygen and reduce or prevent fluvial transportation of spoils downstream in the Knights Branch watershed to depositional environments through the existing channel.

The reclamation activities began in 2001 and proceeded in two significant phases through 2007. During phase one, four acres of spoil were excavated, mixed with bactericide and lime to eliminate acid producing microbes and neutralize acid, respectively, and 'dry' land filled on site. The landfill was then covered with a two-foot thick cap of clean soil and native vegetation to reduce infiltration of precipitation and prevent erosion. Because submerged soil in wetlands is naturally anoxic, the establishment of wetlands was critical for effectively eliminating the oxidation chemical reactions that release acidity into the water column. Therefore, two acres of wetlands full of native vegetation were established in the former tailings pond following the excavation and land filling of the spoil. Alkalinity was added to the remaining spoil masses through the use of submerged, sacrificial, aggregate limestone beds, and a new spillway was built to allow for natural stream flow through the site. Below the dam, three step-pool structures were constructed out of dimension stone and riprap to create two additional acres of wetlands.

During the second phase of reclamation, an area of approximately one acre in size, where spoil had been fluvially transported downstream of the mine, was excavated and the spoil was 'dry' land filled, treated, and covered to support vegetation. Three hundred feet of spoil-laden streambed were also restored by establishing native vegetation on site. Reclamation ended with the planting of more diverse varieties of native plants in the wetland areas and the reseeding of the dam area. In particular, legumes, which fix nitrogen from the air and store it in their roots, were established to enhance the productivity of the disturbed soil on the site. Lastly, in December of 2007, approximately 400 wetland and riparian trees and shrubs were planted at the mine and along the restored stream.

RESULTS

The final products of this reclamation project included: 1) Revegetation of 11 acres with indigenous plants; The creation of 4 acres of wetlands. 2) The excavation and consolidation of mine spoils in onsite disposal/landfill cells capped with clean soil. 3) Installation of anoxic limestone drains to add alkalinity to the system. 4) The capping of three mine shafts with reinforced concrete caps and the demolition of hazardous structures remaining on the site. 5) Restoration of 300 feet of stream channel. 6) Abatement of AMD and associated heavy metal contamination including biocide treatment of selected areas to inhibit AMD development.

Notable evidence of improved ecological health and integrity at Valzinco as a result of the aforementioned remediation work are abundant. Water quality measurements recorded before and after reclamation showed an increase in average pH from 3.4 to 5.1, an increase in hardness of 37 %, and decreases in total dissolved solids (68 %), Fe (94 %), Al (98 %), Zn (77 %), Pb (99.5 %), Cu (97 %), Cd (94 %), and sulfate (81 %) relative to

mean pre-reclamation values (**Table 1**). It should be noted that even though significant reductions in dissolved metals have been recorded, the concentrations of Cu and Zn remain above USEPA and VA hardness-based acute and chronic ecosystem toxicity criteria, and the concentration of Pb remains above USEPA hardness-based chronic ecosystem toxicity criteria. However, these elevated concentrations appear to be at least partly attributable to the natural lithology and pre-mining characteristics of the watershed.

Drainage

Knights Branch, VA

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Table 1. Pre- and post reclamation water quality for filtered (0.45 µm) samples at downstream site (VLZN-3) compared to USEPA aquatic ecosystem toxicity criteria and VA water quality standards for aquatic life when available. [1]

Parameter	Units	Pre-Reclamation				Post Reclamation		USEPA Acute Toxicity Criteria[2]	USEPA Chronic Toxicity Criteria[2]	VA Acute Toxicity Criteria[3]	VA Chronic Toxicity Criteria[3]
		Low	High	Mean	Standard Deviation	June 2007	Percent of Pre-Reclamation Mean				
pH	S.U.	2.6	4.0	3.4	0.5	5.1	151			6.0 – 9.0	
Hardness	mg/L $CaCO_3$	10.0	62.0	21.2	14.5	29.0	137				
Sulfate	mg/L	27.0	1,400	204	421	38.0	19				
Fe	mg/L	5.0	69.7	17.7	18.9	1.01	6		1.0		
Al	mg/L	0.6	19.5	3.1	5.8	0.051	2	0.75	0.087		
Mn	µg/L	410	2100	779	529	1,120	144				
Cd*	µg/L	3.2	88	15.2	25.6	0.91	6	1.0	0.4	1.0	0.4
Cu*	µg/L	49.0	2,200	311.6	664.6	9.7	3	5.7	4.2	5.7	3.2
Ni*	µg/L	2.0	37.0	8.5	10.2	2.3	27	512	57	512	7.3
Pb*	µg/L	170	1,300	349	340	1.6	0.5	17.6	0.7	17.6	2.9
Zn*	µg/L	1,900	27,000	5,750	7,548	1,320	23	42.2	3.2	42.2	42

[1] Data table borrowed and modified from Seal et al. 2008.
[2] USEPA toxicity limits are adjusted based on a hardness of 30 mg/L $CaCO_3$. For additional information please refer to http://www.epa.gov/waterscience/criteria/wqctable/.
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Beyond improvements in the abiotic conditions at the Valzinco site, positive biological indicators of ecosystem health are also present. Initial wetland vegetation, both planted and a naturally occurring, quickly re-colonized the site with an average ground cover of >74% after five years. Aquatic vegetation cover averaged >50% after 2 years and many plots had coverage >100%. In addition to increases in the overall abundance of re-established vegetation, the composition, species richness, and abundance of vegetation communities were similar among the restored and near-by reference (un-

affected by mine activities) wetlands (>75%, 6.0 spp. m^{-2} vs. 5.5 spp. m^{-2}, average cover 74% vs. 67%, respectively).

Accompanying the re-establishment and abundance of native wetland and aquatic vegetation within the site are observations of terrestrial wildlife, including bobwhite quail and wild turkey. In addition, an improvement in the aquatic ecosystems at Valzinco and return of herpetofauna to the wetland and aquatic communities at Valzinco are supported by the fact that two amphibians (southern leopard frog, pickerel frog) and two aquatic reptiles (brown water snake and northern water snake) were captured on the site during the fifth year.

PARTNERS AND FUNDING

The success of the Valzinco Mine Reclamation Project was built upon technical expertise, monitoring, and assistance stemming from a collaborative group of participants from the VA Institute of Marine Science, the USGS, the VA Department of Conservation and Recreation (VA DCR), the VA Department of Environmental Quality, the Virginia Department of Game and Inland Fisheries, the U.S. Army Corps of Engineers, the mineral mining industry, private contracting companies, and the public. The total cost of the project, $500,000, was funded using $95,000 in grants from the USEPA's 319 Non Point-Source Implementation Grant Program and administered by the VA DCR, and $75,000 from Virginia's Water Quality Improvement Fund, also administered by VA DCR. The remainder of the balance came from the Virginia Department of Mines, Minerals and Energy – Division of Mineral Mining Orphaned Land Program.

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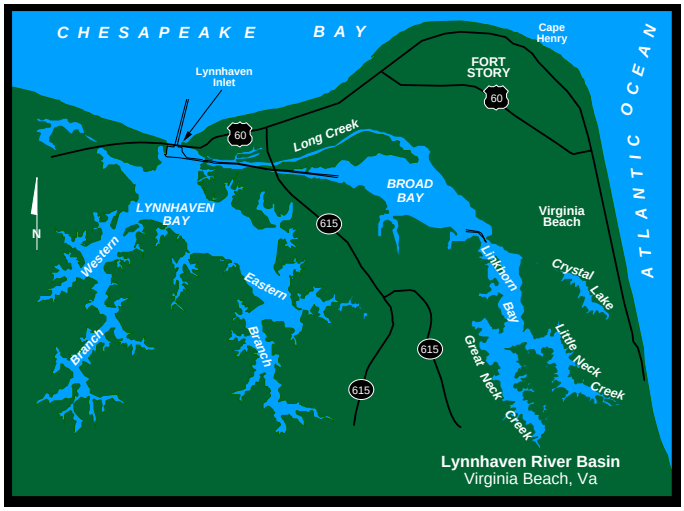
SUCCESS STORY: Shellfish Beds in the Lynnhaven are reopened after being closed to fishing for decades Lynnhaven River, Broad Bay and Linkhorn Bay / VA

In November 2007 State Health Commissioner Robert B. Stroube of the Virginia Department of Health lifted the shellfish condemnation of 1,462 acres within Lynnhaven River, Broad Bay, and Linkhorn Bays of Virginia Beach. These waterbodies are now fully attaining their designated shellfishing use for which the watersheds were condemned in 1998. The dedicated efforts of the City of Virginia Beach and its partners improved the water quality conditions have to the point that these waters are now achieving the bacteria standard for shellfish waters and will be candidates for delisting on the 2010 303(d) list of impaired waters.



Problem

The 64-square-mile drainage area of Lynnhaven River, Broad and Linkhorn Bay watershed is located entirely within the City of Virginia Beach in southeastern Virginia at the southern shore of the mouth of the Chesapeake Bay, near Cape Henry. The Lynnhaven River and associated waters once supported a thriving and renowned shell fishing industry. Oysters were pulled from these waters and sold throughout the country as well as internationally. However by the early 1980s, the shellfish industry no longer existed due to shoreline development, over-harvesting, and pollution. The Lynnhaven River production was shut down in 1986 due to bacteria contamination. The Linkhorn Bay has been closed to shell fishing since 1930. The Lynnhaven River and Broad Bay have been closed on and off throughout the years, and Lynnhaven River was closed permanently due to a June 1986 condemnation. In April 1998 the Virginia Department of Health – Division of Shellfish Sanitation (VDH-DSS) condemned these areas and issued a final Notice and Description of Shellfish Condemnation Number 25, Lynnhaven River, Broad and Linkhorn Bays. Shellfish supporting waters must be in compliance with Virginia's bacteria standards and criteria for the production of edible and marketable natural resources. This two-part standard by the Virginia Department of Health requires that fecal coliform bacteria for 30 consecutive sampling dates not exceed either the 90th percentile MPN (most probable number) of 49 for a 3 tube, 3 dilution test or a geometric mean of 14 MPN per 100 milliliters. Data collected by VDH-DSS between January 2001 and February 2003 show violations of this standard (Table 1).

January 2001 through February 2003

	Station	Geometric Mean	Meets Standard	90th Percentile	Meets Standard
		Standard = 14		Standard = 49	
Area 70 - Lynnhaven Bay	70-1	11.4	Yes	68.4	No
	70-2	16.8	No	111.7	No
	70-2Z	13.6	Yes	103	No
	70-3	27.2	No	259	No
	70-4	24.7	No	190.1	No
	70-4.3	31.6	No	258	No
	70-4.9	14.7	Yes	164.1	No
	70-5	19.2	No	143.3	No
	70-7	21	No	209.7	No
	70-8	27.1	No	332.7	No
	70-9	30.5	No	306.8	No
	70-10	30.2	No	368	No
	70-11	27.1	No	182.9	No
	70-12	41.7	No	569.1	No
	70-15	14.5	Yes	116.6	No
	70-16	18.7	No	195.1	No
	70-17	20.4	No	230	No
	70-18	20.2	No	265.7	No
	70-24	36.6	No	445	No
	70-25	52.6	No	760.7	No
	Average	25.0	NO	264.0	NO

January 2001 through February 2003

	Station	Geometric Mean	Meets Standard	90th Percentile	Meets Standard
		Standard=14		Standard = 49	
Area 71: Broad and Linkhorn Bays	71-1	10.2	Yes	54.8	No
	71-1.6	10.5	Yes	51.9	No
	71-2	9.6	Yes	52.7	No
	71-3	10.2	Yes	66.1	No
	71-3Z	7.9	Yes	37.2	Yes
	71-4	8	Yes	62.4	No
	71-4A	22	No	209.4	No
	71-4B	30.9	No	443.9	No
	71-4C	24.3	No	287	No
	71-4U	10.2	Yes	187.2	No
	71-4V	5.8	Yes	23.8	Yes
	71-4W	7.4	Yes	32.7	Yes
	71-4X	4	Yes	13.4	Yes
	71-4Y	12.3	Yes	61.1	No
	71-4Z	8.6	Yes	34.4	Yes
	71-5	7	Yes	44.7	No
	71-5Z	5.7	Yes	29.1	Yes
	71-6	7.6	Yes	46.3	No
	71-7	8.6	Yes	59.9	No
	71-8	7.5	Yes	36.7	Yes
	71-9	9.8	Yes	72.2	No
	Average	10.9	YES	90.8	NO

Table 1: Water Quality Data Summary for Lynnhaven, Broad and Linkhorn Bays from January 2001 to February 2003 as referenced in the 2004 TMDL (source VDH-DSS 2004).

As a result of not meeting the water quality standard, one segment in each of Lynnhaven River, Broad Bay, and Linkhorn Bay (5.77 square miles) were listed as impaired on the Commonwealth of Virginia's 1998 303(d) list due to violations of the State's water quality standard for fecal coliform bacteria in shellfish supporting waters.

A Total Maximum Daily Load (TMDL) study was completed by VADEQ and stakeholders and approved by the Environmental Protection Agency in 2004. The TMDL identified both point and non-point source contributions to the bacteria levels. Potential human activities that contributed to the bacterial pollution include failing septic systems, sanitary discharges from boats, improper pet waste disposal practices, exfiltration from existing sewer lines, Sanitary Sewer Overflows (SSOs) and sheet flow runoff from lawns and urban areas. Natural sources include the abundance of migratory and resident species of birds along with the natural mammalian populations which are expected to occupy 30% of the watershed area.

Project Highlights

In 2006 a TMDL Implementation Plan was developed through a collaborative effort of many partners. The City of Virginia Beach embraced the TMDL implementation planning efforts and dedicated staff and management resources to help develop and implement measures to reduce bacteria pollution in the affected watersheds. The City took the lead in developing a comprehensive strategy and has accomplished many of the targeted implementation activities, including retrofitting many of its sewage pump stations with generators that will alleviate the impact of power disruptions during extreme storm events; the construction of 7 oyster reefs, wet ponds, extended detention ponds, tidal wetlands and the restoration, revegetation of 2,800 feet of riparian buffers (including 15 shoreline buffer projects, 6 stormwater projects, 4 school projects, and extensive greenway establishment); trial utilization of anti-microbial mats inside stormwater pipes; and installation of three solar aerators in each of two stormwater impoundments, one fish ladder and five outfall sediment traps (Figure 1). The cost for these projects totaled approximately $6 million. Additionally the city focused staff and financial resources towards the task of reducing and preventing Sanitary Sewer Overflows (SSOs) especially into State and U.S. waters. At great expense to the City, Virginia Beach has developed an on-going and intensive campaign to get on-site septic systems and failing systems connected to public sewer. The City is actively engaged with smoke testing the sanitary sewer system and inserting manhole inserts and cleanout plugs to prevent inflow. In fact, Virginia Beach has a mandatory sewer hook-up program in all areas of the watershed where public service is available. Moreover, the City aggressively pursues repairs of its sanitary sewer systems using a "find and fix" approach. The City successfully sought and advocated EPA for a "no discharge zone" for the Lynnhaven River watershed thus reducing bacteria and nutrient inputs from recreational boating and

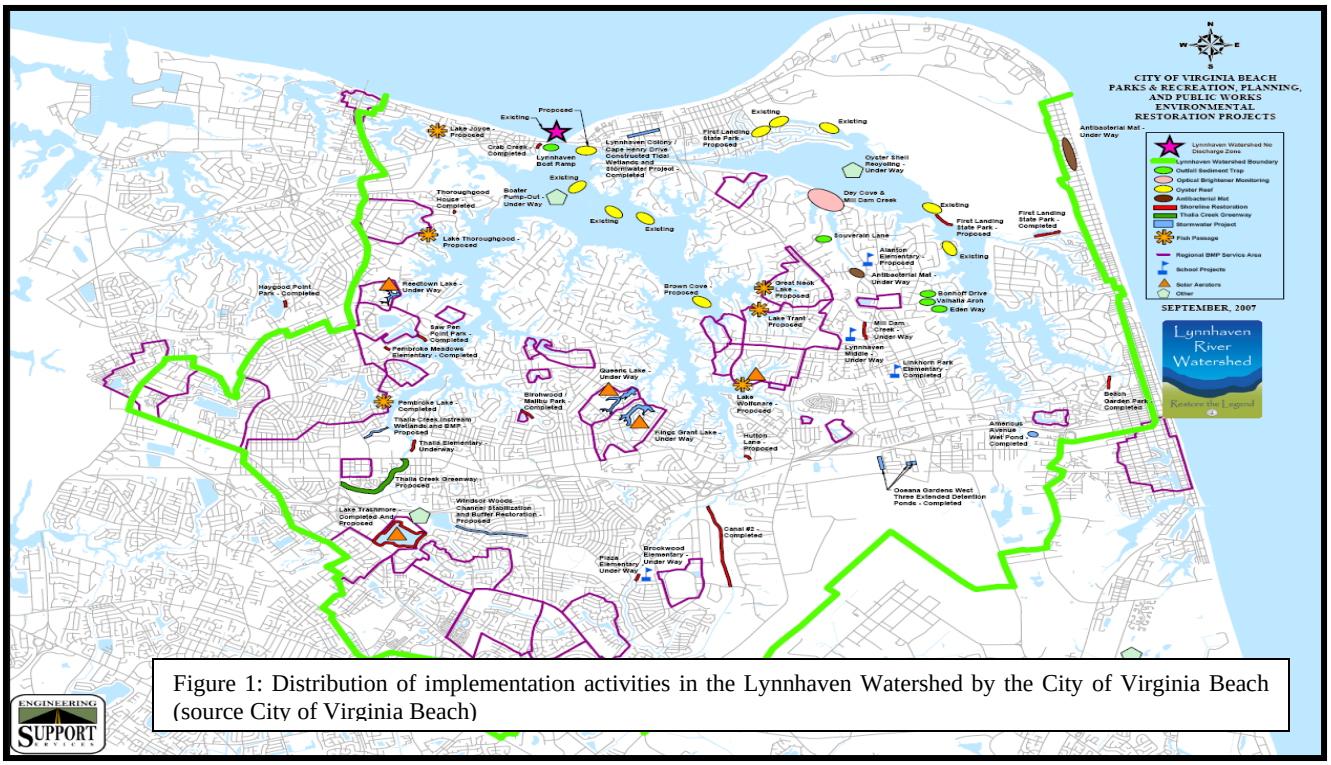


Figure 1: Distribution of implementation activities in the Lynnhaven Watershed by the City of Virginia Beach (source City of Virginia Beach)

substantial oxygen demanding substances that were determined to be part of the wastewater discharges from marine vessels. These efforts were voluntarily embraced by the boating public through the efforts of a citizen advocacy group called Lynnhaven River 2007 (now referenced as Lynnhaven River NOW) and heavy education and publicity campaigns to advocate for the use of sanitary pump-out facilities at city and private marinas. Partnered with Lynnhaven River NOW, the City undertook an extensive public education campaign that included watershed and storm drain identification markers and a pet waste reduction campaign.

Results

These efforts resulted in a significant reduction in fecal coliform counts and all their bays are currently attaining standards (Table 2 and Table 3). On November 13, 2007 State Health Commissioner Robert B. Stroube of the Virginia Department of Health lifted the shellfish condemnation of 1,462 acres within these three bays effective November 26, 2007. All there waterbodies are fully attaining their designated shellfishing use and therefore VA DEQ expects to delist these waters from Virginia's 2010 303(d) list for pathogens.

		September 8 2008			
	Station	Geometric Mean	Meets Standard	90th Percentile	Meets Standard
	Standard	14		40	
Area 70 - Lynnhaven Bay	70-1	4.4	Yes	23.8	Yes
	70-2	4.9	Yes	19.7	Yes
	70-2Z	4.2	Yes	14	Yes
	70-3	5	Yes	21.8	Yes
	70-4	3.8	Yes	14.8	Yes
	70-4.3	7.3	Yes	41.2	No
	70-4.9	5.5	Yes	36.2	Yes
	70-5	6	Yes	28.8	Yes
	70-7	4.8	Yes	17.7	Yes
	70-8	6.1	Yes	28.8	Yes
	70-9	6	Yes	25.2	Yes
	70-10	8.3	Yes	48.4	No
	70-11	10.6	Yes	69.3	No
	70-12	9.6	Yes	57.6	No
	70-15	4.3	Yes	22.5	Yes
	70-16	3.6	Yes	12.3	Yes
	70-17	6.4	Yes	34.7	Yes
	70-18	6.9	Yes	41.5	No
	70-24	10.2	Yes	43.9	No
	70-25	17	No	99	No
	Average	6.7	YES	35.1	YES

		September 8 2008			
	Station	Geometric Mean	Meets Standard	90th Percentile	Meets Standard
	Standard	14		40	
Area 71: Broad and Linkhorn Bays	71-1	4.8	Yes	17	Yes
	71-1.6	7.8	Yes	40.3	Yes
	71-2	3.6	Yes	16.4	Yes
	71-3	3.3	Yes	12.8	Yes
	71-3Z	3.3	Yes	12.2	Yes
	71-4	3.6	Yes	15	Yes
	71-4A	8.3	Yes	73.9	No
	71-4B	7.6	Yes	59.9	No
	71-4C	12.3	Yes	113.6	No
	71-4U	3.7	Yes	15	Yes
	71-4V	3.9	Yes	19.2	Yes
	71-4W	3.1	Yes	12.7	Yes
	71-4X	3.3	Yes	13.3	Yes
	71-4Y	5.1	Yes	37.3	Yes
	71-4Z	3.9	Yes	18.2	Yes
	71-5	3.8	Yes	17	Yes
	71-5Z	3.2	Yes	11.3	Yes
	71-6	3	Yes	10.3	Yes
	71-7	5.9	Yes	38.7	Yes
	71-8	3	Yes	10.5	Yes
	71-9	3.7	Yes	17.9	Yes
	Average	4.8	YES	27.7	YES

Table 2: Water Quality Data Summary for Lynnhaven, Broad and Linkhorn Bays from December 2005 through September 8, 2008 (source VDH-DSS 2008).

Bacterial Data - Fecal Coliform of Shellfish Waters

	February of 2003 Geometric Mean	90th Percentile
Standard	14	49
Area 70 - Lynnhaven Bay	25	264
Area 71: Broad and Linkhorn Bays	10.9	90.8
Meets Water Quality Standards	No	

	September 8 2008 Geometric Mean	90th Percentile
Standard	14	40
Area 70 - Lynnhaven Bay	6.7	35.1
Area 71: Broad and Linkhorn Bays	4.8	27.7
Meets Water Quality Standards	Yes	

Table 3: Comparative water quality summary from 2004 (listing) to 2008 (delisting) (source DEQ 2004, 2008)

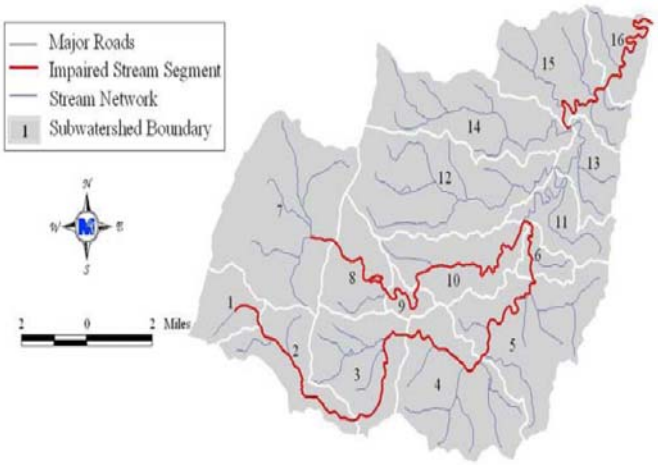
Partners and Funding

The City of Virginia Beach funded the majority of this comprehensive implementation strategy, spending $4.6 million alone on retrofitting sewage pump stations with generators. Since 1975, when the effort to sewer out the Lynnhaven watershed began by the City of Virginia Beach, approximately $180 million has been expended for sewer extensions, sewer rehabilitation, and find and fix repairs. Virginia DEQ funded the development of both the TMDL and implementation plan through approximately $35,000 of section 319 funding provided by the Department of Conservation and Resources.

Catoctin Creek TMDL Implementation Project 2004-2008 (On-going)

Project Location

The project area focuses on a portion of the Catoctin Creek Watershed (HUC# 02700008), located in Loudoun County, Virginia and just north of Purcellville and approximately five miles northwest of Leesburg. Catoctin Creek is part of the Potomac River Basin. The area contains four watersheds – Upper South Fork Catoctin Creek, Lower South Fork Catoctin Creek, North Fork Catoctin Creek and Catoctin Creek Mainstem. The entire project area consists of 59,000 acres and the predominant land uses are forestry and agriculture. The estimated population within Catoctin Creek was 9,757 in 2001.



Implementation Highlights

The Loudoun Soil & Water Conservation District began administering the agricultural component of the Catoctin Creek TMDL Implementation Project in September 2004. During 2008 the District completed 18 best management practices, including 5 agricultural BMPs, all stream exclusion practices. The completed practice resulted in 3,623 feet of stream exclusion fencing and the exclusion of 46 livestock from the stream and the establishment of 1.5 acres of buffer. The Loudoun County Health Department began administering the residential septic system component in 2005. During 2008 the following were completed: two septic pumpouts, four septic repairs, 1 alternative waste treatment system and six septic systems installations.

BMP Summary for the Catoctin Creek TMDL Project (July 2004-December 31, 2007)

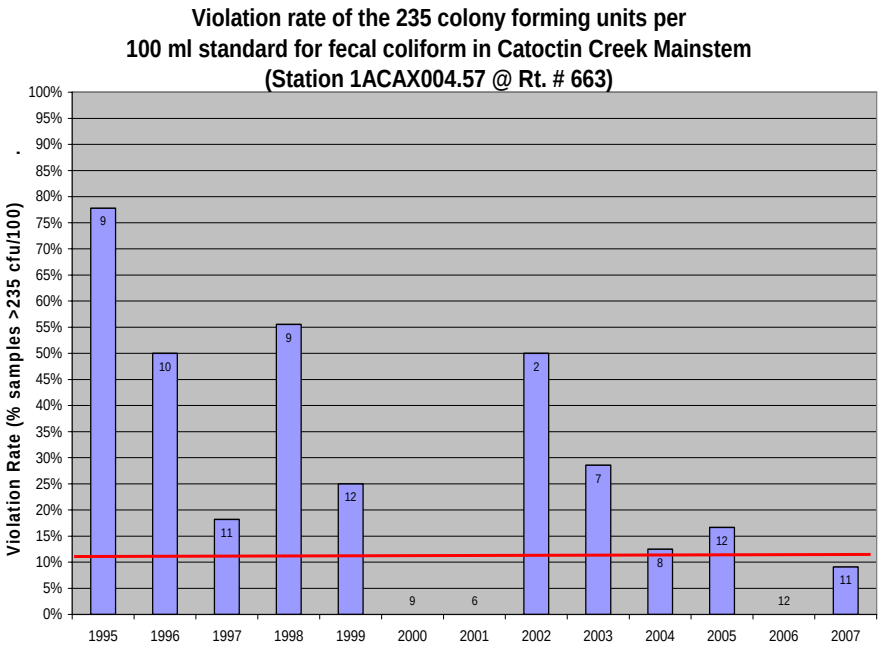
Control Measure	Unit	Units Needed	# Installed	# Goal
Agricultural Program:				
Stream exclusion fencing, SL-6, WP-2T	Feet	168,960	23,671	14%
Full Exclusion System	Systems	126	15	
Hardened Crossings	Systems	76		
Residential Program:				
Septic System Pump Out, RB-1	Systems		10	
Sewer Connection, RB-2	Systems		1	
Septic System Repair, RB-3	Systems		13	
Septic System Installation, RB-4	Systems	10	12	120%
Alternative Waste Treatment Systems, RB-5	Systems	10	7	70%
TOTAL SEPTIC PROGRAM		20	33	165%

Since the beginning of the project (through 2008) a total of 47 best management practices have been installed. These practices have produced 23,671 feet of stream exclusion fencing, 18 acres of buffer, excluding of approximately 527 animals from streams. In the residential program a total of 43 residential BMPs, including the repair or replacement of 25 malfunctioning septic systems or straight pipes, the installation of 7 alternative waste treatement systems and the pumpout of 10 systems. The pollution reductions that are a result of the BMPs installed are summarized in the table below.

July 1 2002-December 31, 2008					
Project Title	**Calendar Year**	**Pathogens (Coliform) CFU**	**Nitrogen lbs/yr**	**Phosphorus lbs/yr**	**Sedimentation-Siltation tons/yr**
Catoctin Creek TMDL Project	2005	3.15E+13	225.90	43.20	27.70
	2006	1.07E+14	84.48	1.71	0.59
	2007	5.40E+14	50.72	4.65	1.64
	2008	7.19E+13	255.38	11.05	6.26
	Sub-Total	**7.50E+14**	**616.49**	**60.62**	**36.20**

Water Quality Improvements

The Virginia Department of Environmental Quality (DEQ) monitors the impaired streams through the agency's ambient monitoring program. The chart to the left shows violation rates for the Catoctin Creek Mainstem (VAN-A02R) of the 235 bacteria standard from the period of 1995 through 2007 are shown for each year. Yearly violation rates dropped following the TMDL development in 2002. No violations of the bacteria water quality standard were recorded in 2000, 2001 or 2006, and in 2007 the rate was below 10.5%.

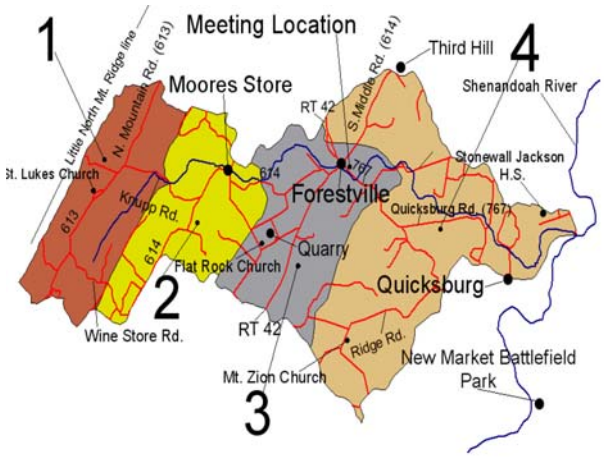


There were no violations in 2006 and only an 8% violation rate in 2007. Catoctin Creek mainstem has only violated the 235 standard 2 out of the last 33 sample dates (between 8/15/05 and 3/18/2008), which is actually a 6% violation rate. This watershed is now below the 10% violation rate threshold for delisting the Catoctin Creek mainstem from the Impaired Waters List. The Catoctin Creek mainstem segment begins at the confluence of Milltown Creek to Catoctin Creek, approximately 1.2 rivermiles downstream of Route 673, and continues downstream to its confluence with the Potomac River. It should be noted that this segment was assessed as fully supporting of the recreation use goal for the 2004 assessment cycle. This segment was assessed as fully supporting the swimming use for the 2004 assessment cycle with a fecal coliform bacteria exceedance rate of 7.9%. It is not known why this segment was not nominated to EPA as a candidate for delisting.

Holmans Creek TMDL Implementation Project 2004-2008 (Completed)

Project Location

Holmans Creek (VAV-B45R-03) is a direct tributary of the North Fork of the Shenandoah River (02070006). The North Fork Shenandoah River is a portion of the Shenandoah-Potomac River Basin that eventually drains into the Chesapeake Bay. Holmans Creek is located in Rockingham and Shenandoah Counties, Virginia approximately 5 miles to the northwest of the town of New Market, and 4 miles northeast of Timberville. Agricultural operations and pastures dominate the land use. Holmans Creek is approximately 11,988 acres of which forested (26%) and agricultural (72%) land uses dominate. Holmans Creek Watershed is mainly located in Karst topography, characterized by many caves and sinkholes.



Implementation Highlights

The Lord Fairfax Soil and Water Conservation District began administering the agricultural and residential components of the Holmans Creek TMDL implementation project in September 2004. A targeted approach in implementation has been adopted in hopes of reaching out to landowners with the greatest potential to aid in improving water quality. During 2008, two agricultural BMPs were installed creating 164 acres of small grain cover crop was planted For nutrient management. Since the beginning of the project in 2004, 27 agricultural practices have been installed on 1,868 acres of land resulting in 8,775 feet of stream fencing that excluded 180 livestock from the stream and created an additional 7 acres of riparian buffers. In addition 53 septic systems have been pumped out, 10 septic systems have been repaired and one system has been replaced. The pollution reductions as a result of BMP installation are summarized in the table below.

BMP Summary for the Holmans Creek TMDL Project (July 2004-December 31, 2008)

BMP	Unit	Units Needed	Total Installed	% Goal
Agricultural BMPs:				
Stream exclusion fencing, SL-6, WP-2T	Feet	279,840	8775	3.1%
Conservation tillage	Acres	569		
Legume cover crop, WQ-4	Acres	660		
Full Exclusion System	Systems	138		
Hardened Crossing, WP-2B	Systems	55		
Sinkhole fencing	Feet	16,000		
Residential BMPs:				
Septic System Pump Out, RB-1	Systems	200	53	26.5%
Septic System repairs, RB-3	Systems	25	10	40%
Septic System Installation, RB-4	Systems	25	1	4%
Alternative Waste Treatment Systems, RB-5	Systems	25		
Total Residential		275	64	23.4%

July 1 2002-December 31, 2008

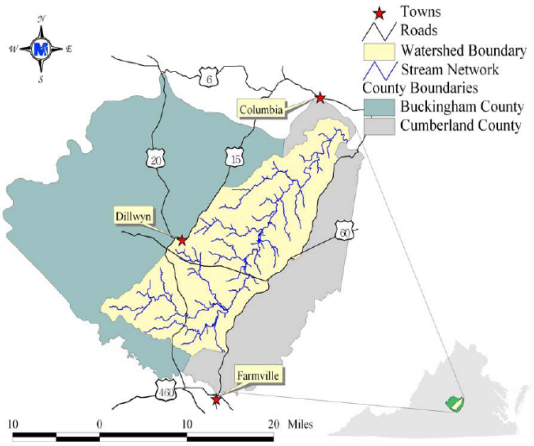
Project Title	Calendar Year	Pathogens (Coliform) CFU	Nitrogen lbs/yr	Phosphorus lbs/yr	Sedimentation-Siltation tons/yr
Holmans Creek TMDL Project	2005	4.73E+10	924.50	181.90	110.00
	2006	3.47E+14	88.76	0.10	0.03
	2007	9.35E+14	1,566.81	276.21	221.70
	2008	0.00E+00	417.07	83.74	50.90
	Sub-Total	**1.28E+15**	**2,997.14**	**541.96**	**382.64**

This project was completed at the end of 2008 and will not be continued.

Willis River TMDL Implementation Project 2005-2008 (On-going)

Project Location

In 1996, the Willis River was placed on the Commonwealth of Virginia's 1996 303(d) list because of violations of the fecal coliform bacteria water quality standard. The fecal coliform TMDL for the Willis River watershed was completed in 2002. In 2005, DCR and Peter Francisco Soil and Water Conservation District, started a 5-year TMDL project to reduce fecal coliform levels through implementation of agricultural and residential BMPs in accordance with a TMDL IP. The Willis River (HUC 02080205, VAC-H35R-36R) is approximately 11,935 acres and is part of the James River Basin, located in Cumberland County and Buckingham County, Virginia.



Implementation Highlights

The Willis River Water Quality Implementation Plan for fecal coliform impairment was finalized in July 2005 and implementation efforts began in earnest. Peter Francisco Soil & Water Conservation District administers the agricultural and residential components of the project. During 2008 a total of 20 best management practices were completed, this included: 13 grazing land protection practices (SL-6) were completed (28,232 feet of exclusion fencing, and 887 head of livestock excluded). In addition 6 pump-outs and one septic system repair were completed.

BMP Summary for the Willis TMDL Project (August 2005-December 2008)

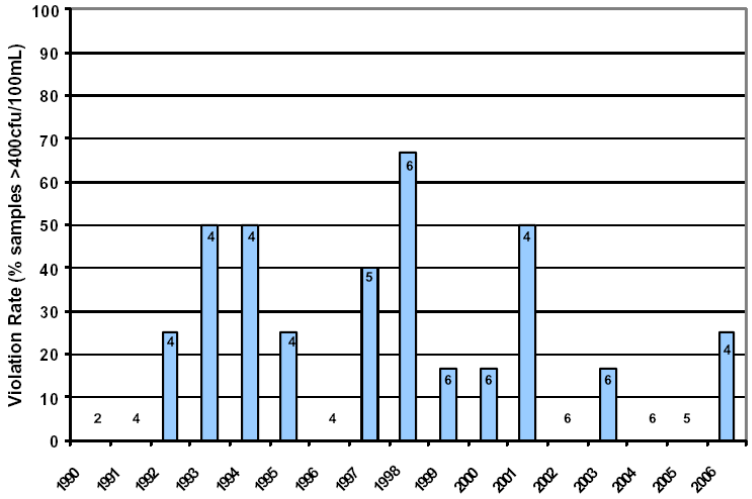
Control Measure	Unit	Units Needed	# Installed	# Goal
Agricultural Program:				
Stream exclusion fencing, SL-6, WP-2T	Feet	90	21 miles	23%
Loafing Lot Management			1	
Full Exclusion System	System	318		
Hardened Crossing, WP-2B	System		6	
Residential Program:				
Septic System Pump Out, RB-1	System	100	13	13%
Septic System repairs, RB-3	System	3	2	66%
Septic System Installation, RB-4	System	2	1	50%

Since the beginning of the project in August 2005, there have been 39 agricultural projects completed. Approximately 3,113 head of livestock have been excluded with fencing from approximately 110,000 feet (21 miles) of stream, establishing over 89 acres of riparian buffers. For the residential program, to date, the District has 13 septic tank pump outs completed, two septic systems have been repaired and another has been replaced. The pollution reductions resulting from the installation of these BMPs are summarized in the table below.

July 1 2002-December 31, 2008					
Project Title	Calendar Year	Pathogens (Coliform) CFU	Nitrogen lbs/yr	Phosphorus lbs/yr	Sedimentation-Siltation tons/yr
Willis River TMDL Project	2005-2006	2.70E+15	43.59	7.56	1.76
	2007	3.20E+15	428.68	158.76	6.36
	2008	2.13E+15	57.68	9.00	2.08
	Sub-Total	**8.03E+15**	**529.94**	**175.32**	**10.20**

Water Quality Improvements

The Virginia Department of Environmental Quality (DEQ) monitors the impaired streams through the agency's ambient monitoring program. The chart to the left shows violation rates of the bacteria standard from the period of 1990 through 2006 are shown for each year. Yearly violation rates dropped following the TMDL development in 2002. No violations of the bacteria water quality standard were recorded in 2002, 2004, or 2005. The rate rebounded slightly in 2006.



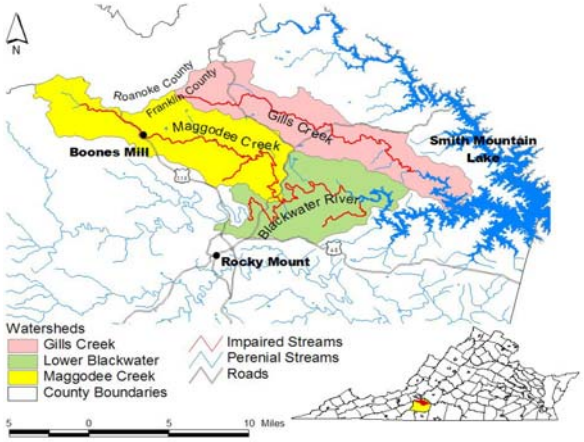
Violation rate of the 400 colony forming units per 100 ml standard for fecal coliform in Willis River

This watershed is approaching the 10% violation rate threshold for delisting the Willis River from the Impaired Waters List. The middle section of the river from the confluence with Tongue Quarter Creek to the confluence with Buffalo Creek (18.03 miles) is a de-list candidate in 2006 because data shows that bacteria levels are now below the violation threshold.

Lower Blackwater TMDL Implementation Project 2006-2008

Project Location

The Lower Blackwater River, Maggodee Creek and Gills Creek project area is located in Franklin County, Virginia (HUC# 0301010). Gills Creek is impaired for fecal coliform in a 27.9-mile segment extending to the confluence with the Blackwater River in Smith Mountain. Maggodee Creek watershed is dominated by forest (62%), agriculture (33%) and is impaired for fecal coliform along a 21.2 mile stretch extending to the confluence with the Blackwater River. The portion of the Blackwater River addressed in this plan (referred to as the Lower Blackwater River) is impaired for 20 miles extending to the upper reaches of Smith Mountain Lake. Water from the Blackwater River and Gills Creek flows through Smith Mountain Lake, into the Roanoke River and eventually into the Albemarle Sound on North Carolina's coast



Implementation Highlights

DCR and local stakeholders completed the TMDL implementation plan for the Lower Blackwater River, Maggodee Creek and Gills Creek in January 2006. A grant agreement to administer the project was signed with the Blue Ridge SWCD on March 1, 2006. During 2008 a total of 39 BMPs were completed. This included: seven grazing land protection systems (SL-6) were installed resulting in 27,856 feet of stream exclusion fencing and the exclusion of 315 animals from the stream In addition two stream protection practices totaling 9,900 feet and 460 animals were installed. In addition during this period a total of 26 septic tank pumpouts (RB-1), one septic system repair (RB-3) and one septic system replacement (RB-4) were completed.

BMP Summary for the Lower BlackwaterTMDL Project (March 2006-December 31, 2008)

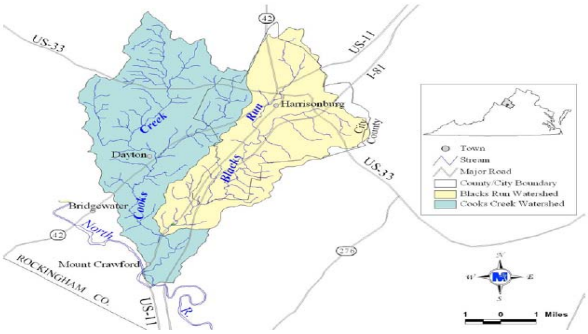
Control Measure	Unit	Units Needed	# Installed	# Goal
Agricultural Program:				
Full Exclusion System (SL-6)	system	74	21	20.3%
Stream Protection (WP-2T)	system	17	3	11.8%
Waste Storace Facility (WP-4)	system		3	
Stream Protection (WP-2)	system		2	
Loafing Lot System (WP-4B)	system	6	1	16.7%
Forested Buffer	Acre		3.8	
Exclusion fence replacement	feet	130,000	68,380	52.6%
Exclusion fencing	feet		60,146	
Livestock excluded	animal		2,520	
Residential Program:				
Septic System pump-out (RB-1)	system	100	57	53%
Septic System Repair (RB-3)	System		1	
Conventional Septic System installation/replacement (RB-4)	system	65	4	6.1%
Alternative Waste Treatment System (RB-5)	system	7		

From March 2006 through December 2008 30 agricultural practices have been completed resulting in 68,316 feet (12.9 miles) of stream fencing, excluding 2520 livestock and establishing 30 acres of riparian buffer. In addition 62 residential BMPs have been installed, including: pumping out of 57 septic systems and five septic systems have been repaired or replaced. The pollution reductions resulting from the installed BMPs are summarized in the table below.

July 1 2002-December 31, 2008					
Project Title	Calendar Year	Pathogens (Coliform) CFU	Nitrogen lbs/yr	Phosphorus lbs/yr	Sedimentation-Siltation tons/yr
Lower Blackwater River, Maggodee Creek and Gills Creek TMDL Project	2006	9.56E+14	188.49	10.58	2.66
	2007	8.52E+14	303.11	135.58	1.74
	2008	1.70E+15	395.21	150.65	5.50
	Sub-Total	**3.51E+15**	**886.81**	**296.81**	**9.90**

Cooks Creek & Blacks Run TMDL Project 2006-2008

Project Location



The Blacks Run and Cooks Creek watersheds are located in Rockingham County and the City of Harrisonburg, Virginia. Water from Blacks Run and Cooks Creek flows into the North River near Mount Crawford, into the South Fork Shenandoah River, and eventually makes its way to the Chesapeake Bay by way of the Potomac River. Blacks Run is impaired for 10.73 miles from its headwaters to the confluence with Cooks Creek; and the watershed is approximately 12,256 acres and is largely urban in northern sections as the stream flows through the City of Harrisonburg and becomes increasingly rural as the stream nears Cooks Creek. Cooks Creek is impaired along a 13.69-mile stretch extending from its headwaters to the confluence with the North River. The Cooks Creek watershed is approximately 15,919 acres, and is predominately rural with the exception of the Town of Dayton and areas adjacent to Harrisonburg.

Implementation Highlights

The Cooks Creek and Blacks Run TMDL Implementation Project began in summer of 2006 and is administered by the Shenandoah Valley Soil and Water Conservation District. In 2008 a total of 20 best management practices were completed. These included one alternative septic system installation and 19 small grain cover crops for nutrient management addressing a total of 521 acres. To date there have been 63 agricultural BMPs completed, including: 10.5 acres of permanent vegetative cover on cropland (SL-1), 2 acres of permanent cover on critical areas, 1,354 acres of small grain cover crops for nutrient management, and 3 loafing lot management systems. To date there have been nineteen (18) residential practices completed, including: 8 septic pump outs completed, 3 connections to public sewer, 4 septic system repair or installation and 3 alternative on-site systems installed.

BMP Summary for the Cooks Creek & Blacks Run (May 2006-December 31, 2007)

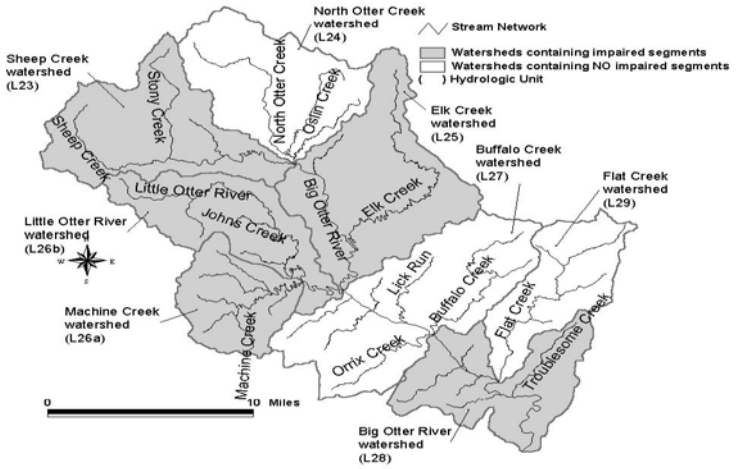
Control Measure	Units	Units	#	%
Agricultural				
Grazing Land Protection Systems (SL-6)	Systems	16		
Stream Protection Systems (WP-2T)	Systems	1		
Voluntary Exclusion Systems	Feet	86914	2,290	26%
Waste Storage	Systems	46	3	
Improved Pasture Management	Acres	758		
Conservation Tillage	Acres	4748		
Nutrient Management	Acres	3565	1,354	38%
Residential				
Septic Tank Pump-Outs (RB-1)	System	100	8	8%
Sewer Connection (RB-2)	System	3	3	100%
Septic System Repair (RB-3)	System	24	3	12.5%
Septic System Installation (RB-4)	System	14	1	7%
Alternative Waste Treatment System (RB-5)	System	14	3	21%

The pollution reductions as a result of the BMPs installed are summarized in the table below.

July 1 2002-December 31, 2008					
Project Title	Calendar Year	Pathogens (Coliform) CFU	Nitrogen lbs/yr	Phosphorus lbs/yr	Sedimentation-Siltation tons/yr
Cooks Creek and Blacks Run TMDL Project	2006	2.44E+11	851.46	79.31	50.82
	2007	1.39E+11	1,742.14	346.65	210.71
	2008	3.73E+10	988.56	171.11	104.01
	Sub-Total	**4.21E+11**	**3,582.16**	**597.06**	**365.53**

Big Otter River TMDL Implementation Project 2006-2008 (On-going)

Project Location



The Big Otter River Basin (BOR) is located in Bedford and Campbell Counties, Virginia. The basin covers a 388 square miles area; contains 267 miles of streams, includes the Cities of Bedford and Lynchburg; and is a tributary of the Roanoke River, eventually discharging into Lake Gaston and into Albemarle Sound in North Carolina. The BOR Basin contains eight watersheds: Sheep Creek, Elk Creek, Machine Creek, Little Otter River, Lower Big Otter River, North Otter Creek, Buffalo Creek (Falling & Elk Creeks), and Flat Creek. The latter 3 watersheds contain no impaired segments but are included in the project area because they drain directly to the project area and contribute to the pollution load.

Implementation Highlights

Since the July 2006, the Peaks of Otter Soil & Water Conservation District has administered the project. During 2008 a total of 76 BMPs were installed, including 40 agricultural BMPs. This included 30 grazing land protection systems (SL-6, stream exclusion) resulting in 94,846 feet (18 miles) of fencing, and 10 BMPs creating forested riparian buffers. These practices excluded 1,556 animals from the stream and creating 167 acres of vegetated riparian stream buffer. In 2008, 36 residential BMPs were installed, including: 10 septic tanks pumped outs, five septic tank system repairs, 3 systems were connected to sanitary sewer, 16 septic system replacements and 2 alternative waste treatment systems were installed.

BMP Summary for the Big Otter River TMDL Project (July 2006-December 31, 2008)

BMP	Unit	Total	Installed	%
Agricultural BMPs:	-			
Grazing Land Protection (SL-6)	S	88	76	86
Forest Buffer (CP-22, CRFR-3)	S		12	
Forest buffer	A		101	
Pasture management	A	3,500		
stream protection	F	246,576	177,385	72
Livestock Excluded			2,876	
Hardened Crossing, WP-2B	S	45		
(S= System, A= Acres, F = Feet)				
Residential BMPs:				
Septic Pumpout, RB-1	S		27	
Connection to sewer, RB-2	S		3	
Septic Repairs, RB-3	S	17	8	48
Septic Installation, RB-4, RB-4P	S	105	26	25
Alternative Treatment, RB-5	S	14	3	21

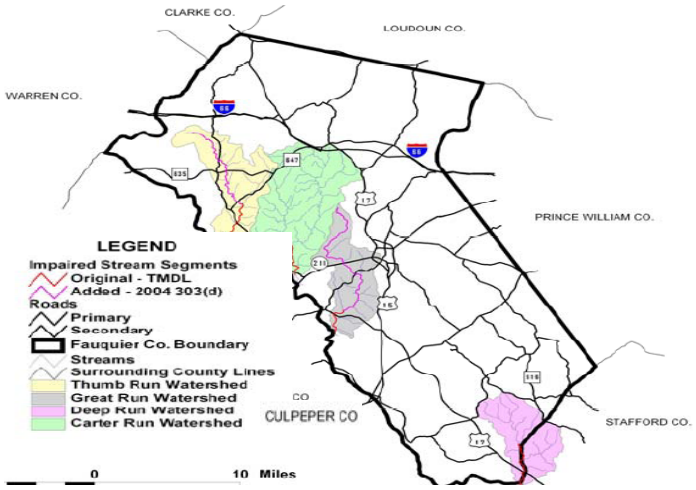
Since July 2006 the agricultural program has installed 88 BMPs including 76 SL-6 grazing land protection systems. In addition 12 other agricultural practices were installed creating 100 acres of forested buffers. These practices resulted in total of 177,385 feet of stream exclusion fencing excluding 2,876 livestock from streams, and creating 231 acres of riparian buffers. 40 of the systems were funded with Section 319 funds, 32 were funded with CREP funds, 14 were funded with state cost-share funds, and 2 was funded with 319/EQIP funds. In terms of the residential septic program, to date the program has installed 67 residential BMPs, including: 27 septic tank pumpouts were completed, 10 septic tank system repairs (RB-3) were completed, 3 connections to sewer, 23 septic system replacements (RB-4) and 4 alternative waste treatment systems (RB-5) were installed. The pollution reductions as a result of the BMPs installed are summarized in the table below.

July 1 2002-December 31, 2008					
Project Title	**Calendar Year**	**Pathogens (Coliform) CFU**	**Nitrogen lbs/yr**	**Phosphorus lbs/yr**	**Sedimentation-Siltation tons/yr**
Big Otter River TMDL Project	2006	9.35E+14	39.14	7.04	1.62
	2007	4.78E+15	200.51	27.71	6.39
	2008	5.03E+15	375.22	65.13	48.95
	Sub-Total	**1.07E+16**	**614.87**	**99.87**	**56.97**

Thumb, Deep, Carter and Great Runs TMDL Project 2006-2008 (On-going)

Project Location

Thumb Run, Carter Run, Great Run, and Deep Run are part of the Rapidan-Upper Rappahannock Basin. The Rappahannock River flows into the Chesapeake Bay. The Thumb Run, Carter Run and Great Run watersheds are completely located in Fauquier County, Virginia. The northern portion of Deep Run watershed lies in Fauquier County with the southern portion in Stafford County. The entire 92,800 acre project is made up of forest (60%), agricultural (39%) and residential (1%) land uses. The Thumb Run watershed area is approximately 21,800 acres; Carter Run is approximately 35,600 acres; Great Run watershed area is approximately 18,100 acres; and, Deep Run land area is approximately 17,300.



Implementation Highlights

The TMDL implementation project for a fecal coliform impairment on Thumb Run and *E. coli* impairments on Thumb, Deep, Carter and Great Runs in Fauquier County began in July 2006. DCR contracted with the John Marshall Soil and Water Conservation District to provide technical assistance and educational outreach to agricultural producers through a full time agricultural specialist. The Fauquier County Health Department was contracted to provide technical assistance and educational outreach to homeowners. **

Implementation Need	Unit	Total Needed	Total Installed	% installed
Agriculture				
Stream Exclusion Fencing (miles)	Miles	67.9	45,847 ft	
Livestock Exclusion (SL-6 Systems)	S	167	16	9.6%
Stream Protection (WP-2T systems)	S		2	
Vegetative Buffer on Cropland (FR-3 acres)	Acres	3,196	19	0.6%
Permanent Veg. Cover on Cropland (SL-1 acres)			31	
Manure/ Incorporation on Cropland (acres)	Acres	5,331		
Pasture Management (acres)	Acres	16,271		
Residential * (S = System)				
Septic System Pump-out (RB-1)	S		31	
Septic System Repair (RB-3)	S	102	6	6%
New Septic System Installation (RB-4)	S	146	5	3.5%
Alternative Waste Treatment (RB-5)	S	44		0
Pet Waste (P = Program)				
Pet Waste Control Program	P	3		
CCU BMP Demonstration	S	2		
CCU BMP Installation	S	25		
Pet Waste Landscape Demonstration	S	2	2	100%

CCU = Concentrated Canine Unit

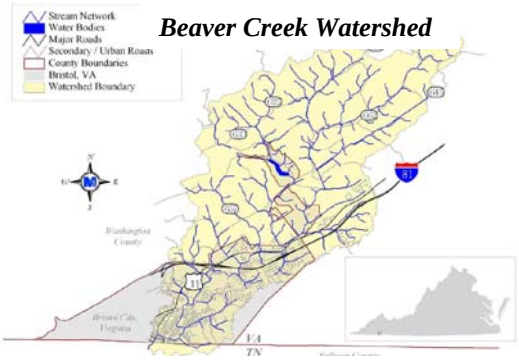
During 2008 a total of 30 best management practices were installed. Five agricultural BMPs were installed, including: 31 acres of permanent vegetation on cropland, and 715 feet of stream fencing repair. A total of 25 residential septic practices were installed, including: 18 septic tank pumpouts, 4 septic system repairs and 3 septic system installation/replacements were completed. To date the project has completed 59 best management practices, including: 19 stream exclusion practices resulting in 45,847 feet of stream exclusion fencing, that excluded 922 livestock from streams; 5 cover crops practices for 31 acres, 31 septic tank pump-outs and the repair or replacement of 11 malfunctioning septic systems or straight pipes.

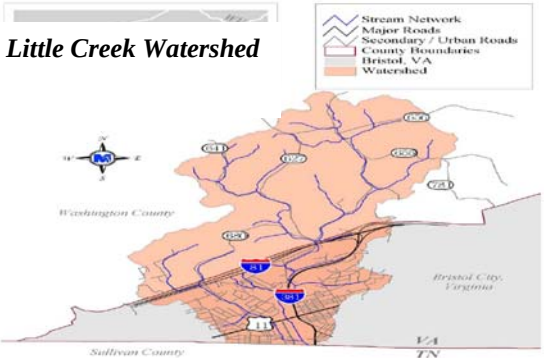
July 1 2002-December 31, 2008					
Project Title	**Calendar Year**	**Pathogens (Coliform) CFU**	**Nitrogen lbs/yr**	**Phosphorus lbs/yr**	**Sedimentation-Siltation tons/yr**
Thumb, Deep, Carter and Great Runs TMDL Project	2006	1.91E+14	15.65	6.08	4.48
	2007	1.53E+15	76.46	12.79	2.96
	2008	5.72E+14	222.40	26.66	12.56
	Sub-Total	**2.29E+15**	**314.51**	**45.53**	**20.00**

Little and Beaver Creeks TMDL Implementation Project 2007-2008

Project Location

Beaver Creek and Little Creek watersheds are located in Washington County and the City of Bristol, Virginia. Water from Beaver Creek and Little Creek flows into South Fork Holston River eventually flowing into the Tennessee River and the Gulf of Mexico. Beaver Creek is a 22, 654 acre watershed and 13.46 miles are impaired near the headwaters..





Little Creek is a major tributary of Beaver Creek which flows in a southwesterly direction until the confluence with the South Fork Holston River in Tennessee. Little Creek is impaired along a 13.69-mile stretch extending from its headwaters to the confluence with the Holston River. The Little Creek watershed is approximately 5,520 acres.

Implementation Highlights

Beginning in the fall of 2006, the Holston River Soil and Water Conservation District has administered both the agricultural and residential programs for the Beaver Creek and Little Creek TMDL Implementation Project. During 2008 a total of 101 best management practices were installed. Fifteen agricultural practices were installed, including nine livestock stream exclusion practices (SL-6) excluding 557 animals from 6,900 feet of stream. In addition, five small grain cover crop practices were installed creating 156 acres of cover crops (SL-8B) and one loafing lot management system (WP-4B) was created. During this period a total of 86 residential BMPs were completed, including the pumping out of 85 septic tanks (RB-1) and the repair of one septic system (RB-3). Since the beginning of the project a total of 133 BMPs have been installed. This includes: 12 "Grazing Land Protection" (SL-6, stream exclusion) BMPs excluding 436 livestock with the establishment of ~9,300 feet of fencing; five BMPs for small grain cover crop for 156 acres; one loafing lot management system installed fencing out 195 animals; 113 septic systems were pumped out; and two septic systems repaired.

BMP Summary for the Beaver and Little Creeks TMDL Implementation Project (January 1, 2007 - December 31, 2008)

BMP	Unit	Total	Installed	%
Agricultural BMPs:	-			
Grazing Land Protection System (SL-6)	S	301	12	4%
Pasture management	Acres	8505		
Permanent Ve.g.Cover on Cropland (SL-1)	Acre	75		
Protective Cover for Specialty Cropland (SL-8)	Acre	136	156	115%
Hardened Crossing (System, S)	S	126		
Manure Incorporation	S	110		
Vegetated Buffers - Cropland	Acres	16	1	6.25%
Streamside Fence Maintenance	Feet	17730		
Livestock Fenced from Stream	Animal	n/a	631	
Streamside Fencing	Feet	n/a	9,300	
Urban/Residential BMPs (Beaver Creek)				
Bioretention Filter (Acre-treated, AT)	AT	600		
Infiltration Trench	AT	1087		
Rain Garden	AT	511		
Stormwater Collection Retro-fits	AT	9		
Vegetated Stream Buffer	Acre	242		
Residential BMPs:				
Pet Waste Control Program (Program , P)	P	2		
Septic System Pumpout, RB-1	S	260	113	43%
Sewer Connection, RB-2 (Beaver Creek Only)	S	121		
Septic System repairs, RB-3	S	197	2	1%
Septic System Installation, RB-4	S	95		
Alternative Waste Treatment Systems, RB-5	S	25		

July 1 2002-December 31, 2008					
Project Title	Calendar Year	Pathogens (Coliform) CFU	Nitrogen lbs/yr	Phosphorus lbs/yr	Sedimentation-Siltation tons/yr
Little and Beaver Creeks TMDL Project	2007	1.63E+14	22.59	1.25	0.29
	2008	1.85E+15	727.14	214.41	107.15
	Sub-Total	**2.02E+15**	**749.72**	**215.66**	**107.44**

Mill Creek and Dodd Creek TMDL Implementation Project 2007-2008

Project Location

The Mill Creek watershed is located in the New River Basin in Montgomery County, Virginia. Mill Creek is a tributary of Meadow Creek, which flows into the Little River. The land area of the Mill Creek watershed is approximately 9,308 acres (14.5 sq. mi.). The majority of developed areas are in and around the Town of Riner with pockets of development close to Childress and Fairview in the eastern portion of the watershed.

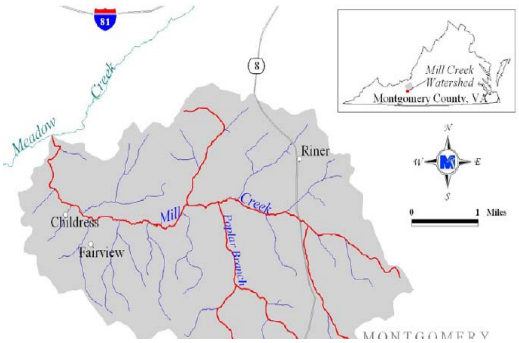


Figure 1: Mill Creek Watershed boundaries and impaired stream segments

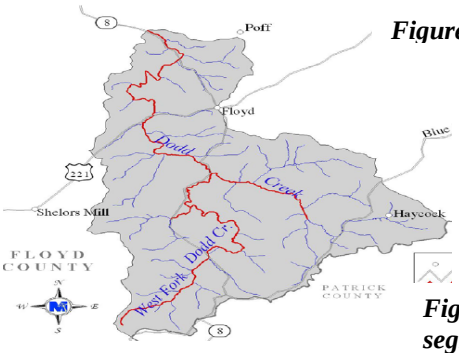


Figure 2: Dodd Creek Watershed boundaries and impaired stream segments

The Dodd Creek watershed is located in the New River Basin in Floyd County, Virginia. Dodd Creek is a tributary of the West Fork of the Little River. The land area of the Dodd Creek Watershed is approximately 14,440 acres (22.6 sq. mi.) and is comprised of forest (55%), pasture (43%), and urban/residential (1%) land uses. The majority of developed areas are in and around the Town of Floyd.

Implementation Highlights

The Skyline Soil and Water Conservation District began administering the agricultural components of the Mill and Dodd Creek TMDL Implementation Project in January 2007. The project addresses fecal coliform impairments in the Mill Creek and Dodd Creek watersheds. During 2008 a total of 24 best management practices were installed. During this period six grazing land protection and stream exclusion practices (SL-6) were installed, fencing out 470 animals and protecting 10,802 feet of stream. The residential program installed seventeen (17) residential BMPS, including: fifteen (15) septic tank pumpouts and the repair or replacement of two septic systems. Since the beginning of the project a total of 26 practices have been installed. These included 7 stream exclusion and grazing land protection practices (SL-6) for 12,362 feet of stream exclusion and 620 livestock excluded. In terms of the residential program 19 residential practices have been installed including 16 pumpouts and the repair or replacement of 3 septic systems.

BMP Summary for the Dodd Creek and Mill Creek TMDL Implementation Project – (January 2007-December 31, 2008)				
BMP	Unit	Total	Installed	%
Agricultural BMPs:	-			
Grazing Land Protection System (SL-6)	System	94	7	7..5%
Stream protection system (WP-2T)	System	6		
Waste Storage Facilities (WP-4)	System	3		
Loafing Lot management System	System	1		
Improved Pasture Management	Acres	1439		
Streamside Fence Maintenance	Feet	11583		
Livestock Fenced from Stream	Animals	n/a	620	
Streamside Fencing	Feet	n/a	12362	
Residential BMPs:				
Residential Education Program	System	2		
Septic System Pumpout, RB-1	System	200	16	8.0%
Septic System repairs, RB-3	System	51	1	2%
Septic System Installation, RB-4	System	183	2	1.1%
Alternative Waste Treatment Systems, RB-5	System	27		

July 1 2002-December 31, 2008					
Project Title	**Calendar Year**	**Pathogens (Coliform) CFU**	**Nitrogen lbs/yr**	**Phosphorus lbs/yr**	**Sedimentation-Siltation tons/yr**
Mill and Dodd Creeks TMDL Project	2007	5.20E+14	10.24	0.81	0.19
	2008	1.11E+15	24.78	1.65	0.38
	Sub-Total	**1.63E+15**	**35.02**	**2.46**	**0.57**

PROGRESS REPORT: Hawksbill Creek and Mill Creek TMDL Implementation Project 2008

Project Location

Mill Creek and Hawksbill Creek are part of USGS hydrologic unit code 02070005, the Shenandoah River Basin (Figure 1.1) and located in Page County. Additionally, Hawksbill Creek runs through the Town of Luray. Mill Creek watershed is 8,178 acres and Hawksbill Creek watershed is 56,951 acres. . Mill Creek (VAV-B38R-01) and Hawksbill Creek (VAV-B39R-02) were listed as impaired on Virginia's *1998 303(d) Total Maximum Daily Load Priority List and Report* (DEQ, 1998) due to violations of the State's water quality standards for fecal coliform (modified listing for *E. Coli*) . The impaired segment includes Mill Creek from the headwaters to the confluence with the South Fork Shenandoah River (6.78 miles) and Hawksbill Creek from its headwaters downstream to its confluence with the South Fork Shenandoah River (19.3 miles).

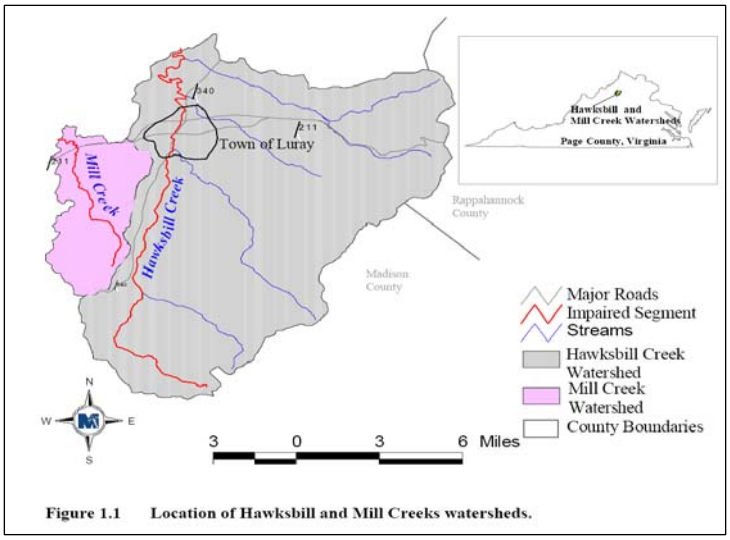


Figure 1.1 Location of Hawksbill and Mill Creeks watersheds.

Implementation Highlights

A TMDL implementation Plan was developed in 2007 that includes a list of BMP implementation goals (Stage 1 and 2) to meet the TMDL. The Shenandoah Valley Soil and Water Conservation District began administering the agricultural and residential components of the project in January 2008. Implementation during the first of the year of the project was slow as the District began making contacts with the agricultural and residential communities. During 2008, the District made at least 42 farm visits, conducted or attended 9 education activities, developed 2 farm plans, wrote 3 agricultural BMP contracts, and 4 acres of permanent vegetation on cropland was established. On the residential septic side, the District made 17 site visits, attended or conducted 9 educational activities, wrote 4 articles for newspapers, and completed the installation of 17 residential BMPs. The BMPs installed were 17 septic system pumpouts. In addition they wrote contracts for one septic system repair and 4 septic system replacements.

BMP Summary for theHawksbill and Mill Creek TMDL Implementation Project (January 1, 2008 - December 31, 2008)				
BMP	Unit	Total	Installed	%
Agricultural BMPs:	-			
Grazing Land Protection System (SL-6)	System	55		
Pasture management	Acres	3940		
Stream protection system (WP-2T)	System	7		
Polywire Fencing (no cost-share)	System	30		
Waste Storage Facilities (WP-4)	System	8		
Manure Incorporation	Acres	838		
Vegetated Buffers - Cropland	Acres	9		
Stream Sdie Fence Maintenance	Feet	3471		
Urban BMPs				
Residential Pet Waste Program	System	1		
Residential Pet Waste Composting	Composter	1577		
Vegetated Buffers	Acres	12		
Residential BMPs:				
Septic System Pumpout, RB-1	System	936	16	
Septic System repairs, RB-3	System	57		
Septic System Installation, RB-4, RB-4P	System	57		
Alternative Waste Treatment, RB-5	System	29		

July 1 2002-December 31, 2008					
Project Title	Calendar Year	Pathogens (Coliform) CFU	Nitrogen lbs/yr	Phosphorus lbs/yr	Sedimentation-Siltation tons/yr
Hawksbill and Mill Creeks TMDL Project	2008	7.96E+10	8.24	0.00	0.00
	Sub-Total	**7.96E+10**	**8.24**	**0.00**	**0.00**