

US EPA ARCHIVE DOCUMENT

**REPORT OF THE DEPARTMENT OF CONSERVATION AND  
RECREATION**

**2010 FEDERAL CLEAN WATER ACT SECTION 319  
NONPOINT SOURCE POLLUTION MANAGEMENT  
PROGRAM ANNUAL REPORT**

and

**2010 PROGRESS REPORT ON THE ‘CHESAPEAKE  
BAY AND VIRGINIA WATERS CLEANUP PLAN’  
(July 1, 2009 – June 30, 2010)**

**SUPPLEMENT: TMDL WATERSHED  
IMPLEMENTATION PROGRESS SUMMARY**



COMMONWEALTH OF VIRGINIA  
RICHMOND  
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## 2010 SUPPLEMENTAL REPORT: TMDL IMPLEMENTATION PROGRESS SUMMARY

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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 Virginia fiscal year 2010. These activities include nonpoint source pollution management program implementation, agricultural cost-share funding allocations and BMP implementation, support for other NPS programs, 2010 grant awards for nonpoint source programs and projects, and planned use of recent funding. This Executive Summary includes highlights from the 2010 Chesapeake Bay and Virginia Waters Clean-up Plan as well as the 2010 TMDL Supplement.

- From July 1, 2009 thru June 30 2010 Virginia developed 9 implementation plans. Since 2000, Virginia has completed 44 TMDL implementation plans addressing 122 impaired stream segments and over 141 impairments. Currently Virginia is working on the development of an additional 12 implementation plans addressing 82 impaired stream segments and 85 impairments.
- In addition, to date and as a result of the program water quality conditions are improving in 30 stream segments and 8 stream segments have either been delisted or are candidates for delisting due to TMDL activities.
- From January 1, 2009 thru June 30, 2010 there were 11 active §319(h) funded implementation projects. Collectively these projects implemented 456 agricultural and residential best management practices (BMPs) that resulted in over 114,842 feet of stream exclusion, establishment or restoration of 96 acres of riparian buffers, and the reduction of 9.72 E+15 colony forming units (CFU) of fecal coliform bacteria, 166,8896 pounds of nitrogen, 31,736 pounds of phosphorous, and 30,590 tons of sediment.
- In 2006, 14 WQIF targeted TMDL implementation projects were started, utilizing State funding (Pigg River was split into two separate projects). From July 1, 2009 – June 30, 2010 the 513 BMPS installed from these projects resulted in a reduction of 59,019 tons of sediment, 321,061 pounds of nitrogen, 70,428 pounds of phosphorus and 1.52E+16 CFU of pathogens and resulted in a total of 244,740 linear feet of stream bank protected and 458 acres of riparian buffer established or restored.
- Virginia runs a comprehensive cost-share program for BMP implementation utilizing both federal 319(h) grant funding, other grant funding and state provided resources from the Water Quality Improvement Fund and the Virginia Natural Resources Commitment Fund. All together in Virginia fiscal year 2010 (July 1, 2009 thru June 30, 2010), the Virginia Cost-share program provided cost-share assistance to install 11,944 BMPs and issued cost-share payments totaling over \$16.6 million of federal, state and grant funding). Total BMP costs (including farmer match) were over \$22.8 million. Collectively these projects reduced 533,829 pounds of phosphorus, 2.59 million pounds of nitrogen and 477,158 tons of sediment. In addition these BMPs resulted in the protection of 527,566 linear feet of stream bank.
- The Virginia Department of Mines, Minerals and Energy (DMME) reclaimed 210 acres of abandoned coal mine land, including the planting of over 12,000 native hardwood seedlings. Additional work included removing gob piles and restoring perennial streams. For 2010, reining efforts of the Virginia coal industry reclaimed an estimated 2100 acres, with approximately 25% of this area being previously mined lands. In 2010, the Virginia coal industry planted over 1.7 million tree seedlings to complement its reclamation efforts. As a result of reclamation and reining efforts 10.96 miles of Middle Creek in Tazewell County was delisted in 2008 and is being written up as an EPA success story.
- As of 2008, 92 free-flowing segments have been approved by EPA for de-listing from the list of Consent Decree waters. Six segments were nominated for delisting in 2006 and 2008. 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.

## 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 adopted the "Chesapeake Bay and Virginia Waters Clean-up Plan" as the Commonwealth's NPS Pollution Management Plan update. In 2010 DCR continued 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 was last updated in June 2009. A progress report is produced annually as well; the latest status report was developed in December 31, 2010 and will be presented by,

## Virginia's 2010 NPS Annual Report (Final January 2011)

Secretary of Natural Resources of the Commonwealth of Virginia to members of the General Assembly of Virginia In February 2011. 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.

### ***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 2010 Virginia NPS Pollution Management Program Annual Report***

The 2010 NPS Management Program Annual Report for Virginia is made up of two parts, which in their entirety make up the full report of accomplishments for the Commonwealth. The first part is the "Chesapeake Bay and Virginia Waters Clean-up Plan Report" and the second part is the TMDL Implementation Supplement. 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 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 supersedes and updates the Commonwealth's NPS Management Plan. 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 will be submitted on in February 2011 by the Secretary of Natural Resources of the Commonwealth of Virginia to members of the General Assembly of Virginia and it will be submitted to EPA once the report is in final format. The second part of the NPS annual report is a supplement describing the progress made in TMDL implementation. This report is a comprehensive summary of the activities accomplished by the Commonwealth in TMDL implementation plan development and implementation

**2010 SUPPLEMENTAL REPORT: TMDL IMPLEMENTATION PROGRESS****CHAPTER 1: 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. To meet the NPS annual reporting requirement for 2010 and to summarize the activities from July 1, 2009 through June 30, 2010; DCR has developed this *TMDL Implementation Program Summary Report*. This report summarizes the successes and accomplishments of the TMDL program, focusing fiscal year 2010. Additional information regarding this program can be found in Appendix I which contains case studies of the Section 319 funded TMDL implementation projects; summarizing their progress from conception through June 30, 2010.

***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. To meet the 1999 Consent Decree (CD) that resulted from a settlement by EPA with plaintiffs regarding enforcement of the TMDL provisions of the Clean Water Act, Virginia completed TMDLs covering approximately 225 shellfish and 333 non-shellfish CD impairments, and approximately 185 non-CD impairments. In addition, Virginia is in the process of completing TMDLs for 28 CD waters and 18 non-CD waters covered under the EPA-lead Chesapeake Bay TMDL. Virginia has also received credit under the CD for an additional 145 delisted or recategorized impairments.

**CD and Non CD TMDLs Completed**

Year	CD TMDL	Shellfish TMDL	Non-CD TMDL	CD Delayed	Non-CD Delayed	Total
2000	11	0	0	0	0	11
2002	24	0	0	0	0	24
2004	91	0	8	0	0	99
2006	76	94	36	0	0	206
2008	70	62	82	0	0	214
2010	61	69	59	28	18	235
<b>Totals</b>	<b>333</b>	<b>225</b>	<b>185</b>	<b>28</b>	<b>18</b>	<b>789</b>

## **Summary of 2010 TMDL Implementation Program**

In FY2010, DCR and DEQ, along with other agency and non-agency partners, continued to develop TMDL implementation plans and to implement these plans throughout Virginia. As a result of the work of these agencies Virginia has developed 9 implementation plans (IPs) during 2010. Since 2000 Virginia has completed 44 TMDL IPs addressing 122 impaired stream segments and 141 impairments. In additional IPs are in progress for an additional 12 plans addressing 83 stream segments and 85 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.

From January 1, 2009 thru June 30, 2010 there were 11 active §319(h) funded implementation projects. Collectively these projects implemented 456 agricultural and residential best management practices (BMPs) that resulted in over 114,842 feet of stream exclusion, establishment or restoration of 96 acres of riparian buffers, and the reduction of 9.72 E+15 colony forming units (CFU) of fecal coliform bacteria, 166,8896 pounds of nitrogen, 31,736 pounds of phosphorous, and 30,590 tons of sediment.

In 2006, 14 WQIF targeted TMDL implementation projects were started, utilizing State funding (Pigg River was split into two separate projects). From July 1, 2009 – June 30, 2010 the 513 BMPS installed from these projects resulted in a reduction of 59,019 tons of sediment, 321,061 pounds of nitrogen, 70,428 pounds of phosphorus and 1.52E+16 CFU of pathogens and resulted in a total of 244,740 linear feet of stream bank protected and 458 acres of riparian buffer established or restored

During 2010 DEQ, DCR and their partners have been very busy developing TMDL implementation plans, and then making sure the implementation plans are initiated and BMPs are installed.

Figures I-1 shows further detail in the progress of TMDL implementation plan development as well as implementation. In the majority of 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.

### **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 2010 DCR and DEQ completed 9 implementation plans covering 25 impaired segments and started an additional 12 implementation plans covering 83 impaired segments (Table I-1). To date 44 IPs have been completed, covering over 122 TMDL segments and 141 impairments.

Figure I-1: Status of TMDL Implementation Status in Virginia

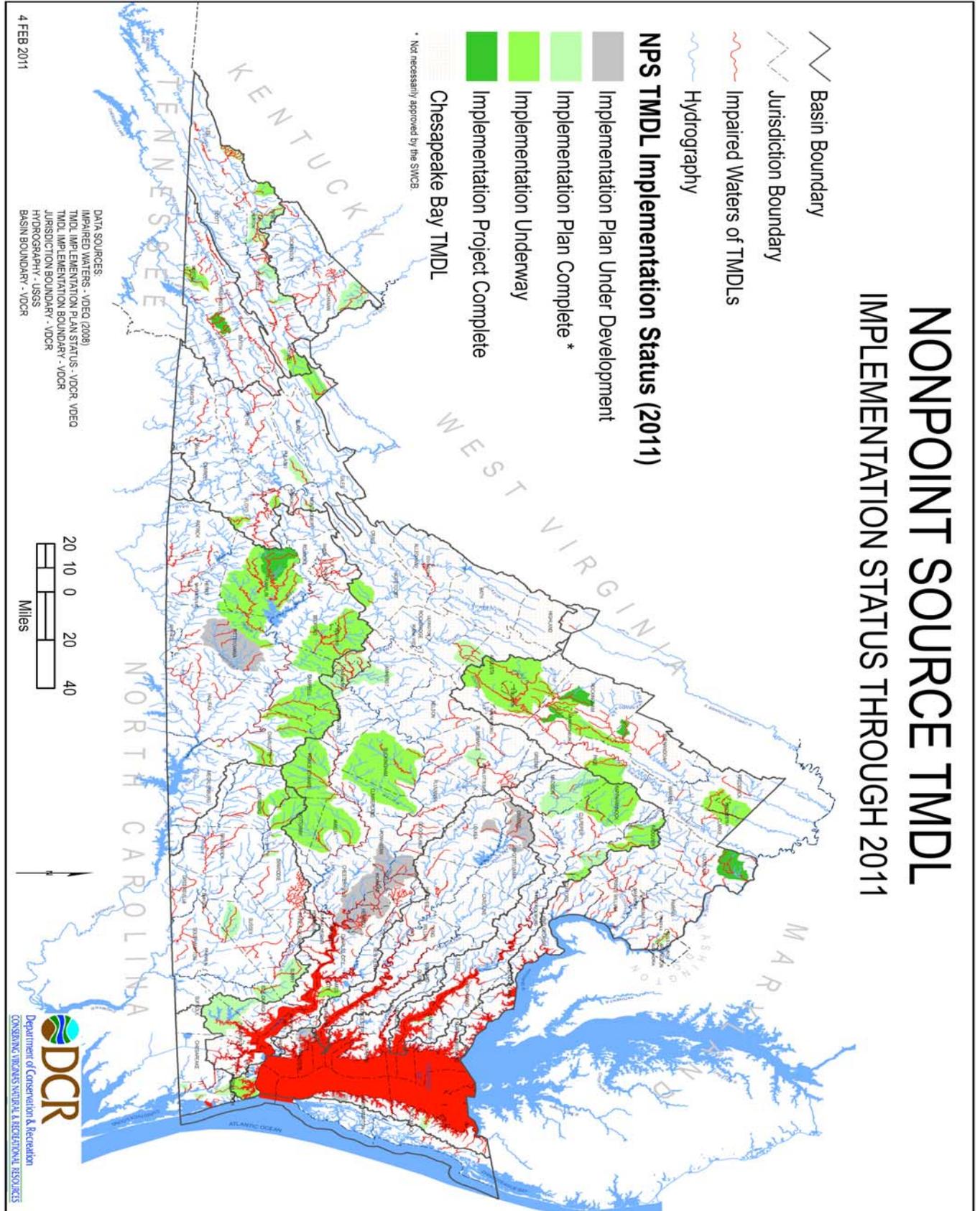


Table I-1

Summary of Completed Implementation Plans (IP) (Status from 2001 thru 06/30/2010)				
Watershed (# of impaired segments/ # of impairments)	Location (County or City)	Impairment	Lead	Complete
Middle Fork Holston (3/3)	Washington	Bc	DCR	2001 (a)
North River (Muddy, Lower Dry, Pleasant, & Mill Creek) (4/5)	Rockingham	Bc, Be	DCR	2001 (a)
Upper Blackwater River (4/4)	Franklin	Bc	DCR	2001 (a)
Catoctin Creek (4/4)	Loudoun	Bc	DCR	2004 (a)
Holmans Creek (2/2)	Shenandoah	Bc, Be	DCR	2004 (a)
Four Mile Run (1/1) *	Arlington & Alexandria	Bc	DEQ	2004
Willis River (1/1)	Cumberland & Buckingham	Bc	DCR	2005 (a)
Chowan Study Area (8/8)*	(Multiple counties)	Bc	DEQ	2005
Moore's Creek (1/1) *	Charlottesville, Albemarle	Bc	DEQ	2005 (c)
Guest River (5/5) *	Wise, Scott, Dickenson	Be	DEQ	2005
Lower Blackwater, Maggoddee & Gills Creek (3/3)*	Franklin	Bc	DCR	2005 (a,b)
Lynnhaven (Shellfish) (1/1)*	VA Beach	Bc	DEQ	2005 (c)
Cooks Creek and Blacks Run (2/6)	Rockingham, City of Harrisonburg	Bc, Be	DCR	2006 (a, b, c, d)
Thumb, Deep, Carter & Great Runs (4/4)	Fauquier and Stafford	Bc	DCR	2006 (a, b)
Big Otter (8/8)	Bedford & Campbell	Bc	DCR	2006(a,b,c)
Dodd Creek and Mill Creek (2/2)	Floyd & Montgomery	Bc	DCR	2006 (a)
Little Creek and Beaver Creek (2/3)	Bristol, Washington	Bc, Be	DCR	2006(a,b,c)
Stroubles Creek (1/1) *	Montgomery	Be	DEQ	2006 (c)
Back Creek (1/2) *	Pulaski	Bc, Be	DEQ	2006/07
Abrams & Opequon Creek (5/8)*	Frederick & Winchester	Bc, Be	DEQ	2006 (b)
Knox & PawPaw Creek (2/4) *	Buchanan	Bc, Be	DEQ	2007
Hawksbill & Mill Creek (2/2)	Page	Bc	DCR	2007 (a, b)
Looney Creek (1/1)	Botetourt	Bc	DCR	2007(a, b)
Upper Clinch River (1/1)	Tazewell	Be	DCR	2008 (b, c)
Occahannock Creek (Shellfish) (1/1)	Accomac	Bc	DCR	2008 CNP
Falling River (1/1)	Campbell and Appomattox	Bc	DCR	2008 (b)
Dumps Creek (1/2)*	Russell	TSS,TDS	DEQ	2008
Bluestone River (1/1)	Tazewell & Bluefield	Bc, Be (sed)	DCR	2008
Smith Creek (1/2)*	Rockingham & Shenandoah	Bc, Be (sed)	DEQ	2008 (a,b, d)
Appomattox River - Spring Creek, BrieryCreek, Bush River, Little Sandy River and Sayers Creek (5/5)	Prince Edward and Amelia	Bc	DCR	2008 (b)
Appomattox River - Flat, Nibbs, Deep and West Creeks (4/4)	Amelia and Nottoway	Bc	DCR	2008 (b)
Straight Creek, Stone Creek and Tributaries (3/3)	Lee	Bc, Be (sed)	DEQ	2009
Long Glade Run, Mossy Creek, and Naked Creek (3/5)	Augusta and Rockingham	Bc Be (sed),	DCR	2009 (b)
Back Bay Watershed (1/1)*	City of Virginia Beach	Bc	DEQ	2009
North Landing Watershed (2/2)*	City of Virginia Beach	Bc	DEQ	2009
Pigg River and Old Womans Creek (8/8)	Franklin and Pittsylvania	Bc	DEQ	2009 (b, c)
Cub, Turnip, Buffalo and UT Buffalo Creeks (4/4)	Appomattox and Charlotte	Bc	DCR	2009 (b)
Hazel River Watershed (4/4)	Culpeper, Madison & Rappahannock	Bc	DCR	2009 (a,b, c)
Greenvale Creek, Paynes Creek, and Beach Creek, (Shellfish)* (2/3)	Lancaster	Bc	DCR	2010
Ash Camp Creek, Twitty's Creek (2/2)*	Charlotte	Be (sed)	DCR	2010 (b)
Upper Middle R., Lower Middle, Moffett Cr, Polecat Cr (5/7).	Augusta	Bc, Be (sed)	DCR	2010 (b)
Mill Creek and Powhatan Creek (2/2)*	James City County	Bc	DEQ	2010
Nansemond River, Shingle Creek (3/3)*	Suffolk	Bc	DEQ	2010
Lewis Creek (1/1)	Russell	Be (sed)	DCR	2010 (c)
TOTAL IPs Completed = Plans (44), Segments (122), impairments (141). In addition, as of June 30, 2010 there were 12 IPs not on the above list that are currently under development (UD) that include up to 82 impaired segments and 85 impairments. Impairment types: Bc=Bacteria, Be = Benthic, NI= Nitrogen, TSS=Total Suspended Solids, TDS=Total Dissolved Solids, Sed=Sediment, Temp=temperature (for trout waters)				
<b>Note:</b> All IPs were funded by §319(h), except those done in-house by either DCR or DEQ, indicated by a (*). For all completed IPs, implementation is funded by either (a) EPA Section 319, (b) state WQIF/VNRCF targeted TMDL cost-share, (c) received limited or one-time funding from WQIF RFP, or (d) received from other non-319 and non state grants (e.g. NFWF, National Fish and Wildlife Foundation) administered by DCR . Otherwise the project is not being funded by DCR.				

Summary of Completed Implementation Plans (IP) (From July 1, 2010 thru 03/22/2011)				
Watershed (# of impaired segments/ # of impairments)	Location (County or City)	Impairment	Lead	Complete
Browns, Craig, and Marsh Runs (3/3)	Fauquier	Bc	DCR	2010 (b, c)
Little Dark Run and Robinson River (3/3)	Culpeper and Madison	Bc	DCR	2010 (b, c)
Rock Island, Austin, Frisby and Troublesome Creeks, North and Slate Rivers (6/6)	Buckingham	Bc	DCR	2010 (a)
Hays, Moffatts, Otts and Walker Creeks (4/4) *	Augusta and Rockbridge	Bc	DCR	2010 (c)
Christians Creek and South River (3/6)	Augusta and City of Waynesboro	Bc, Be (sed)	DCR	2010 (b)
South James River, Ivy, Tomahawk, Burton, Judith, Fishing, Blackwater and Beaver Creeks (8/8)	Campbell, Bedford, Amherst and City of Lynchburg	Bc	DEQ	2010
Cherrystone Inlet, Kings Creek (Shellfish) (1/1) *	Northampton	Bc	DCR	2011
Roanoke River Watersheds - Upper Banister River and Stinking River, Bearskin, Cherrystone and Whitehorn Creeks (5/5)	Pittsylvania	Bc	DCR	UD
York Basin Watersheds - Beaver Creek, Goldmine Creek, Mountain Run, Pamunkey Creek, Plentiful Creek, and Terry's Run (6/6)	Louisa, Orange and Spotsylvania	Bc	DCR	UD
James River Watershed James River and Bernards, Powhite, Reedy, Gilles, Almond, Goode, Falling and Noname Creeks (10/10)	Chesterfield, Powhatan, Henrico, and City of Richmond	Bc	DEQ	UD (d)
Little River Watershed - Little River, Meadow Run, and Pine, West Fork Dodd, Dodd, Meadow, Brush, Laurel, and Big Indian Creeks (26/26)	Montgomery and Floyd	Bc, Be (sed), Temp	DEQ	UD
Clinch River, Coal Creek, Middle Creek, Plum Creek (7/7)	Tazewell	Bc, Be (sed)	DEQ	UD
<b>TOTAL IPs Completed = Plans (7), Segments (28), impairments (31). In addition 5 IPs are currently under development (UD) that include up to 54 impaired segments and 54 impairments. Impairment types: Bc=Bacteria, Be = Benthic, NI= Nitrogen, TSS=Total Suspended Solids, TDS=Total Dissolved Solids, Sed=Sediment, Temp=temperature (for trout waters)</b>				
<b>Note:</b> All IPs were funded by §319(h), except those done in-house by either DCR or DEQ, indicated by a (*). For all completed IPs, implementation is funded by either (a) EPA Section 319, (b) state WQIF/VNRCF targeted TMDL cost-share, (c) received limited or one-time funding from WQIF RFP, or (d) received from other non-319 and non state grants (e.g. NFWF, National Fish and Wildlife Foundation) administered by DCR. Otherwise the project is not being funded by DCR.				

### Watershed Restoration and TMDL Implementation:

The goal of the TMDL Implementation Program is to implement targeted, on-the-ground activities, through TMDL implementation plans, that result in watershed restoration and increased water quality improvements and delisting of impaired stream segments. Virginia uses a staged approach 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 nine years ago when DCR started three pilot TMDL implementation projects: North Fork (Muddy Creek, Pleasant Run, Mill Creek and Lower Dry River), Middle Fork Holston River (Three Creeks), and the Upper Blackwater River. Since that time DCR has started another 12 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 24 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 2007 after 6 years. The North River finished in August 2008 (after over 7 years). To keep the momentum going for implementation activities DCR started additional projects over the years, including: two projects in 2004 (Catoctin Creek and Holmans Creek), one project in 2005 (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), one project in 2008 (Hawksbill and Mill Creeks), and two projects in 2009 (Looney Creek and Upper Hazel River). The last year of targeted implementation for both the North River project as well as Holmans Creek was 2008, and the Catoctin Creek project in Loudoun County ended in December 2009 after 5.5 years of implementation.

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For the most part these projects are funded with Section 319 federal funds. However several of these projects have received non-federal money to fund urban and/or septic BMP installation (Hazel River, Cooks Creek and Blacks Run, Little and Beaver Creek, etc.). In addition DCR was successful in securing over \$1.5 million of state Virginia Natural Resource Commitment Funds (VNRFCF) to augment federal 319 funds to be used for the installation of agricultural BMPs. In 2010 a total of 10 projects are being implemented using Federal 319 funds; of these projects four of the projects (Big Otter, Little and Beaver Creeks, Lower Blackwater River and Hazel River) are receiving some state WQIF money to fund their agricultural practices. DCR is trying to move in the direction that eventually all agricultural practices for TMDL implementation projects will be funded using non-319 sources (state cost-share, USDA/NRCS, private funds, etc.) and that section 319 will fund mining, residential septic and urban/residential and pet waste 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 implementation plans. 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. 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 June 2010, the program consists of 24 organized implementation projects funded through a variety of federal, state, local and non-profit sources (Table I-2, sections B and C) and 9 projects (section D) with some DCR funding . Table I-2

Status of TMDL/ Watershed Implementation Projects					
Watershed Area	TMDL Segment	Status	Year Implementation	Lead Agency	Funds Used
<b>A. CLOSED: Projects 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.</b>					
1. Middle Fork Holston River	VAS-O05R	MI	2001-2007	DCR	(a)
2. Upper Blackwater River	LAW-L08R	SI	2001-2007	DCR	(a)
3. North River	VAN-B21R, B22R, B27R & B29R	I	2001-2008	DCR	(a)
4. Holmans Creek	VAV-B45R	SI	2005-2008	DCR	(a)
5. Catocin Creek	VAN-A-02R	I	2005-2009	DCR	(a)
<b>B. ACTIVE: Projects are being funded by Federal 319(h), select projects may also receive State VNRFCF administered by DCR</b>					
1. Willis River	VAC-H36R	I, D(3 2006/2008)	2005-2010	DCR	(a, b)
2. Lower Blackwater River	VAW-L09R, L10R and L11R	SI, D(1, 2008)	2006-2011	DCR	(a, b)
3. Thumb, Great, Carter & Deep Runs	VAN-E01R, E02R & E10R	SI	2006-2011	DCR	(a, b)
4. Cooks Creeks & Blacks Run	VAV-B25R & B26R	SI	2006-2011	DCR	(a, b, c, d)
5. Big Otter River	VAW-L23R, L25R, L27R, & L28R	I, D (200	2006-2011	DCR	(a, b, c)
6. Mill and Dodd Creeks	VAW-N20R & N21R	SI	2007-2012	DCR	(a, b)
7. Little and Beaver Creeks	VAS-O07	SI	2007-2012	DCR	(a, b, c)
8. Hawksbill and Mill Creeks	VAN-B38R, B39R	TETD	2008-2012	DCR	(a, b)
9. Looney Creek	VAW-I26R	TETD	2009-2013	DCR	(a, b)
10. Hazel River	VAN-E03R, E04R, E05R	SI	2009-2013	DCR	(a, b, c)
<b>C. ACTIVE: Projects are receiving some WQIF / VNRFCF funds (and other funds as well)</b>					
1. Chowan Study Area	VASC-K14R,	SI	2005-2009+ (Ag)	DCR	(b)
2. Falling River	VAW-L34R	SI	2007+ (Ag only)	DCR	(b)
3. Mossy & Naked Creeks, Long Glade Run	VAV-B19R, B24R, B28R	SI	2007+ (Ag only)	DCR	(b)
4. Pigg River (Blue Ridge SWCD)	VAW-L14R, L15R, L16R, L17R	SI	2007 (Res 2011+)	DCR	(b, c)
5. Pigg River (Pittsylvania SWCD)	VAW-L13R, L17R, L18R	SI	2007+ (Ag only)	DCR	(b)
6. Twittys and Ash Camp Creeks	VAC-L39R	SI	2007+ (Ag only)	DCR	(b)
7. Abrams & Opequeon Creeks	VAV-B08R & VAV-B09R	SI	2006+ (Ag Only)	DCR/DEQ	(b, c)
8. Cub, Turnip and Buffalo Creek	VAC-L36R, L37R, L40R	SI	2007+ (Ag only)	DCR	(b)
9. Appomattox Flat, Nibbs, Deep, West Creeks	VAP-J08R, J09R, J11R	SI	2007+ (Ag only)	DCR	(b)
10. Moffett Creek, Middle River, Polecat Draft	VAV-B10, B13, B15	SI	2007+ (Ag only)	DCR	(b)
11. Christians Creek & South River	VAV-B14, B30	SI	2007+ (Ag only)	DCR	(b)
12. Upper Clinch River	VAS-P01R	SI	2007+ (Ag only)	DCR	(b)
13. Bluestone River	VAS-N36R	SI	2007+ (Ag only)	DCR	(b)
14. Appomattox: Briery, Little Sandy, Spring, Sayers Creeks and Bush River	VAC-J02, J03, J04, J05 and J06R	SI	2007+ (Ag only)	DCR	(b)
<b>TOTAL of 29 IPs that were or currently under some type of organized implementation project; 15 funded with Section 319 funds, and 14 with State WQIF targeted TMDL funding. 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: (a) EPA 319, (b) state WQIF/VNRFCF cost-share, (c) WQIF RFP, (d) Other Grant funds (NFWF, NRCS, OSM, DMME etc.). NFWF=National Fish and Wildlife Fund grant, NRCS - USDA Natural Resource Conservation Service, VNRFCF=Virginia Natural Resource Commitment Fund</b>					

Status of TMDL/ Watershed Implementation Projects					
Watershed Area	TMDL Segment or NWBD	Status	Year Implementation	Lead Agency	Funds Used
<b>D. Projects have received some WQIA RFP funds over the years (and other funds as well)</b>					
1. Moore's Creek	VAV-H28R	SI	2005+	N/A	(c)
2. Guest River	VAS-P11R	TETD	2005+	N/A	(c)
3. Stroubles Creek	VAV-N22R	MI, D (2008)	2006+	N/A	(c)
4. Smith Creek	VAV-1347R	TETD	2008+	DEQ/DCR	(a, b, d)
5. Straight Creek and Tributaries	VAS-P20R	TETD	2009+	Other	(c)
6. Lewis Creek	VAS-P04R	TETD	2010+	other	(c)
7. Browns, Craig and Marsh Runs	RA17	TETD	2011+	Other	(b, c)
8. Little Dark Run and Robinson River	RA31-36	TETD	2011+	Other	(b, c)
9. Slate River, Rock Island, Austin, Frisby and Troublesome Creeks	JM43, JM51-57	TETD	2011+	DCR	(a, b)
<b>E. Projects are not receiving designated funding from DCR</b>					
1. Four Mile Run	VAN-A12R	D	N/A	DEQ	Unknown
2. Middle Creek/Tazewell County	VAS-P03R	D 2006	N/A	DMME	OSM
3. Quail Run/Rockingham County	VAV-B35R	D 2005	N/A	DEQ	Unknown
4. Lynnhaven (Shellfish)	VAT-V08E	D/SFB 2008	2005-2008	VA Beach	OTHER
6. Back Creek	VAV-N22R	unknown	2008+	Other	Unknown
7. Knox and Paw Paw Creek	VAS-Q03R	unknown	2008+	Other	Unknown
8. Occahannock Creek	VAT-C13E	unknown	2008+	CNP	OTHER
9. Dumps Creek	VAS-P08R	unknown	2008+	Other	Unknown
10. Back Bay Watershed	VAT-K41R	unknown	2008+	DEQ	OTHER
11. North Landing River	VAT-K41R	unknown	2008+	Va Beach	OTHER
12. Grennvale, Paynes, and Beach Creeks	VAP-E25E	unknown	2010	DCR	Unknown
13. Mill Creek and Powhatan Creek	VAT-G10E, VAT-G10R	unknown	2010+	James City County	Unknown
14. Nansemond River, Shingle Creek	JL44-49	TETD	2010+	DEQ	Unknown
15. Hays, Moffatts, Ottis, and Walker Creeks	JU72-JU73	TETD	2011+	Other	Unknown
16. Christians Creek and South River	PO08-09, PS27	TETD	2011+	Other	Unknown
17. James River, Ivy, Tomahawk, Burton, Dudith, fishing, Blackwater and Beaver Creeks	JM07-JM12	TETD	2011+	Other	Unknown
18. Cherrystone Inlet, Kings Creek (Shellfish)	CB46	TETD	2011+	Other	Unknown
<b>TOTAL of 9 IPs that are completed and that have received some type of limited assistance from DCR (through RFP or one-time allocation) but which don't have a designated funding stream. There are 18 projects where the IP is completed but there is not a designated, DCR managed implementation project or any designated DCR funding; Status 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: (a) EPA 319, (b) state WQIF/VNRCF cost-share, (c) WQIF RFP, (d) Other Grant funds (NFWF, NRCS, OSM, DMME etc.). NFWF=National Fish and Wildlife Fund grant, NRCS – USDA Natural Resource Conservation Service, VNRCF=Virginia Natural Resource Commitment Fund</b>					

**Funding of Implementation:**

As the agency taking the lead in nonpoint TMDL watershed implementation, DCR utilizes both state 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. In addition, Virginia runs a comprehensive cost-share program for BMP implementation utilizing both federal 319(h) grant funding, other grant funding and state provided resources from the Water Quality Improvement Fund and the Virginia Natural Resources Commitment Fund. All together in Virginia fiscal year 2010 (July 1, 2009 thru June 30, 2010), the Virginia Cost-share program provided cost-share assistance to install 11,944 BMPs and issued cost-share payments totaling over \$16.6 million of federal, state and grant funding). Total BMP costs (including farmer match) were over \$22.8 million (Table I-3).

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Table I-3: Summary of Virginia Cost-Share BMP Implementation by Watershed Basin

Completed BMPs - by Drainage - by Basin - by Practice

BMPs installed in PY 2010 through June 30, 2010

Chesapeake Bay

Basin	Number of Participants	Number of Contracts	Number of BMPs	Tons SL Reduced	Pounds N Reduced	Pounds P Reduced	Stream Bank Protected	Actual BMP Cost	Actual Cost Share Payment	Other Funding Amount	Tax Credit Amount Issued
Chesapeake Bay Coastal	128	180	1614	20,046	109,050	27,007		\$945,716	\$951,525		
James-Appomattox	49	56	128	40,446	220,025	55,046	54,528	\$704,370	\$463,698	\$12,545	\$21,177
James-Rivanna	21	22	41	1,535	8,353	1,232	52,276	\$437,163	\$211,050	\$75,179	\$14,455
Lower James	92	121	579	8,198	44,596	10,922	1,585	\$802,492	\$890,055		\$2,551
Lower Potomac	124	151	879	38,749	210,803	32,779	52,988	\$1,000,101	\$856,989		\$27,239
Middle James	61	76	214	12,773	69,495	10,342	69,995	\$1,087,582	\$718,203	\$121,473	\$29,306
Potomac-Shenandoah	364	378	1017	49,959	271,771	62,786	132,065	\$3,012,357	\$1,747,020	\$519,170	\$96,484
Rappahannock	299	382	1583	26,791	145,859	25,597	67,639	\$2,215,752	\$1,747,240	\$3,952	\$39,466
Upper James	71	77	152	9,939	54,084	9,435	45,948	\$680,007	\$400,058	\$91,790	\$1,101
Upper Potomac	13	14	23	1,582	8,607	1,405	4,706	\$127,628	\$86,141	\$23,681	\$2,227
York	152	257	1924	40,477	220,193	39,350	50,661	\$2,191,732	\$1,621,928	\$166,604	\$37,000
<b>Sub-Total</b>	<b>1,374</b>	<b>1,714</b>	<b>8,154</b>	<b>250,495</b>	<b>1,362,837</b>	<b>275,900</b>	<b>532,391</b>	<b>\$ 13,204,899</b>	<b>\$ 9,693,907</b>	<b>\$ 1,014,394</b>	<b>\$ 271,007</b>

Southern Rivers

Basin	Number of Participants	Number of Contracts	Number of BMPs	Tons SL Reduced	Pounds N Reduced	Pounds P Reduced	Stream Bank Protected	Actual BMP Cost	Actual Cost Share Payment	Other Funding Amount	Tax Credit Amount Issued
Albemarle Sound Coastal	17	29	186	3,528	19,192	3,634		\$268,992	\$200,834		
Atlantic Ocean Coastal	40	52	329	7,604	41,368	10,528		\$333,993	\$333,995		
Big Sandy	6	6	6	72	391	72	5,919	\$102,167	\$75,658		\$4,457
Chowan-Meherrin	59	81	565	14,955	81,355	21,793	3,336	\$307,467	\$388,985	\$14,719	\$12,393
Lower Chowan	5	5	11	314	1,706	514		\$29,347	\$567		
Lower Roanoke	15	15	16	3,275	17,816	4,532	1,618	\$24,855	\$37,906		\$401
New River	161	166	459	46,062	250,042	43,829	88,963	\$1,504,374	\$1,093,114	\$20,511	\$86,341
Roanoke-Dan	73	85	114	17,117	93,115	18,622	56,844	\$829,681	\$591,565	\$203,812	\$54,384
Tennessee-Clinch	32	32	70	26,576	144,572	26,683	33,148	\$775,159	\$371,066	\$68,091	\$39,685
Tennessee-Holston	97	114	261	35,378	189,462	38,189	56,888	\$1,090,507	\$730,955	\$158,959	\$58,134
Tennessee-Powell	16	16	19	4,356	23,698	4,356	27,751	\$341,470	\$224,999		\$22,237
Upper Chowan	143	194	1519	33,106	180,094	48,920	21,963	\$1,207,246	\$1,057,877	\$15,203	\$80,664
Upper Roanoke	146	161	226	33,147	180,365	35,083	229,936	\$2,752,590	\$1,765,596	\$246,880	\$122,327
Yadkin	7	8	9	1,175	6,390	1,175	1,100	\$103,387	\$64,457		\$9,676
<b>Sub-Total</b>	<b>817</b>	<b>964</b>	<b>3,790</b>	<b>226,663</b>	<b>1,229,565</b>	<b>257,929</b>	<b>527,466</b>	<b>\$ 9,671,234</b>	<b>\$ 6,937,572</b>	<b>\$ 728,174</b>	<b>\$ 490,698</b>

<b>TOTAL</b>	<b>2,191</b>	<b>2,678</b>	<b>11,944</b>	<b>477,158</b>	<b>2,592,401</b>	<b>533,829</b>	<b>1,059,857</b>	<b>\$ 22,876,133</b>	<b>\$ 16,631,479</b>	<b>\$ 1,742,568</b>	<b>\$ 761,706</b>
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TMDL Implementation Project Funding: DCR routinely provides targeted funding for implementation of TMDL watershed implementation plans. This includes funding provided by the 319(h) program as well as funding from state resources. Below is a table summarizing the BMP implementation and funding provided from July 1, 2009 thru June 30, 2010. All together \$2.6 million of targeted state and federal resources were provided for BMP installation. This figure does not include funding for BMPs installed in TMDL watersheds that paid for by non-TMDL targeted funding (Table I-4). Please note that table I-4a summarizes the funding managed by DCR and does not summarize the non-319 or non TMDL targeted state funds utilized in these TMDLs in these same project areas.

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**Table I-4a Amount of Targeted TMDL funding (319 or State), does not include funding for Urban projects, only agricultural and residential practices; and does not include funding for CREP or regular state Cost-share for agricultural practices.)**

**Summary Breakdown by Funding Source of Cost-share spent in TMDL Project Areas from 7/1/2009 thru 6/30/2010**

Funding	Data	Total
319	Sum of Total BMPs	261
	Sum of Actual Amount	\$ 979,404.80
	Sum of Cost Share Payment	\$ 873,954.87
	Sum of Other Funding Amount	\$ 191,098.61
	Sum of Tax Credit Amount Issued	\$ 41,941.11
319-VNRCF	Sum of Total BMPs	24
	Sum of Actual Amount	\$ 232,638.78
	Sum of Cost Share Payment	\$ 209,843.76
	Sum of Other Funding Amount	\$ 720.00
	Sum of Tax Credit Amount Issued	\$ 13,279.57
WQIF	Sum of Total BMPs	93
	Sum of Actual Amount	\$ 1,580,704.67
	Sum of Cost Share Payment	\$ 1,512,561.74
	Sum of Other Funding Amount	\$ 20,598.74
	Sum of Tax Credit Amount Issued	\$ 70,913.19
WQIA-RFP	Sum of Total BMPs	14
	Sum of Actual Amount	\$ 25,367.28
	Sum of Cost Share Payment	\$ 24,433.04
	Sum of Other Funding Amount	\$ -
	Sum of Tax Credit Amount Issued	\$ -
<b>Total Sum of Total BMPs</b>		<b>392</b>
<b>Total Sum of Actual Amount</b>		<b>\$ 2,818,115.53</b>
<b>Total Sum of Cost Share Payment</b>		<b>\$ 2,620,793.41</b>
<b>Total Sum of Other Funding Amount</b>		<b>\$ 212,417.35</b>
<b>Total Sum of Tax Credit Amount Issued</b>		<b>\$ 126,133.87</b>

**Description of Funding Sources**

<b>319</b>	BMPs implemented in 10 project areas funded by Section 319(h) funding from EPA
<b>319-VNRCF</b>	BMPs funded by state VNRCF money but are part of larger projects that are predominately funded by 319
<b>WQIF</b>	BMPs implemented in 15 project areas exclusively funded by State WQIF money
<b>WQIF-RFP</b>	BMPs implemented in one 319 project area but funded with state RFP funds

**319 TMDL Targeted Projects:** 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, capacity building and 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. In 2008 over \$1.53 million Federal 319 funds was spent on 11 TMDL implementation projects. From January 1 – June 30, 2009 approximately \$ 1.1 million of Federal 319 funds was spent on 11 TMDL implementation projects. As illustrated in Table I-4a, from July 1, 2009 thru June 30, 2010 approximately \$1.0 million was spent on 10 TMDL implementation projects (\$1.5 million if including technical assistance). 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. In July 2007 thru June 2010 DCR allocated a total of over \$1.5 million of state WQIF funds years to fund agricultural cost-share practices of the above referenced Section 319 projects, of which just shy of a quarter million was spent from July 2009 thru June 2010. In 2007 the state issued several WQIF grants through a competitive process utilizing state funds. These WQIF RFP grant funds were responsible for over \$24,000 in grant funds toward implementation of 319 projects.

By utilizing other available funding, such as state funded cost-share (non-targeted) CREP [Conservation Reserve Enhancement Program (Federal - NRCS), and local donations the amount of cost share payments was just over \$1.75 million with actual BMP costs of almost \$2.5 million. (Table I-4b)

**Table I-4b Total Cost-Share (from all state sources) spent in 319 Targeted TMDL Watersheds (not including Urban practices)**

Summary of Cost-share Funding for BMPs Installed in Section 319 Targeted TMDL Watersheds July 1, 2009 thru June 30, 2010  
Includes state-funded cost-share

TMDL IP Area	Pollutant Reduced	Total	TMDL IP Area	Pollutant Reduced	Total
Beaver Creek and Little Creek	Total Actual BMP Cost	\$ 501,435	Hawksbill Creek and Mill Creek	Total Actual BMP Cost	\$ 218,147
	Total Actual Cost Share Payment	\$ 123,612		Total Actual Cost Share Payment	\$ 100,769
	Total Other Funding Amount	\$ 162,555		Total Other Funding Amount	\$ 30,117
	Total Tax Credit Amount Issued	\$ 18,223		Total Tax Credit Amount Issued	\$ 1,635
Big Otter River Watershed	Total Actual BMP Cost	\$ 612,989	Looney Creek	Total Actual BMP Cost	\$ 72,382
	Total Actual Cost Share Payment	\$ 335,022		Total Actual Cost Share Payment	\$ 48,071
	Total Other Funding Amount	\$ 66,324		Total Other Funding Amount	\$ -
	Total Tax Credit Amount Issued	\$ 18,045		Total Tax Credit Amount Issued	\$ 803
Carter Run, Great Run, Deep Run and Thumb Run	Total Actual BMP Cost	\$ 282,216	Lower Blackwater River, Maggodee and Gills Creek	Total Actual BMP Cost	\$ 96,006
	Total Actual Cost Share Payment	\$ 227,843		Total Actual Cost Share Payment	\$ 72,315
	Total Other Funding Amount	\$ -		Total Other Funding Amount	\$ -
	Total Tax Credit Amount Issued	\$ 7,997		Total Tax Credit Amount Issued	\$ 3,074
Catoclin Creek	Total Actual BMP Cost	\$ 304,354	Upper Hazel River	Total Actual BMP Cost	\$ 182,055
	Total Actual Cost Share Payment	\$ 198,636		Total Actual Cost Share Payment	\$ 115,277
	Total Other Funding Amount	\$ -		Total Other Funding Amount	\$ -
	Total Tax Credit Amount Issued	\$ 8,784		Total Tax Credit Amount Issued	\$ 5,143
Cooks Creek and Blacks Run	Total Actual BMP Cost	\$ 55,082	Willis River Watershed	Total Actual BMP Cost	\$ 132,129
	Total Actual Cost Share Payment	\$ 32,123		Total Actual Cost Share Payment	\$ 122,143
	Total Other Funding Amount	\$ -		Total Other Funding Amount	\$ 15,834
	Total Tax Credit Amount Issued	\$ 914		Total Tax Credit Amount Issued	\$ 3,669
Dodd Creek and Mill Creek	Total Actual BMP Cost	\$ 111,641	<b>Total of All Target TMDL Implementation Projects</b> (not including 319 funded projects)	Total Actual BMP Cost	\$ 2,568,436
	Total Actual Cost Share Payment	\$ 68,802		Total Actual Cost Share Payment	\$ 1,444,612
	Total Other Funding Amount	\$ -		Total Other Funding Amount	\$ 274,830
	Total Tax Credit Amount Issued	\$ 7,042		Total Tax Credit Amount Issued	\$ 75,328

(Note: The Catoclin Creek Implementation Project ended March 31, 2010)

**WQIF Targeted TMDL 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 an additional 46 impaired segments. Approximately \$4.822 million 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 2010. 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, 2008 through June 30, 2009 \$ 1.29 million was spent on agricultural cost-share BMPs using these special, targeted state funds. From July 1, 2009 thru June 30, 2010 a little over \$1.5 million was spent on TMDL BMP implementation using these special funds. By utilizing other available funding, such as CREP [Conservation Reserve Enhancement Program (Federal - NRCS)], the amount of cost share payments was \$1.944 million with actual BMP costs of almost \$4.5 million. (Table I-4c)

**Table I-4c Total Cost-Share (from all state sources) spent in Targeted TMDL Watersheds**

Summary of Cost-share Funding for BMPs Installed in State-funded Targeted TMDL Watersheds July 1, 2009 thru June 30, 2010

TMDL IP Area	Pollutant Reduced	Total	TMDL IP Area	Pollutant Reduced	Total
Blackwater/Raccoon Study Area (Chowan River Watershed)	Total Actual BMP Cost	\$ 142,226	Mossy Creek, Naked Creek and Long Glade Run	Total Actual BMP Cost	\$ 238,443
	Total Actual Cost Share Payment	\$ 123,844		Total Actual Cost Share Payment	\$ 144,389
	Total Tax Credit Amount Issued	\$ 4,894		Total Tax Credit Amount Issued	\$ 7,748
Bluestone River	Total Actual BMP Cost	\$ 137,134	Opequon Creek Watershed	Total Actual BMP Cost	\$ 1,389,748
	Total Actual Cost Share Payment	\$ 82,907		Total Actual Cost Share Payment	\$ 110,018
	Total Tax Credit Amount Issued	\$ 4,693		Total Tax Credit Amount Issued	\$ 3,704
Christians Creek and South River Watersheds	Total Actual BMP Cost	\$ 311,944	Pigg River and Old Womans Creek Watersheds	Total Actual BMP Cost	\$ 616,703
	Total Actual Cost Share Payment	\$ 136,993		Total Actual Cost Share Payment	\$ 564,429
	Total Tax Credit Amount Issued	\$ 1,370		Total Tax Credit Amount Issued	\$ 27,255
Cub Creek, Turnip Creek and UT to Buffalo Creek	Total Actual BMP Cost	\$ 141,419	Spring Creek, Briery Creek, Bush River, Little Sandy River and Sayers Creek	Total Actual BMP Cost	\$ 218,519
	Total Actual Cost Share Payment	\$ 79,475		Total Actual Cost Share Payment	\$ 127,180
	Total Tax Credit Amount Issued	\$ 2,548		Total Tax Credit Amount Issued	\$ 6,064
Falling River	Total Actual BMP Cost	\$ 509,608	Twittys and Ash Camp Creeks	Total Actual BMP Cost	\$ 38,891
	Total Actual Cost Share Payment	\$ 320,849		Total Actual Cost Share Payment	\$ 24,491
	Total Tax Credit Amount Issued	\$ 7,994		Total Tax Credit Amount Issued	\$ 1,460
Flat, Nibbs, Deep and West Creeks	Total Actual BMP Cost	\$ 268,820	Upper Clinch River	Total Actual BMP Cost	\$ 344,754
	Total Actual Cost Share Payment	\$ 86,150		Total Actual Cost Share Payment	\$ 148,052
	Total Tax Credit Amount Issued	\$ 9,754		Total Tax Credit Amount Issued	\$ 14,555
Hays and Moffatts Creeks	Total Actual BMP Cost	\$ 91,745	<b>Total of All Target TMDL Implementation Projects</b> (not including 319 funded projects)	Total Actual BMP Cost	\$ 4,449,953
	Total Actual Cost Share Payment	\$ 45,224		Total Actual Cost Share Payment	\$ 1,994,002
	Total Tax Credit Amount Issued	\$ 360		Total Tax Credit Amount Issued	\$ 92,399

**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, 14 WQIF targeted TMDL implementation projects were started, utilizing State funding (Pigg River was split into two separate projects). From July 1, 2009 – June 30, 2010 the BMPS from these projects resulted in a reduction of 59,019 tons of sediment, 321,061 pounds of nitrogen, 70,428 pounds of phosphorus and 1.52E+16 CFU of pathogens (Table I-5a) from the installation of 513 BMPs (Table I-5b and I-5c) resulted in a total of 244,740 linear feet of stream bank protected and 458 acres of riparian buffer established or restored (Table I-5d).

**Table I-5a Summary of Pollution Reductions from State funded BMPs in Targeted (non-319) TMDL Watersheds 7/1/2009-06/30/2010**  
Totals include BMPs funded with state WQIF/VNRCF, Targeted State WQIF TMDL Funds and CREP

TMDL IP Area	Pollutant Reduced	Total	TMDL IP Area	Pollutant Reduced	Total
Blackwater/Raccoon Study Area (Chowan River Watershed)	Total Tons SL	1,517	Mossy Creek, Naked Creek and Long Glade Run	Total Tons SL	3,282
	Total Pounds N	8,251		Total Pounds N	17,855
	Total Pounds P	2,234		Total Pounds P	3,612
	Total Bacteria Redux	5.19E+13		Total Bacteria Redux	1.96272E+15
Bluestone River	Total Tons SL	1,578	Opequon Creek Watershed	Total Tons SL	2,278
	Total Pounds N	8,584		Total Pounds N	12,394
	Total Pounds P	1,578		Total Pounds P	2,132
	Total Bacteria Redux	1.599E+12		Total Bacteria Redux	0
Christians Creek and South River Watersheds	Total Tons SL	5,410	Pigg River and Old Womans Creek Watersheds	Total Tons SL	4,177
	Total Pounds N	29,432		Total Pounds N	22,724
	Total Pounds P	5,843		Total Pounds P	4,489
	Total Bacteria Redux	2.52318E+15		Total Bacteria Redux	3.39007E+15
Cub Creek, Turnip Creek and UT to Buffalo Creek	Total Tons SL	415	Spring Creek, Briery Creek, Bush River, Little Sandy River and Saylers Creek	Total Tons SL	5,670
	Total Pounds N	2,256		Total Pounds N	30,846
	Total Pounds P	361		Total Pounds P	5,670
	Total Bacteria Redux	8.996E+14		Total Bacteria Redux	9.515E+14
Falling River	Total Tons SL	3,492	Twittys and Ash Camp Creeks	Total Tons SL	60
	Total Pounds N	18,995		Total Pounds N	326
	Total Pounds P	3,172		Total Pounds P	65
	Total Bacteria Redux	3.4773E+15		Total Bacteria Redux	4.34772E+14
Flat, Nibbs, Deep and West Creeks	Total Tons SL	20,579	Upper Clinch River	Total Tons SL	8,769
	Total Pounds N	111,949		Total Pounds N	47,702
	Total Pounds P	30,686		Total Pounds P	8,769
	Total Bacteria Redux	3.2285E+14		Total Bacteria Redux	1.08699E+15
Hays and Moffatts Creeks	Total Tons SL	1,792	<b>Total of All Target TMDL Implementation Projects</b> (not including 319 funded projects)	<b>Total Tons SL</b>	<b>59,019</b>
	Total Pounds N	9,746		<b>Total Pounds N</b>	<b>321,061</b>
	Total Pounds P	1,816		<b>Total Pounds P</b>	<b>70,428</b>
	Total Bacteria Redux	1.384E+14		<b>Total Bacteria Redux</b>	<b>1.52E+16</b>

**Table I-5b BMPs Installed in Targeted State WQIF TMDL Project Areas from 7/1/2009 thru 6/30/2010 Utilizing All Cost-share Sources**

Summary of the Extent of Agricultural and Residential Septic Practices installed in State WQIF/NRCF sponsored TMDL Watersheds 7/1/2009-06/30/2010  
 Totals include BMPs funded with state WQIF/VNRCF, Targeted State WQIF TMDL Funds and CREP

Plan_Name	CP-22B	CRF R-3	CRL F-1	CRS L-6	CR WQ-1	FR-1	FR-3	LE-1T	LE-2T	LTC NT	NM-1	NM-2	NM-3	NM-3B	NM-4	SL-1	SL-11	SL-15A	SL-6	SL-6B	SL-7	SL-8	SL-8B	SL-8H	WL-1	WL-2	WP-2T	WP-4	WP-4B	WQ-4	Grand Total	
Blackwater/Raccoon Study Area (Chowan River Watershed)											27	52			12	2	1	4	1					43								142
Bluestone River		1		1				2																							4	
Christians Creek and South River Watersheds	3	6	1	6		1		2	2		1	8	6			4								25	24	1	1			1	92	
Cub Creek, Turnip Creek and UT to Buffalo Creek		1		2		1		2		1						1							2								10	
Falling River		5		6	1	2		6			1	3							1				3	3							31	
Flat, Nibbs, Deep and West Creeks						1		1		1	2					2	1						1	6	5			1		3	24	
Hays and Moffatts Creeks	1	3	1	2												2			1		2		12	11							35	
Mossy Creek, Naked Creek and Long Glade Run		1		1				4	2		5	4											16	31				1			65	
Opequon Creek Watershed												1		2		7			1				10	4							25	
Pigg River and Old Womans Creek Watersheds								13															15	13			1	1	2		45	
Spring Creek, Briery Creek, Bush River, Little Sandy River and Saylers Creek		4		3		1		3								1			1				1	1							15	
Twittys and Ash Camp Creeks							1	2																							3	
Upper Clinch River		6	1	3				5											5	1											21	
<b>Grand Total</b>	<b>4</b>	<b>27</b>	<b>3</b>	<b>24</b>	<b>1</b>	<b>6</b>	<b>1</b>	<b>40</b>	<b>4</b>	<b>2</b>	<b>36</b>	<b>68</b>	<b>6</b>	<b>2</b>	<b>12</b>	<b>19</b>	<b>2</b>	<b>4</b>	<b>10</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>133</b>	<b>92</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>4</b>	<b>512</b>	

Code	Practice
CP-22B	CREP Riparian 100' Wide and Wider Buffer Bonus
CRFR-3	CREP Riparian Forest Buffer Planting
CRLF-1	CREP Buffer Length Recording Practice
CRSL-6	CREP Grazing Land Protection
CRWP-2	CREP Streambank Protection
CRWQ-1	CREP Grass Filter Strips
FR-1	Reforestation of erodible crop and pastureland
FR-3	Woodland buffer filter area
LE-1T	Livestock Exclusion with Riparian Buffers for TMDL Imp.
LE-2T	Livestock Exclusion with Reduced Setback for TMDL Imp.

Code	Practice
LTCNT	Long Term Continuous No-Till Planting System
NM-1	Nutrient Management Plan Writing and Revision
NM-2	Nutrient Management Plan Implementation and Record Keeping
NM-3	Sidedress Application of Nitrogen on Corn
NM-3B	Manure Application to Corn Using Pre-app. Nitrate Test
NM-4	Late Winter Split Application of N on Small Grains
SL-1	Permanent Vegetative Cover on Cropland
SL-11	Permanent Vegetative Cover on Critical Areas
SL-15A	Continuous No-Till System
SL-6	Stream Exclusion With Grazing Land Management

Code	Practice
SL-6B	Alternative Water System
SL-8	Protective cover for specialty crops
SL-8B	Small Grain cover crop for Nutrient Management
SL-8H	Harvestable Cover Crop
WL-1	Field Borders/Wildlife Option
WL-2	Idle Land/Wildlife Option and Idle Tobacco Land
WP-2T	Stream Protection - TMDL
WP-4	Animal waste control facilities
WP-4B	Loafing Lot Management System
WQ-4	Legume cover crop

**Table I-5c Extent of BMPs Installed in Targeted State WQIF TMDL Project Areas from 7/1/2009 thru 6/30/2010 Utilizing All Cost-share Sources**

Summary of the Extent of Agricultural Practices installed in State WQIF/NRCF sponsored TMDL Watersheds 7/1/2009-06/30/2010  
Totals include BMPs funded with state WQIF/NRCF, Targeted State WQIF TMDL Funds and CREP

Plan_Name	CRLF-1	CRSL-6	CRWQ-1	FR-1	LE-1T	LE-2T	LTCNT	NM-1	NM-2	NM-3	NM-3B	NM-4	SL-1	SL-11	SL-15A	SL-6	SL-7	SL-8	SL-8B	SL-8H	WL-1	WL-2	WP-2T	WP-4	WP-4B	WQ-4	Grand Total
Blackwater/Raccoon Study Area (Chowan River Watershed)								980.77	2025.2			367.68	68.13	6	112.5	350			1196.5								5108.78
Bluestone River		790			819																						1609
Christians Creek and South River Watersheds	5800	38236		3	4400	4450		53	565.7	173.9			75						501.1	524.43	4	2				15.1	54803.23
Cub Creek, Turnip Creek and UT to Buffalo Creek		4100		30	8826		24.8						6.4						42.1								13029.3
Falling River		16580	4.3	23	31600			93.9	188.9							6600			137.3	255.8							55483.2
Flat, Nibbs, Deep and West Creeks				29.4	858		111.4	69					38.19	0.1				14	449.6	826.79				1		424.65	2822.13
Hays and Moffatts Creeks	3500	3600											22			800	178.73		248.18	210.8							8559.71
Mossy Creek, Naked Creek and Long Glade Run		3050			8425	3225		228.3	57.6										332.1	687.9				1			16006.9
Opequon Creek Watershed									874.5		607.6		174.2			2000			561.4	351.6							4569.3
Pigg River and Old Womans Creek Watersheds					45758														1058.1	1421.9			12113	1	2		60353.96
Spring Creek, Briery Creek, Bush River, Little Sandy River and Saylor's Creek		4035		13.6	17478								9.5			1214			224.3	270.9							23245.3
Twittys and Ash Camp Creeks					3600																						3600
Upper Clinch River	900	7783			1050											2770											12503
<b>Grand Total</b>	<b>10200</b>	<b>78174</b>	<b>4.3</b>	<b>99</b>	<b>122814</b>	<b>7875</b>	<b>136.2</b>	<b>1425</b>	<b>3712</b>	<b>173.9</b>	<b>607.6</b>	<b>367.68</b>	<b>393.42</b>	<b>6.1</b>	<b>112.5</b>	<b>13734</b>	<b>178.73</b>	<b>14</b>	<b>4750.7</b>	<b>4550.1</b>	<b>4</b>	<b>2</b>	<b>12113</b>	<b>3</b>	<b>2</b>	<b>439.75</b>	<b>261892</b>
	Ac	LF	LF	Ac	LF	LF	Unit	Ac	Ac	Ac	Ac	Ac	Ac	Ac	Unit	LF	Ac	Ac	Ac	Ac	Ac	Ac	LF	Unit	Unit	Ac	

<b>Code</b>	<b>Practice</b>	<b>Code</b>	<b>Practice</b>	<b>Code</b>	<b>Practice</b>
CRFR-3	CREP Riparian Forest Buffer Planting	NM-2	Nutrient Management Plan Implementation and Record Keeping	SL-8	Protective cover for specialty crops
CRLF-1	CREP Buffer Length Recording Practice	NM-3	Sidedress Application of Nitrogen on Corn	SL-8B	Small Grain cover crop for Nutrient Management
CRSL-6	CREP Grazing Land Protection	NM-3B	Manure Application to Corn Using Pre-app. Nitrate Test	SL-8H	Harvestable Cover Crop
CRWQ-1	CREP Grass Filter Strips	NM-4	Late Winter Split Application of N on Small Grains	WL-1	Field Borders/Wildlife Option
FR-1	Reforestation of erodible crop and pastureland	SL-1	Permanent Vegetative Cover on Cropland	WL-2	Idle Land/Wildlife Option and Idle Tobacco Land
LE-1T	Livestock Exclusion with Riparian Buffers for TMDL Imp.	SL-11	Permanent Vegetative Cover on Critical Areas	WP-2T	Stream Protection - TMDL
LE-2T	Livestock Exclusion with Reduced Setback for TMDL Imp.	SL-15A	Continuous No-Till System	WP-4	Animal waste control facilities
LTCNT	Long Term Continuous No-Till Planting System	SL-6	Stream Exclusion With Grazing Land Management	WP-4B	Loafing Lot Management System
NM-1	Nutrient Management Plan Writing and Revision	SL-6B	Alternative Water System	WQ-4	Legume cover crop

**Table I-5d Stream Bank Protected and Area of Buffer Restored as a Result of BMPs Installed in Targeted State WQIF TMDL Project Areas from 7/1/2009 thru 6/30/2010 Utilizing All Cost-share Sources**

Summary of Activity Related to BMPs Installed in State-funded Targeted TMDL Watersheds July 1, 2009 thru June 30, 2010

TMDL IP Area	Activity	Total	TMDL IP Area	Activity	Total
Blackwater/Raccoon Study Area (Chowan River Watershed)	Total Stream Bank Protected	350	Mossy Creek, Naked Creek and Long Glade Run	Total Stream Bank Protected	14700
	Total Area Buffer Restored	0		Total Area Buffer Restored	6.2
Bluestone River	Total Stream Bank Protected	1609	Opequon Creek Watershed	Total Stream Bank Protected	2000
	Total Area Buffer Restored	1.8		Total Area Buffer Restored	0
Christians Creek and South River Watersheds	Total Stream Bank Protected	52886	Pigg River and Old Womans Creek Watersheds	Total Stream Bank Protected	57871
	Total Area Buffer Restored	142.6		Total Area Buffer Restored	0
Cub Creek, Turnip Creek and UT to Buffalo Creek	Total Stream Bank Protected	12926	Spring Creek, Briery Creek, Bush River, Little Sandy River and Saylers Creek	Total Stream Bank Protected	22727
	Total Area Buffer Restored	6.1		Total Area Buffer Restored	16.7
Falling River	Total Stream Bank Protected	54780	Twittys and Ash Camp Creeks	Total Stream Bank Protected	3600
	Total Area Buffer Restored	82.4		Total Area Buffer Restored	0
Flat, Nibbs, Deep and West Creeks	Total Stream Bank Protected	858	Upper Clinch River	Total Stream Bank Protected	12503
	Total Area Buffer Restored	0		Total Area Buffer Restored	162.7
Hays and Moffatts Creeks	Total Stream Bank Protected	7900	<b>Total Sum of Stream Bank Protected</b>		244710
	Total Area Buffer Restored	39.9	<b>Total Sum of Area Buffer Restored</b>		458

***Federal Section 319 Projects.***

During 2010, there were 11 active implementation projects that received some type of §319(h) funding, though they may have been funded by a variety of state and federal sources. These projects utilized Federal 319, state WQIF, private grants and other national grant 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.

From July 1, 2009 thru June 30, 2010, funding from 319 and other state resources collectively implemented 456 best management practices (BMPs) within these 11 project areas. This included 239 residential septic system practices and 217 agricultural practices (Table I-6). This number does not include the urban practices implemented in Beaver Creek and Cooks Creek; these will be described in the individual progress reports in Section II.

The implementation of these BMPs resulted in 114,842 linear feet of stream bank protection, and 96 acres of riparian buffer established or restored (Table I-7a and I-7b).

Table I-6

## Summary of Agricultural and Residential Septic Practices installed in 319 sponsored TMDL Watersheds July 1, 2009 thru June 30, 2010

Totals include BMPs funded with Federal EPA 319(h) as well as state WQIF/VNRC and CREP

Plan_Name	CRFR-3	CRSL-6	FR-1	FR-3	LE-1T	LE-2T	NM-1	NM-2	RB-1	RB-2	RB-3	RB-4	RB-4P	RB-5	SL-1	SL-11	SL-6	SL-8B	SL-8H	WP-2T	WP-4	WP-4B	Grand Total
Beaver Creek and Little Creek	1	2			1				6		3		1					3	10			1	28
Big Otter River Watershed	3	6	1		10	1		10			5	14	1	1			4	3	6		2		67
Carter Run, Great Run, Deep Run and Thumb Run					5		1		28		6	1			4			3					48
Catoctin Creek					5	4			1	1	5	5		1	5			2	3	2			34
Cooks Creek and Blacks Run							2		1	1						1		16	12				33
Hawksbill Creek and Mill Creek	2	2	1		2		5		64		15	5	4	1	4			3	3				111
Looney Creek								7	3		3		1	1			1	2					18
Lower Blackwater River, Maggodee and Gills Creek					2				1								1	3	5				12
Upper Hazel River	1	1		1	3	2			16		6	4	3		2			1	1				41
Willis River Watershed	1	1	2	1	5				2			2			1	1		7	3				26
Dodd Creek and Mill Creek					3				23		3	1			1			7					38
<b>Grand Total</b>	<b>8</b>	<b>12</b>	<b>4</b>	<b>2</b>	<b>36</b>	<b>7</b>	<b>8</b>	<b>17</b>	<b>145</b>	<b>2</b>	<b>46</b>	<b>32</b>	<b>10</b>	<b>4</b>	<b>17</b>	<b>2</b>	<b>6</b>	<b>50</b>	<b>43</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>456</b>

Code	Practice	Code	Practice	Code	Practice
CRFR-3	CREP Riparian Forest Buffer Planting	RB-1	Septic Tank Pumpout	SL-11	Permanent Vegetative Cover on Critical Areas
CRSL-6	CREP Grazing land protection	RB-2	Connection to Public Sewer	SL-6	Stream Exclusion With Grazing Land Management
FR-1	Reforestation of Erodible Crop and Pastureland	RB-3	Septic Tank System Repair	SL-8B	Small Grain Cover Crop for Nutrient Management
FR-3	Woodland Buffer Filter Area	RB-4	Septic Tank System Replacement	WP-2T	Stream Protection - TMDL
LE-1T	Livestock Exclusion with Riparian Buffers for TMDL Imp.	RB-4P	Septic Tank System Installation/Replacement with Pump	SL-8H	Harvestable Cover Crop
LE-2T	Livestock Exclusion with Reduced Setback for TMDL Imp.	RB-5	Installation of Alternative Waste Treatment System	WP-4	Animal Waste Control Facilities
NM-1	Nutrient Management Plan Writing and Revision	SL-1	Permanent Vegetative Cover on Cropland	WP-4B	Loafing Lot Management System
NM-2	Nutrient Management Plan Implementation and Record Keeping				

Table I-7a Summary of BMP Installation and Extent Installed by Watershed Project Area

Summary of the Extent of Agricultural and Residential Septic Practices installed in 319 sponsored TMDL Watersheds 7/1/2009-06/30/2010  
 Totals include BMPs funded with Federal EPA 319(h) as well as state WQIF/VNRC and CREP

I Plan_ Name	CRFR-3	CRSL-6	FR-1	LE-1T	LE-2T	NM-1	NM-2	RB-1	RB-2	RB-3	RB-4	RB-4P	RB-5	SL-1	SL-11	SL-6	SL-8B	SL-8H	WP-2T	WP-4	WP-4B	Grand Total
Beaver Creek and Little Creek	7	6300		450				6		3		1					28	213			1	7009
Big Otter River Watershed	5	14125	43	25406	155		635			5	14	1	1			320	393	574		2		41678
Carter Run, Great Run, Deep Run and Thumb Run				21260		36		28		6	1			86			280					21698
Catoctin Creek				6351	3922			1	1	5	5		1	202			80	52	1719			12339
Cooks Creek and Blacks Run						25		1	1					0.5			312	316				655
Hawksbill Creek and Mill Creek	5	3590	4	1150		184		64		15	5	4	1	26			48	38				5134
Looney Creek							385	3		3			1	1		167	158					718
Lower Blackwater River, Maggodee and Gills Creek				4865				1								320	69	522				5777
Upper Hazel River	1	1235		1650	1455			16		6	4	3		76			81	19				4547
Willis River Watershed	2	3195	40	12345				2			2			8	0.5		395	43				16033
Dodd Creek and Mill Creek				4862				23		3	1			25			482					5396
<b>Grand Total</b>	<b>20</b>	<b>28445</b>	<b>87</b>	<b>78339</b>	<b>5532</b>	<b>245</b>	<b>1020</b>	<b>145</b>	<b>2</b>	<b>46</b>	<b>32</b>	<b>10</b>	<b>4</b>	<b>423</b>	<b>1</b>	<b>807</b>	<b>2327</b>	<b>1778</b>	<b>1719</b>	<b>2</b>	<b>1</b>	<b>120985</b>

Code	Practice	Code	Practice	Code	Practice
CRFR-3	CREP Riparian Forest Buffer Planting	RB-1	Septic Tank Pumpout	SL-11	Permanent Vegetative Cover on Critical Areas
CRSL-6	CREP Grazing land protection	RB-2	Connection to Public Sewer	SL-6	Stream Exclusion With Grazing Land Management
FR-1	Reforestation of Erodible Crop and Pastureland	RB-3	Septic Tank System Repair	SL-8B	Small Grain Cover Crop for Nutrient Management
LE-1T	Livestock Exclusion with Riparian Buffers for TMDL Imp.	RB-4	Septic Tank System Replacement	WP-2T	Stream Protection - TMDL
LE-2T	Livestock Exclusion with Reduced Setback for TMDL Imp.	RB-4P	Septic Tank System Installation/Replacement with Pump	SL-8H	Harvestable Cover Crop
NM-1	Nutrient Management Plan Writing and Revision	RB-5	Installation of Alternative Waste Treatment System	WP-4	Animal Waste Control Facilities
NM-2	Nutrient Management Plan Implementation and Record Keeping	SL-1	Permanent Vegetative Cover on Cropland	WP-4B	Loafing Lot Management System

Table I-7b Summary of Stream Bank Protected with BMP Installation in 319H Watershed Project Areas

Summary of Streambank Protected from BMPs Installed in 319(H) Targeted TMDL Watersheds July 1, 2009 thru June 30, 2010  
 Includes state-funded cost-share

TMDL IP Area	Pollutant Reduced	Total	TMDL IP Area	Pollutant Reduced	Total
Beaver Creek and Little Creek	Total Stream Bank Protected	6,750	Hawksbill Creek and Mill Creek	Total Stream Bank Protected	4,740
	Total Area Buffer Restored	14		Total Area Buffer Restored	11
Big Otter River Watershed	Total Stream Bank Protected	40,006	Looney Creek	Total Stream Bank Protected	167
	Total Area Buffer Restored	62		Total Area Buffer Restored	-
Carter Run, Great Run, Deep Run and Thumb Run	Total Stream Bank Protected	21,260	Lower Blackwater River, Maggodee and Gills Creek	Total Stream Bank Protected	5,185
	Total Area Buffer Restored	-		Total Area Buffer Restored	-
Catoctin Creek	Total Stream Bank Protected	11,992	Upper Hazel River	Total Stream Bank Protected	4,340
	Total Area Buffer Restored	-		Total Area Buffer Restored	4
Cooks Creek and Blacks Run	Total Stream Bank Protected	-	Willis River Watershed	Total Stream Bank Protected	15,540
	Total Area Buffer Restored	-		Total Area Buffer Restored	4
Dodd Creek and Mill Creek	Total Stream Bank Protected	4,862	<b>Total Sum of Stream Bank Protected</b>		<b>114,842</b>
	Total Area Buffer Restored	-	<b>Total Sum of Area Buffer Restored</b>		<b>96</b>

(Note: The Catoctin Creek Implementation Project ended March 31, 2010)

(Note: Projects that do not show any streambank protected may indicate a project with emphasis on residential septic repairs)

The BMPs installed from July 1, 2009 thru June 30, 2010 in 319 targeted TMDL areas (including BMPs funded by all sources) resulted in the reduction of 9.72E+15 colony forming units (CFU) of fecal coliform bacteria, 166,889 pounds of nitrogen, 31,736 pounds of phosphorus and 30,590 tons of sediment. From the beginning of the implementation of these projects in 2005, these projects have accomplished the following pollution reductions: 4.772E+16 colony forming units (CFU) of fecal coliform bacteria, 176,589 pounds of nitrogen, 33,872 pounds of phosphorus and 31,335 tons of sediment.

Table 1-9 summarizes the pollutant loads from BMPs funded by EPA's 319(h) federal funds and implemented during the years 2005 – June 2009, Table 1-10 summarizes the pollution reductions loads from BMPs funded by a mix of EPA 319(h), state targeted WQIF, CREP and regular state cost-share during this period.

Table I-9 Summary of Pollution Reductions by 319 TMDL Projects 2005-2009

<b>Section 319 TMDL Implementation Projects – Pollution Reduction 2005 - 2009</b>						
<b>Pollution Reductions (edge of stream) January 1, 2005-June 30, 2009</b>						
Project Title	Calendar Year	Pathogens (Coliform) CFU	Nitrogen lbs/yr	Phosphorus lbs/yr	Sedimentation-Siltation tons/yr	
Catoclin 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	
	2009	1.24E+11	24.96	0.00	0.00	
	<b>Sub-Total</b>	<b>7.51E+14</b>	<b>641.44</b>	<b>60.62</b>	<b>36.20</b>	
<b>Pollution Reductions (edge of stream) March 1, 2006-June 30, 2009</b>						
Project Title	Calendar Year	Pathogens (Coliform) CFU	Nitrogen lbs/yr	Phosphorus lbs/yr	Sedimentation-Siltation tons/yr	
Cooks Creek and Blacks Run TMDL Project	Mar-06	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	
	2009	7.84E+14	714.27	135.53	80.95	
		<b>Sub-Total</b>	<b>7.85E+14</b>	<b>4,296.43</b>	<b>732.59</b>	<b>446.48</b>
<b>Pollution Reductions (edge of stream) July 1, 2006 - June 30, 2009</b>						
Project Title	Calendar Year	Pathogens (Coliform) CFU	Nitrogen lbs/yr	Phosphorus lbs/yr	Sedimentation-Siltation tons/yr	
Big Otter River TMDL Project	Jul-06	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	
	2009	3.13E+15	360.83	56.02	35.47	
		<b>Sub-Total</b>	<b>1.39E+16</b>	<b>975.70</b>	<b>155.89</b>	<b>92.44</b>
<b>Pollution Reductions (edge of stream) January 1, 2008 - June 30, 2009</b>						
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	
	2009	1.39E+14	70.68	0.21	1.94	
		<b>Sub-Total</b>	<b>1.39E+14</b>	<b>78.92</b>	<b>0.21</b>	<b>1.94</b>
<b>Pollution Reductions (edge of stream) January 1, 2007 - June 30, 2009</b>						
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	
	2009	1.42E+11	15.83	0.00	0.00	
		<b>Sub-Total</b>	<b>2.02E+15</b>	<b>765.56</b>	<b>215.66</b>	<b>107.44</b>
<b>Pollution Reductions (edge of stream) March 1, 2006-June 30, 2009</b>						
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	Mar-06	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	
	2009	8.27E+14	32.48	5.24	2.39	
		<b>Sub-Total</b>	<b>4.34E+15</b>	<b>919.30</b>	<b>302.05</b>	<b>12.29</b>
<b>Pollution Reductions (edge of stream) January 1, 2007 - June 30, 2009</b>						
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	
	2009	1.99E+10	32.15	4.26	4.08	
		<b>Sub-Total</b>	<b>1.63E+15</b>	<b>67.17</b>	<b>6.72</b>	<b>4.65</b>
<b>Pollution Reductions (edge of stream) July 1, 2006 - June 30, 2009</b>						
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	Jul-06	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	
	2009	6.98E+14	49.05	4.53	1.05	
		<b>Sub-Total</b>	<b>2.99E+15</b>	<b>363.55</b>	<b>50.06</b>	<b>21.05</b>
<b>Pollution Reductions (edge of stream) July 1, 2005-June 30, 2009</b>						
Project Title	Calendar Year	Pathogens (Coliform) CFU	Nitrogen lbs/yr	Phosphorus lbs/yr	Sedimentation-Siltation tons/yr	
Willis River TMDL Project	Jul-05	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	
	2009	1.97E+15	58.17	8.79	2.03	
		<b>Sub-Total</b>	<b>9.99E+15</b>	<b>588.11</b>	<b>184.11</b>	<b>12.23</b>
		Other	1.36E+15	1,004.29	427.89	8.56
	<b>Total</b>	<b>1.14E+16</b>	<b>1,592.40</b>	<b>612.00</b>	<b>20.79</b>	
<b>Sub-Total 2009:</b>		<b>2.13E+16</b>	<b>1358</b>	<b>215</b>	<b>127</b>	
<b>TOTAL 2005-2009:</b>		<b>3.80E+16</b>	<b>9700</b>	<b>2136</b>	<b>745</b>	

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**Table I-10 (pollution reductions for 319 projects only, not including urban BMPs)**

**Summary of Pollution Reductions from State funded BMPs in 319 H Targeted TMDL Watersheds 7/1/2009-06/30/2010**

*Totals include BMPs funded with state WQIF/VNRCF, Targeted State WQIF TMDL Funds and CREP*

*These estimates only include pollution reductions from Agricultural and Residential BMPs, does not include Urban BMPs at this time.*

TMDL IP Area	Pollutant Reduced	Total	TMDL IP Area	Pollutant Reduced	Total
Beaver Creek and Little Creek	Total Tons SL	6,667	Hawksbill Creek and Mill Creek	Total Tons SL	844
	Total Pounds N	36,290		Total Pounds N	4,731
	Total Pounds P	7,467		Total Pounds P	1,148
	Total Bacteria Redux	2.55E+14		Total Bacteria Redux	5.18E+14
Big Otter River Watershed	Total Tons SL	9,478	Looney Creek	Total Tons SL	1,463
	Total Pounds N	51,648		Total Pounds N	7,983
	Total Pounds P	10,415		Total Pounds P	1,229
	Total Bacteria Redux	2.14E+15		Total Bacteria Redux	5.22E+13
Carter Run, Great Run, Deep Run and Thumb Run	Total Tons SL	818	Lower Blackwater River, Maggodee and Gills Creek	Total Tons SL	758
	Total Pounds N	4,496		Total Pounds N	4,123
	Total Pounds P	655		Total Pounds P	819
	Total Bacteria Redux	1.28E+15		Total Bacteria Redux	5.88E+14
Catoctin Creek	Total Tons SL	1,937	Upper Hazel River	Total Tons SL	268
	Total Pounds N	10,592		Total Pounds N	1,521
	Total Pounds P	1,550		Total Pounds P	242
	Total Bacteria Redux	4.24E+14		Total Bacteria Redux	1.70E+15
Cooks Creek and Blacks Run	Total Tons SL	1,630	Willis River Watershed	Total Tons SL	2,444
	Total Pounds N	8,873		Total Pounds N	13,306
	Total Pounds P	2,347		Total Pounds P	1,760
	Total Bacteria Redux	5.48E+10		Total Bacteria Redux	2.38E+15
Dodd Creek and Mill Creek	Total Tons SL	4,283	<b>Total of All 319 Target TMDL Implementation Projects</b>	<b>Total Tons SL</b>	<b>30,590</b>
	Total Pounds N	23,326	(including project funded from other sources)	<b>Total Pounds N</b>	<b>166,889</b>
	Total Pounds P	4,105		<b>Total Pounds P</b>	<b>31,736</b>
	Total Bacteria Redux	3.912E+14		<b>Total Bacteria Redux</b>	<b>9.72E+15</b>

Please note: as of July 1, 2009 pollution reductions were calculated as 'edge-of-field' not 'edge-of-stream' as previously recorded.

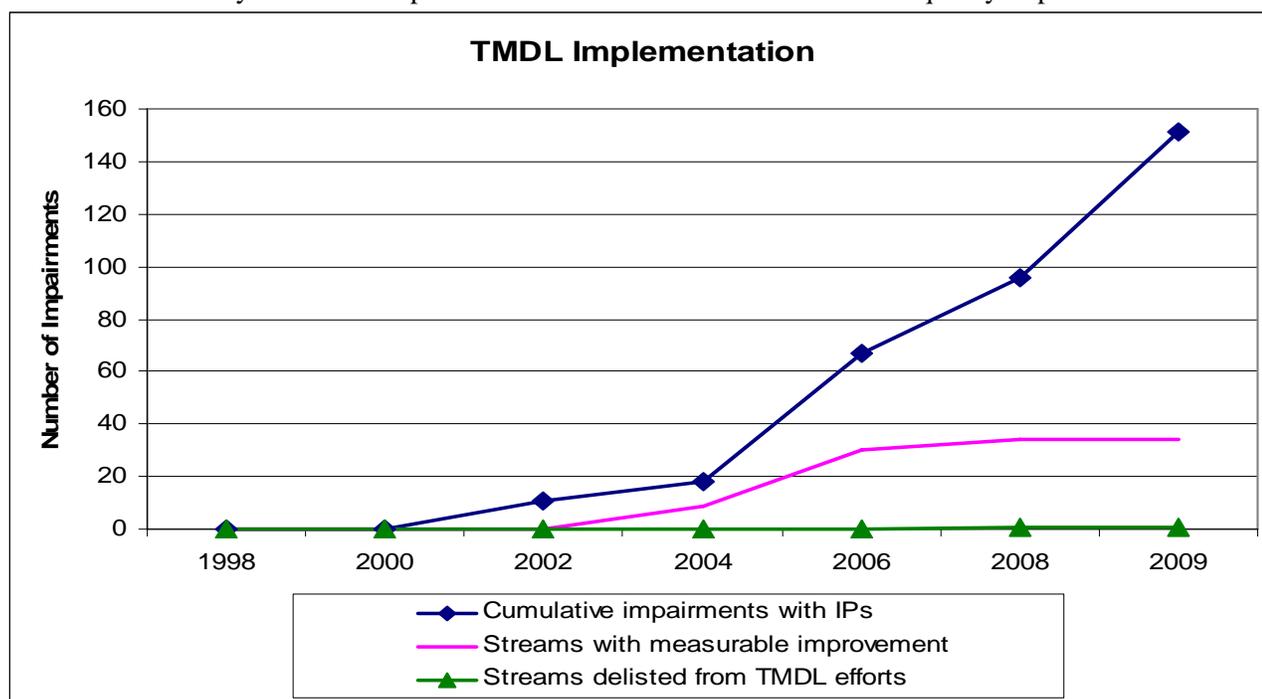
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## Water Quality Improvements, Watershed Restoration, Delisting and Future Actions

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-11). 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-11: 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. There are several projects that are showing marked improvement in water quality. Willis River has shown remarkable success in the 4 years it has been active and in 2006 and 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:***

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

Since 2001 a total of thirty (31) of fifty-six (56) TMDL IP projects (see table I-2) have shown some level of improvement in water quality conditions. Eight projects have had some of their stream miles listed on the 303(3)/305(b) Integrated Report as 'candidates for delisting'.

It should be noted that since 2001 when the first two 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 all three modifications, the revisions have been more conservative and this has impacted the achievement of measurable progress for water quality improvements.

### ***Delisting:***

As of 2008, 92 free-flowing segments have been approved by EPA for de-listing from the Consent Decree since 2002. Six segments were nominated for delisting in 2006 and 2008. 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 six streams that are eligible for delisting from the Impaired Water List due to attaining the bacteria water quality standard. Potential delisting include:

1. Willis River, Buckingham and Cumberland Counties, 34.71 miles (18.03 miles in 2006 and 16.2 in 2008);
2. Big Otter River, Bedford and Campbell Counties, 13.98 miles (2008);
3. Maggodee Creek, Franklin County, 4.40 miles (2008);
4. Stroubles Creek Middle, Montgomery County, 2.20 miles (2008);
5. Lynnhaven River in the City of Virginia Beach., 1,462 acres (2008)
6. Middle Creek, Tazewell County, 10.96 miles (2008), benthic

### ***Success Stories:***

Throughout the year information is gathered regarding the successes of various projects. In 2010 DCR was working on several 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. In addition in 2011 DCR will be looking to write a success story for Big Otter River and Stroubles Creek.

## CHAPTER 2: PROGRESS REPORTS FOR FEDERALLY FUNDED TMDL IMPLEMENTATION PROJECTS and SUCCESS STORIES

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

This appendix provides success stories for NPS implementation as well as updated progress reports on the TMDL implementation projects. This appendix also contains several success stories related to resource extraction in Virginia's impaired streams.

### *Contents Progress Reports and Success Stories*

- 1) Non-point Source Pollution Reductions in Virginia's Resource Extraction Impaired Streams.
  - a. Success Story - MIDDLE CREEK: Stream Restoration Improves Creek's Population and Benthic Organism Population
  - b. Success Story - BLACK CREEK: Stream Restoration Efforts Reduce Impacts of Acid Mine Drainage
  - c. Success Story - BULL CREEK: Stream Restoration Efforts Reduce Harmful Impacts of Coal Mining Pollutants
  - d. Progress Report - TMDL OFFSETS
- 2) 319(h) funded TMDL Implementation Projects
  - a. PROGRESS REPORT and SUCCESS STORY: Willis River TMDL Implementation Project 2005-2010 (On-going)
  - b. PROGRESS REPORT: Lower Blackwater River, Maggodee Creek and Gills Creek TMDL Implementation Project 2006-2010 (On-going)
  - c. PROGRESS REPORT: Blacks Run and Cooks Creek TMDL Implementation Project 2006-2010 (On-going)
  - d. PROGRESS REPORT: Big Otter River TMDL Implementation Project 2006-2010 (On-going)
  - e. PROGRESS REPORT: Thumb, Deep, Carter and Great Runs TMDL Implementation Project 2006-2010 (On-going)
  - f. PROGRESS REPORT: Little and Beaver Creeks TMDL Implementation Project 2006-2010 (On-going)
  - g. PROGRESS REPORT: Mill and Dodd Creeks TMDL Implementation Project 2006-2010 (On-going)
  - h. PROGRESS REPORT: Hawksbill and Mill Creeks TMDL Implementation Project 2006-2010 (On-going)
  - i. PROGRESS REPORT: Looney Creek TMDL Implementation Project
  - j. PROGRESS REPORT: Upper Hazel River TMDL Implementation Project 2009-2010 (On-going)

## **(1) NON-POINT SOURCE POLLUTION REDUCTIONS IN VIRGINIA'S RESOURCE EXTRACTION IMPAIRED STREAMS**

Virginia's formal 303(d) list of impaired waters includes approximately 150 miles of streams identified as impaired by resource extraction in the state's southwestern coalfields. These stream miles, located within six of Virginia's western most counties (Buchanan, Tazewell, Dickenson, Russell, Wise, and Lee) have poor aquatic health and do not meet the state's general water quality standards due to impacts from the region's century-long history of pre-law coal mining. Many old abandoned mined land (AML) features continue to contribute heavy loads of non-point source pollution (NPS) to the streams.

Because the Virginia Department of Mines, Minerals, and Energy's Division of Mined Land Reclamation (DMLR) is responsible for ensuring the reclamation of lands and the restoration of waters affected by coal mining in the state, DMLR has taken a pro-active approach to the reduction of non-point source pollution and the restoration of coalfield streams through the agency's administration of both the state's Abandoned Mine Land (AML) program and the state's Surface Mining Control and Reclamation Regulations (SMCRR). DMLR's pro-active approach includes taking the lead with the development and implementation of many resource extraction TMDLs.

Since signing a TMDL Memorandum of Understanding with Virginia's Department of Environmental Quality (DEQ) in September 2000, DMLR has worked, and continues to work, cooperatively with DEQ and with the Virginia Department of Conservation and Recreation (DCR) to develop TMDLs and TMDL Implementation Plans (IPs) for resource extraction impaired waters.

Ten years of pro-active approach and cooperative effort has produced many TMDL and NPS success stories. Several success stories, with important 2010 updates, are included in the following narratives.

- (A) Success Story - MIDDLE CREEK: Stream Restoration Improves Creek's Population and Benthic Organism Population
- (B) Success Story - BLACK CREEK: Stream Restoration Efforts Reduce Impacts of Acid Mine Drainage
- (C) Success Story - BULL CREEK: Stream Restoration Efforts Reduce Harmful Impacts of Coal Mining Pollutants
- (D) Progress Report - TMDL OFFSETS

## SUCCESS STORY - MIDDLE CREEK: Stream Restoration Improves Creek's Population and Benthic Organism Population

**River Basin:** Tennessee/Big Sandy River Basins **County:** Tazewell **Stream Name:** Middle Creek **Hydrologic Unit:** 06010205 **TMDL ID:** VAS-P03R-01. **Segment Size:** 11 - Miles **Initial listing:** 1998 **TMDL Schedule:** 2006 **Clean Water Act Goal and Use:** Aquatic Life Use - Not Supporting **Impairment Cause:** General Standard (Benthic)

**DELISTING** in 2008 Integrated Report: VAS-P03R\_MID01A98 Middle Creek 2.65 Miles Delisting **Summary:** Aquatic Life **DELIST** - Benthic Macroinvertebrates - VAS-P03R-01 USEPA verbal approval for delist aquatic life impairment on 4.25.2006. 6BMID000.20 was sampled on 11.17.03, 07.31.03; no impairment was detected. VAS-P03R\_MID02A98 Middle Creek 8.31 M - VAS-P03R-01 USEPA verbal approval for aquatic life impairment on 4.25.2006. 6BMID000.20 was sampled on 11.17.03, 07.31.03; no impairment was detected. **TOTAL DELISTING:** 10.96 miles

### *Water Body Improved:*

Middle Creek is a tributary to the Clinch River located in the coalfields of Tazewell County Virginia. The streams local geology can be described as layers of gently dipping sedimentary rocks interspersed with several above drainage coal seams. These seams include the Seaboard and Greasy Creek. Due to precipitation washing pollution from coal mining conducted between the 1950's to the 1990's Middle Creek was placed on Virginia's state 303(d) list of impaired waters in 1998. Monitoring results had shown that the creek had low benthic organism count and poor biological health. From 1983-1999 some NPS pollution controls were installed; sediment control and land management practices were required and utilized at the active mines. Scores for both 2003 surveys indicated that Middle Creek was no longer scored as impaired. In early 2005, DEQ formally requested that EPA allow the state to de-list Middle Creek. The de-listing was approved in May 2006.

### *Problem:*

Old abandoned mined lands existed in Middle Creek, and through a re-mining permit most of the mined areas were incorporated into state issued mining and reclamation permits during the early 1980's. These permits contained requirements for drainage plans, materials handling, regrading, revegetation, and pollution control. Also, the permits required operators to provide a performance bond to insure that the mine sites would be reclaimed to an acceptable post mining land use.

The stream's total length is approximately eleven miles and its drainage area is approximately seven thousand acres. Middle Creek is joined with the Clinch River in the town of Cedar Bluff. In December 1981, several hundred acres of the watershed were disturbed by active mining. Coal mine refuse was being disposed along the stream and its tributaries without adequate environmental and engineering safeguards. Precipitation events washed suspended and dissolved solids into the stream from the mine sites and non-point source pollution was a significant problem. In addition, releases of black water were noted by representatives from the Virginia Department of Mines, Minerals, and Energy's Division of Mined Land Reclamation (DMLR) and the average of specific conductivity values for samples collected from the stream in December 1981 was relatively high at 660 mmhos/cm. Documentation of the streams impairment and listing was based on the benthic macroinvertebrate monitoring performed by the DEQ. In 1998, Virginia's DEQ placed Middle Creek on the state's 303(d) list of impaired waters. The listing was based on benthic macroinvertebrate monitoring performed by DEQ in the stream. Monitoring results showed low benthic organism count and poor biological health. The 1998 303(d) fact sheet identified the source of impairment as resource extraction.

### *Project Highlights:*

Regulated and permitted mining operations were conducted in the watershed from 1983 until 1999. Also during this time period, some non-point source pollution controls were installed; sediment control and land management practices were required and utilized at the active mines. Improvements in stream water chemistry were noted. Through the 1990's, Covenant Coal Corporation (Covenant) operated the mines in Middle Creek. Their last facility, the coal processing plant, was idled in 1999. Covenant's operations in Middle Creek included the Middle Seaboard No. 3 mine, the Middle Creek Energy mine, the Greasy Creek No. 3 mine, the Sawmill Hollow refuse area; the

Middle Creek fill No. 5 and Middle Creek Coal Preparation Plant. These facilities totaled 243.92 permitted acres. After Covenant closed their last operation in Middle Creek, the company did not complete reclamation of the mine sites. As a result of Covenant's failure to reclaim permitted areas, DMLR initiated enforcement actions that led to the company's forfeiture of the performance bonds in August 2000. After the bond forfeiture of Covenant Coal Corporation, DMLR administered the reclamation of the sites through a settlement agreement with Claredon National Insurance Company. From 2000 to 2005 DMLR used these best management practices; revegetation, regrading of the land to original contours, removed abandoned mining equipment and structures and established the post mining land use. The reclamation methods address both point sources and non-point sources of pollution. In Middle Creek, all sites were ultimately reclaimed as unmanaged forestlands.

**Results:**

During a compliance evaluation inspection by DMLR of all the active coal operations in Middle Creek, September 1996, specific conductivity values for the stream at the same general location as the December 1981 measurements averaged 416 mmhos/cm for the period of July through September 1996. Before DMLR reclaimed the sites specific conductivity was 660 mmhos/cm. VA DEQ followed up the land reclamation in Middle Creek with benthic macroinvertebrate monitoring in July and November of 2003. The stream showed considerable improvement as compared to the previous DEQ monitoring. Scores for both 2003 surveys indicated that Middle Creek was no longer scored as impaired. DMLR conducted chemical monitoring at two stations in Middle Creek – one near the mouth of the stream at DEQ's benthic macroinvertebrate monitoring station and one near the location of the 1981 and 1996 chemical measurements mentioned earlier in this narrative. The samples collected from Middle Creek average 263 mmhos/cm for specific conductivity. The reclamation of the historical mining sites in Middle Creek appears to have reduced the level of NPS, solids, and minerals contributed to the stream from the sites.

In 2005 the DEQ formally requested that the EPA allow the state to de-list Middle Creek. The de-listing was approved in May of 2006. Utilizing DMLR's approach to mined land reclamation, 3 miles of resource extraction impaired stream was restored and a little less than 11 miles of stream were delisted.

**Partners and Funding**

DMLR administered the reclamation of the sites through a settlement agreement with Claredon National Insurance Company. The total bond forfeiture amount for Middle Creek was \$1,190,100.

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## SUCCESS STORY - BLACK CREEK: Stream Restoration Efforts Reduce Impacts of Acid Mine Drainage

**River Basin:**Tennessee/Big Sandy River Basins **County:**Wise **Stream Name:**Black Creek And Tributaries  
**Hydologic Unit:**06010206 **TMDL ID:**VAS-P17R-03 **Segment Size:**4.21 - Miles **Initial Listing:**1996  
**TMDL Schedule:**2004 **Clean Water Goal and Use Support:** Aquatic Life Use - Not Supporting  
**Impairment Cause:** General Standard (Benthic) **TMDL Completed:** [Black Creek And Tributaries](#) Clinch-Powell River Wise P17R Alkalinity Manganese **Date:** 06/03/2004

### *Water Body Improved:*

Commercial coal mining has been continuously conducted in southwestern Virginia for nearly one hundred years until 1981. There are now thousands of acres of disturbed lands and mines that cause acidic drainage in Black Creek. DMLR and local governments planned to reclaim mining sites and set TMDLs for the polluted streams. The stream was placed on Virginia's state 303(d) list in 1998. The creek's water quality has improved but it has not yet been removed from the 303(d) list.

### *Problem:*

Black Creek is located near the City of Norton in Wise County. In 1998 Black Creek was one of many creeks in Southwest Virginia that was identified as impaired. The benthic health of the stream was impaired by acid mine drainage. The drainage was coming from old underground mines and deep-mine cavities.

Coal processing wastes generated at preparation plants and coal-loading sites were often disposed in a convenient hollow or creek. The old piles of refuse contribute adverse loads of sediment and dissolved minerals into the adjacent water. Abandoned mine lands cause off-site environmental impacts that includes impairment of coalfield streams like Black Creek. The TMDL study determined that the specific chemical stressors causing the benthic impairment were total manganese and dissolved solids: these solids are related to the acid mine drainage. The TMDL set for Black creek was 2,127 KG/YR of Manganese. The goal for the creek was to have abandoned sites reclaimed and pollution load reduction of the stream.

"Shoot-and-shove" mining, a common practice in steep-slope areas prior to SMCRA, created much of Virginia's abandoned mine acreages. Soil and strata overlying the coal was blasted and pushed down hill resulting in the characteristic highwall-bench-outslope terrain still common in Virginia's coalfield counties. "Shoot-and-shove" mining created numerous environmental problems. Outslope spoils tend to be unstable and contain pyritic materials that cause acidic drainage.

### *Project Highlights:*

A viable approach for addressing some abandoned mine areas is re-mining. Re-mining can be defined as conducting new surface coal mining operations in compliance with current environmental standards on old abandoned areas or nearby older areas where spoil from active sites may be used to reclaim the abandoned features. Coal companies re-disturb lands that were previously mined, remove remaining coal, eliminate existing environmental problems, and reclaim the land to current standards. A TMDL study of Black Creek was completed in 2002. The TMDL study determined that the specific chemical stressors causing the benthic



impairment were total manganese and dissolved solids and that these stressors are related to the AMD. An approved mining and reclamation plan was developed to directly address these stressors. The plan included elimination of a large underground mine area via daylighting, uncovering the mine voids, purging the acidic waters, and the reclamation of about 300 acres of old abandoned mine area.

Red River Coal Company is a local coal company currently remining in the Black Creek watershed. Operations plans included reclamation measures specifically designed to address the stream's impairment source; elimination of a large underground mine area via daylighting – uncovering the mine voids and purging the acidic waters - and the reclamation of about 300 acres of old abandoned mine area. Incentives incorporated in the mining plans are alternate and less stringent effluent limits. The reclamation measures are reducing the stressors identified in the TMDL study. At present, the remining operation is seventy-five percent complete and initial environmental results are very positive. Chemical water monitoring performed routinely in Black Creek by the coal company shows marked improvement and macroinvertebrate data collected under a DMLR contract, and presented to the agency in 2010, is showing better aquatic insect population.

Red River Coal Company is a local coal company currently remining in the Black Creek watershed. Cost for BMPs per acre utilized during re-mining are included in the attached table:

Mined Land BMP for Black Creek		
BMP	Description of BMP	BMP Cost Estimate*
Revegetation	The establishment of a diverse and permanent vegetative cover on mined areas that is adequate to control surface water infiltration and erosion.	\$1,000,000
Regrading	The restoration of original contours on mined areas.	\$2,500,000
Infiltration Channels	Construction of a shallow, excavated trench backfilled with coarse gravel then covered with soil with grass planted on the surface. Stormwater runoff diverted into the trench gradually infiltrates into the surrounding soils from the bottom and sides of the trench.	
Daylighting with Resource recovery	The exposure, by surface mining, of a deep-mined coal seam with the purpose of recovering the remaining coal and eliminating existing pollutional discharge.	\$191,625
Wetland Construction	The establishment of a wetland area as part of the mining and reclamation process.	\$300,000
Sediment Pond Construction	The construction and placement of ponds to collect drainage from disturbed areas and provide stormwater retention and sedimentation.	\$125,000
Stream Buffer	The restoration of a riparian area along a stream segment that includes plantings and structures designed to buffer the stream.	\$75,000
Diversion Ditches	The construction of ditches and the restoration of drainage patterns to direct water away from outcrops and areas where the potential for erosion and mineralization are high.	\$400,000
<b>TOTAL COST</b>		<b>\$4,591,625</b>

\* Estimate: Cost estimate per 1000 acres of mined lands.

Chemical water monitoring performed routinely in Black Creek by the coal company shows marked improvement. Macroinvertebrate data collected under a DMLR contract, and presented to the agency in 2010, is showing better aquatic insect population.

VSCI Metrics for Aquatic Health for Black Creek								
	Taxa Richness	EPT Richness	% Ephemeroptera	P+T-C (%)	% Scrapers	% Chironomidae	VSCI	Habitat
1995	4	3	2.3	3.4	0	81.6	39	80
2001	8	3	0	7.23	0	0	36	160
2009	18	5	0.92	12.84	4.13	12.84	49	181

This reclamation of abandoned mine areas in southwestern Virginia's coalfields will be a critical component of watershed restoration and implementation plans for streams impaired by historical coal mining. After remining and reclamation is totally complete, DMLR and DEQ will re-assess the impairment status of the stream and, hopefully, be able to remove Black Creek from the 303(d) list.

## SUCCESS STORY - BULL CREEK: Stream Restoration Efforts Reduce Harmful Impacts of Coal Mining Pollutants

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**River Basin:** Tennessee/Big Sandy River Basins **County:** Buchanan **Stream Name:** Bull Creek & Tributaries **Hydrologic Unit:** 05070202 **TMDL ID:** VAS-Q08R-01 **Segment Size:** 16.87 - Miles **Initial Listing:** 1998 TMDL SCHEDULE: 2008 **Clean Water Act Goal and Use Support:** Aquatic Life Use - Not Supporting **Impairment Cause:** General Standard (Benthic)

### *Water Body Improved:*

The Bull Creek watershed is located in the western Buchanan County, in Virginia, approximately four miles from Grundy. The impaired segments of the stream include its entire length and all its tributaries; Belcher Branch, Deel Fork, Burnt Poplar Fork, Big Branch, Jess Fork, and Convict Hollow. The stream has been contaminated for many years but was not placed on Virginia's state 303(d) list until 1999. Due to old mining in the watershed Bull Creek was listed as impaired. The refuse disposal site in Starr Branch degraded the water quality by contributing sediment and coal fines to the stream. To address the poor water quality of the stream sediments and coal fines were cleaned from the plant and covered on-site. The existing retaining walls were removed and replaced with designed riparian zones.

### *Problem:*

Harman Mining Company operated coal mining, processing, and refuse disposal facilities in the headwaters of Bull Creek, including Starr Branch, Belcher Branch, and Deel Fork, from the 1930's until the 1990's. At its peak in the 1940's, Harman Mining Company employed over 1600 workers. Originally, mining, loading, and cleaning coal was all done by hand. When modernization and automation arrived in the early 1950's, the plant began cleaning the coal with sand and water mixture – utilizing mine water discharging from the Splashdam works. The wastewater flowed directly into Bull Creek until the 1970's and the stream often ran black. Historically, the coal preparation plant adjacent to Bull Creek and the refuse disposal site in Starr Branch degraded water quality by contributing sediment and coal fines to the stream. The results included increased levels of dissolved solids, suspended solids, and sulfates in the water, as well as deposition along the stream bank. Much of the pollution was in the form of non-point source run-off during rain and storm events. The prep plant contributed to the abandoned mine pollution load that also included hundreds of acres of strip mine bench in the upper reaches of the watershed.

16.9 miles of Bull Creek were impaired due to the sediment and coal fines. The direct source of the problem was the nearby preparation plant and refuse disposal site. Much of the pollution was in the form of non-point source run-off during rain and storm events. Original impairment was partially caused by low pH, high TDS, sediment, and unspecified contaminants. The preparation plant contributed to the abandoned mine pollution load that also included hundreds of acres of strip mine bench in the upper reaches of the watershed. Virginia's Department of Environmental Quality (DEQ) developed a TMDL which set the sedimentation goal as 2759.7(t/yr).

### *Project Highlights:*

The goal of the Bull Creek Stream Improvement project was to enhance water quality and address biological impairment through bank stabilization and riparian zone restorations in conjunction with the reclamation of abandoned mined lands. This included the Harman mine and prep plant. Sediments and coal fines were cleaned from the plant and covered on-site. The existing retaining walls were removed and replaced with designed riparian zones. Because the Harman Coal Corporation mine and preparation plant were forfeited sites, the DMLR used reclamation bond funds to reclaim the site. Sources of sediment were from the defunct coal processing plant, abandoned mined lands, other barren areas, and formally active mining areas. BMPS implemented by the DEQ were the implementation of sediment ponds, sediment removal, and the

reduction of loads from extractive and reclaimed land uses. The Bull Creek Stream Improvement project was implemented to enhance water quality and address biological impairment through bank stabilization and riparian zone restorations in conjunction with the reclamation of abandoned mined lands. In April of 2010 a “phased” TMDL report was submitted by the VA DEQ to EPA’s Region III. The TMDL report calls for additional pollution reductions, similar to those accomplished by the Stream Improvement Project.

Utilizing grant funds from DCR, DMLR was also able to work in areas not under permit and repair the stream, adjacent stream bank, and riparian areas. The stream’s water quality has improved but it has not yet been delisted from Virginia’s 303(d) list. 85% of sedimentation was removed from Bull Creek and retaining walls were replaced by riparian zones. Now that the coal plant is gone the pH level is back to normal, mining increases, and minor improvements in VaSCI but the habitat metrics are still poor.

**Water Quality of Bull Creek below project area:**

	<b>Average Sulfate</b>	<b>Average TDS</b>	<b>Average TSS</b>
<b>Pre-project Quality (1998 &amp; 1999)</b>	364.2 mg/liter	657.0 mg/liter	7.2 mg/liter
<b>Post-project Quality (2002 &amp; 2003)</b>	335.0 mg/liter	372.8 mg/liter	5.8 mg/liter

The DMLR continues to make efforts to improve the streams water quality. In April of 2010, a “phased” TMDL report was submitted by the VA DEQ to EPA’s Region III. The TMDL report calls for additional pollution reductions, similar to those accomplished by the Stream Improvement Project

***Partners and Funding:***

The total funding for the Bull Creek Stream Improvement Project was \$555,785 and the funds were provided by a group of partners including Virginia DMME, Virginia Department of Environmental Quality, Virginia Department of Conservation and Recreation, and U. S. EPA.

**PROGRESS REPORT - TMDL OFFSETS**

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DMLR currently tracks active mining wasteloads on a watershed basis to insure that all new or revised mine permits are consisted with any approved resource extraction TMDLs. If tracking indicates that active mining wasteloads are at the upper limits of wasteload allocations in the TMDLs, DMLR has been requiring mine operations to include NPS offsets before additional mining can be permitted.

DMLR's current permitting and offset processes in TMDL watersheds addresses NPS in several important ways. These include more stringent sampling requirements in TMDL and impaired watersheds, a reduction in the overall amount of pollution from active mining activity, and the restoration of AML features as part of offset projects. A specific example of an offset project in Callahan Creek, Wise County, is described below.

Slope failure, related to impounded water in an abandoned underground mine (the old Hi-Top mine), resulted in a major landslide in 2006. The landslide created sedimentation that impacted Callahan Creek and the Powell River for 24 miles downstream. The potential continued to exist for another catastrophic mine blow out which would have caused major sediment loading and created a danger to public health and safety. As a TMDL offset, a local coal company worked with DMLR to dewater the underground mine workings to a level below outcrop and regrade & revegetate slide area. A significant amount of NPS pollution reduction was accomplished.

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## **(2) TMDL IMPLEMENTATION PROGRESS REPORTS AND SUCCESS STORIES**

This section contains progress reports for ten current Section 319(h) supported TMDL Implementation Projects. These projects are mainly funded by Section 319 funds but also have practices funded by state Water Quality Improvement Funds (WQIF) , Virginia Natural Resource Commitment Fund (VNRFCF), and other private or federal funds.

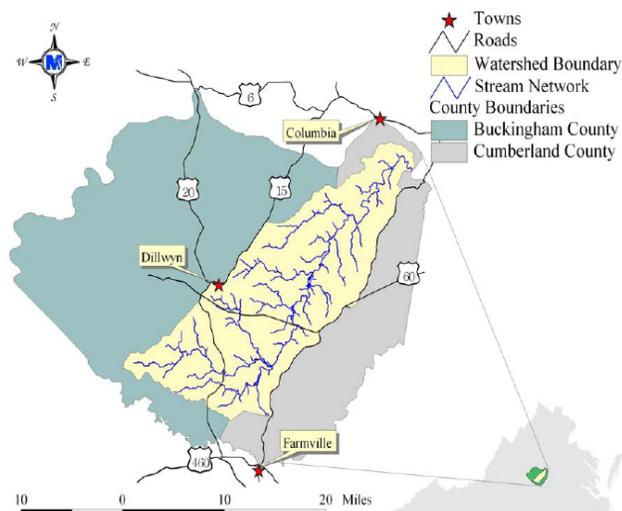
- a. PROGRESS REPORT and SUCCESS STORY: Willis River TMDL Implementation Project 2005-2010 (On-going)
- b. PROGRESS REPORT: Lower Blackwater River, Maggodee Creek and Gills Creek TMDL Implementation Project 2006-2010 (On-going)
- c. PROGRESS REPORT: Blacks Run and Cooks Creek TMDL Implementation Project 2006-2010 (On-going)
- d. PROGRESS REPORT: Big Otter River TMDL Implementation Project 2006-2010 (On-going)
- e. PROGRESS REPORT: Thumb, Deep, Carter and Great Runs TMDL Implementation Project 2006-2010 (On-going)
- f. PROGRESS REPORT: Little and Beaver Creeks TMDL Implementation Project 2006-2010 (On-going)
- g. PROGRESS REPORT: Mill and Dodd Creeks TMDL Implementation Project 2006-2010 (On-going)
- h. PROGRESS REPORT: Hawksbill and Mill Creeks TMDL Implementation Project 2006-2010 (On-going)
- i. PROGRESS REPORT: Looney Creek TMDL Implementation Project
- j. PROGRESS REPORT: Upper Hazel River TMDL Implementation Project 2009-2010 (On-going)

## Willis River TMDL Implementation Project July 2005-June 2010

### Buckingham and Cumberland Counties, Virginia

#### Waterbody Improved

Located approximately 60 miles west of Richmond in the Piedmont, the Willis River and its tributaries in Buckingham and Cumberland counties were first listed as not meeting water quality standards on Virginia's 1996 303(d) list of impaired waters. The impairment was due to violations of the State's fecal coliform bacteria standard for recreational contact. Through the joint efforts of the Virginia Department of Conservation and Recreation (DCR) and the Peter Francisco Soil and Water Conservation District (PFSWCD), as well as other stakeholders, various agricultural and residential best management practices (BMPs) have been installed through a Total Maximum Daily Load (TMDL) implementation project funded with EPA Section 319(h) funds that began in 2005. These BMPs include: a dairy loafing lot management system, composting facilities, animal waste storage, livestock stream exclusion with grazing land protection systems, riparian buffers, septic tank pump-outs, septic system repairs and replacements.



As a result of four plus years of implementation activities 64 agricultural best management practices have been installed, including 34.33 miles of stream exclusion fencing, the fencing out of 4,138 livestock from streams, and the establishment of almost 139 acres of riparian vegetative buffers. The widespread installation of BMPs throughout the Willis River Watershed has reduced bacterial levels to allow three stream segments, totaling 34.71 miles of streams, to attain water quality standards for primary contact recreation. These two segments of the Willis River were removed from Virginia's 303(d) list of impaired waters in 2006 and 2008 as a direct result of TMDL implementation activities.

#### Project Background and Problem Identification

The Willis River watershed is part of the James River Basin (HUC 02080205, VAC-H35R and VAC H36R). The land area is approximately 177,936 acres, with woodlands and pasture as the primary land uses. The watershed is comprised of forest (75%), water (1%), wetlands (2%) agricultural (21%), and urban (1%) land uses.

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 original 1996 impaired segment of the Willis River stretched from the confluence with the James River upstream to Reynolds Creek (14.53 miles). The segment was extended in the 2004 cycle to include the entire Willis River from the headwaters to the mouth (61.34 miles). The fecal coliform TMDL for the Willis River was completed in 2002. In 2005, DCR and Peter Francisco Soil and Water Conservation District, with extensive input from other stakeholders, completed a TMDL implementation plan and commenced a 5-year implementation project to reduce fecal coliform levels in the Willis River through implementation of agricultural and residential BMPs.

#### Project Highlights

Residential and agricultural conservation successes have largely been the result of partnerships between the PFSWCD and several state agencies including the Virginia Departments of Conservation and Recreation and Environmental Quality, Virginia Cooperative Extension, Farm Bureau, Cattlemen's Association, and USDA – Natural Resources Conservation Service. Numerous tours have been held to promote the agricultural and residential BMPs offered under the TMDL implementation plan, along with presentations at civic clubs throughout the watersheds, postcard mailings

advertising the program, personal contacts with farmers and residents, and meetings updating the community about the water quality improvements.

From July 1, 2009 thru June 30, 2010 five livestock stream exclusion practices were installed protecting 15,540 feet of stream from 638 livestock, creating 9.9 acres of riparian buffer and an additional 2.8 acres of woodland buffer filter area was established. During this period two septic pumpouts and two septic system installations were completed. Since the beginning of the project in July 2005 (through June 30, 2010), there have been 61 agricultural practices completed. Approximately 4,582 head of livestock have been excluded with 34.33 miles of finished stream fencing, establishing almost 139 acres of buffers. Approximately 1,780 acres of pastureland has been improved. For the residential program, to date, 23 septic projects have been implemented. The District has 16 septic tank pump outs completed. So far, four septic systems have been repaired and four more are approved. Three septic systems have been replacement and installation is completed. The pollution reductions as a result of the BMPs installed included below are only for 319(h) funded practices.

<b>BMP Implementation Summary for the Willis TMDL Project (August 2005-June 2010)</b>				
<b>Control Measure*</b>	<b>Unit</b>	<b>Units Needed</b>	<b># Installed</b>	<b>% Goal</b>
<b>Agricultural Program:</b>				
Stream Exclusion Fencing,	Mile	475,000	184,457	39%
Riparian Buffer Established	Acre		143	
Livestock Exclusion System (LE-1T, LE-2T, SL-6, WP-2T)	System	318	50	15.7%
Stream Crossing & Hardened Access	System		6	
Loafing Lot Management (WP-4B)	System		1	
Animal Waste Storage Facility (WP-4)	System		4	
Composting Facility (WP-4C)	System		3	
<b>Residential Program:</b>				
Septic System Pump Out, RB-1	System	100	16	16%
Septic System Repair, RB-3	System	3	4	133%
Septic System Installation, RB-4	System	2	3	150%
*NOTE: BMP counts after 7/1/2009 only include 319 funded projects. BMPs funded by State CS , CREP or Federal EQUIP are not included after this date (though they may have been included previously)				
<b>Water Quality Goals Met</b>	<b>Unit</b>	<b>Miles needed</b>	<b>Miles Delisted</b>	<b>% Goal</b>
Stream Miles impaired on 303(d) list	Miles	61.34	34.71	56.6%

<b>Pollution Reductions for the Willis TMDL Project (August 2005-June 2010)</b>				
<b>Period</b>	<b>Pathogens (Coliform) CFU</b>	<b>Nitrogen Lbs/year</b>	<b>Phosphorus Lbs/year</b>	<b>Sedimentation-Siltation tons/year</b>
July 2005-June 2009	1.14E+16	1,592.40	612.00	20.79
July 2009-June 2010	2.21E+15	3,245.35	428.27	594.82
<b>TOTAL</b>	<b>1.36E+16</b>	<b>4,837.75</b>	<b>1,040.27</b>	<b>615.61</b>

The Virginia Department of Environmental Quality (DEQ) monitors the impaired streams through the agency's ambient monitoring program. DEQ monitors several stations throughout the Willis River Watershed. Analysis of data from several sites has shown drastic improvements in the water quality conditions of various segments of the Willis River. Subsequently three stream reaches were delisted due to the bacteria violation rates being 10% or less. These sites include:

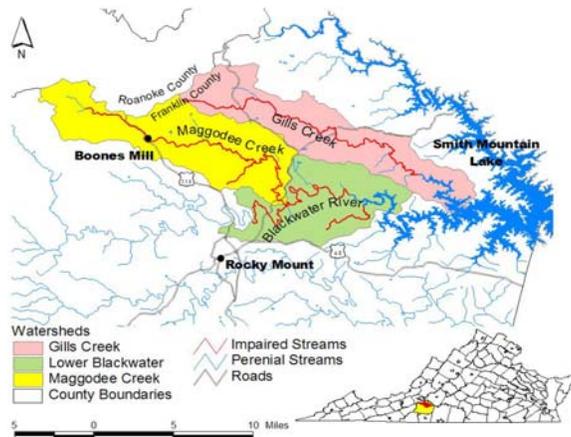
- VAC-H35R\_WLS02A04, 9.92 miles (station 2-WLS004.27), which had a violation rate of 2/20 with a 10% violation rate and was listed in the 2006 303(d)/305(b) report as attaining standards, and
- VAC-H36R\_WLS02A06, 8.11 miles, which had a violation rate of 1/20 with a less than 10% violation rate and was listed in the 2006 303(d)/305(b) report as attaining standards, and
- VAC-H36R\_WLS01A00, 16.68 miles (station 2-WLS042.78), which had a violation rate of 2/21 with a 9.5% violation rate and was listed in the 2008 303(d)/305(b) report as attaining standard.

As a result of activities a total of 34.71 miles are now meeting water quality standards and changed to category 2C. The chart to the left shows violation rates of the bacteria standard from the period of 1996 through 2008 for the sampling station at the mouth of the Willis River (WLS000.4.27). For the 2006 303(d) list the bacteria standard was based on fecal coliform, 400 colony forming units (CFU) per 100 ml of water. For the 2008 303(d) list the standard changed to *E. coli* at 235 CFU per 100 ml of water.

## Lower Blackwater TMDL Implementation Project 2006- June 2010

### 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 Lake. 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. From July 1, 2009 thru June 30, 2010 a total of 7 BMPs were completed. Fencing practices installed resulted in 7,185 feet of stream exclusion fencing and the exclusion of 175 animals from the stream. Two animal waste storage facilities were also installed. During this period a total of 1 septic tank pumpout (RB-1) was completed and three septic system installations were accomplished. From March 2006 through June 2010 36 agricultural practices have been completed resulting in over 18 miles of stream fencing, excluding 3,021 livestock and establishing 92 acres of riparian buffer. In addition 69 residential BMPs have been installed, including: pumping out of 61 septic systems and eight septic systems have been repaired or replaced. The pollution reductions as a result of the BMPs installed included below are only for 319(h) funded practices.

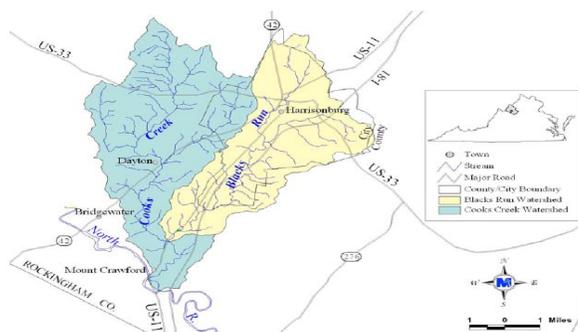
BMP Summary for the Lower Blackwater TMDL Project (March 2006-June 2010)				
Control Measure*	Unit	Units Needed	# Installed	# Goal
<b>Agricultural Program:</b>				
Stream Exclusion Fencing	Feet	147,840	94945	64.2%
Riparian Buffer Established	Acre		91.56	
Livestock Exclusion System (LE-1T, LE-2T, SL-6, WP-2T)	System	77	27	31%
Waste Storage Facility (WP-4)	System		4	
Loafing Lot Management (WP-4B)	System	3		
Vegetative Cover on Critical Area (SL-11)	Acre		2	
<b>Residential Program:</b>				
Septic System Pump Out (RB-1)	System	100	61	61%
Septic System Repair (RB-3)	System		1	
Septic System Installation (RB-4)	System	65	7	10.8%
Alternative Waste Treatment System (RB-5)	System	7		
*NOTE: BMP counts after 7/1/2009 only include 319 funded projects. BMPs funded by State CS, CREP or Federal EQUIP are not included after this date (though they may have been included previously)				
Water Quality Goals Met	Unit	Miles Listed	Miles Delisted	% Goal
Impaired miles on the 303(d) list	Miles	?	?	?

Pollution Reductions for the Lower Blackwater River, Maggodee Creek and Gills Creek TMDL Project (March 2006-June 2010)				
Period	Pathogens (Coliform) CFU	Nitrogen Lbs/year	Phosphorus Lbs/year	Sedimentation-Siltation tons/year
March 2006-June 2009	4.34E+15	919.3	302.05	12.29
July 2009-June 2010	50.88E+14	906.71	179.91	168.58
<b>TOTAL</b>	<b>9.43E+15</b>	<b>1,826.01</b>	<b>481.96</b>	<b>180.87</b>

## Cooks Creek & Blacks Run TMDL Project 2006- June 2010

### 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. From July 1, 2009 thru June 30, 2010 a total of 21 best management practices were completed. This included 2 nutrient management planning practices, sixteen small grain cover crop for nutrient management covering over 312 acres was completed. Residential practice changes included one septic system pump-outs and one connection to public sewer systems. The TMDL coordinators collaborated with the Pure Water Forum, Cargill and the Shenandoah Resource Conservation Council in community conservation practice change projects, gave presentations at 8 different events including the Beef Marketing Workshop, and a poultry growers meeting.

To date there have been 82 agricultural BMPs completed, including: 11 acres of permanent vegetative cover on cropland (SL-1), 1,295 acres of small grain cover crops, one loafing lot management system, and 3 miles of stream exclusion fencing installed. To date there have been 31 residential practices completed, including: 20 septic pump outs completed, 3 connections to public sewer, 5 septic system repaired or installed, and 3 alternative waste treatment systems installed.

BMP Summary for the Cooks Creek & Blacks Run (May 2006-June 2010)				
Control Measure*	Units	Units	#	%
<b>Agricultural</b>				
Stream Exclusion Fencing	M	50	3	6%
Riparian Buffer Established	Ac		12.6	
Livestock Exclusion System (SL-6, LE-1T, LE-2, WP-2T)	S	17	1	6%
Voluntary Exclusion Systems	F	86,914	14,389	17%
Waste Storage Facility (WP-4)	S	46		
Loafing Lot Management	S		1	
Pasture Management	Ac	758		
Conservation Tillage	Ac	4,748		
Small Grain Cover Crop (SL-8B)	Ac		1295	
Vegetative Cover on Cropland (SL-1 and SL-11)	Ac		11.5	
Nutrient Management	Ac	3,565	25	
Woodland Buffer Filter Area (FR-3)	Ac		0.5	
<b>Urban/Residential BMPs</b>				
Pet Litter Control Program	P	2	1	50%
Pet Waste Digesters	System		35	
Pet waste Stations	System		15	
Rain Barrels	Systems		138	
Bioretention Filters	AT	1025	1,672	.02%
Retention Ponds	AT	400		
Street Sweeping	LM	7,574	16,978	224%
Streambank Stabilization	F	7,000	7350	105%
Vegetated Buffer	F	197,704	9000	4.5%
Rain Gardens	AT	600	1.0	0.02%
Nutrient Management	Ac	1100	11.5	0.1%
<b>Residential Septic</b>				
Septic Tank Pump Outs (RB-1)	S	100	20	20%
Sewer Connection (RB-2)	S	3	3	100%
Septic System Repair (RB-3)	S	24	4	17%
Septic System Installation (RB-4)	S	14	1	7%
Alternative Waste Treatment System (RB-5)	S	14	3	21%

AT = Acres Treated, Ac = Acres, S = System, F = Feet of stream, P = Program, LM= Lane/mi/yr, M = miles of stream

**\*NOTE: BMP counts after 7/1/2009 only include 319 funded projects. BMPs funded by State CS, CREP or Federal EQUIP are not included after this date (though they may have been included previously)**

The pollution reductions as a result of the BMPs installed are summarized in the table below. These figures do not include the Urban and Residential (non-septic) practices due the fact that the pollution reductions for these practices were not available at the time of this report. The pollution reductions as a result of the BMPs installed included below are only for 319(h) funded practices.

Pollution Reductions for the Cooks Creek and Blacks Run TMDL Project (March 2006-June 2010)				
Period	Pathogens (Coliform) CFU	Nitrogen Lbs/year	Phosphorus Lbs/year	Sedimentation-Siltation tons/year
March 2006-June 2009	7.85E+14	4296.43	732.59	446.48
July 2009-June 2010	5.478E+10	2448.19	646.4	448.9
<b>TOTAL</b>	<b>7.85E+14</b>	<b>6744.62</b>	<b>1378.99</b>	<b>895.38</b>

In addition this project has received funding to do urban/residential (non-septic) practices in Blacks Run from various sources of funding. The Section 319 program funded several vegetated buffer and stream restoration projects in Blacks Run through a grant to the City of Harrisonburg. In addition 319 funds were partnered with state Water Quality Improvement Funds (WQIF) to pay for the installation of 5 rain gardens, several stream restoration and buffer projects as well as several pet waste digester projects. In addition this partnership paid for the installation of 38 rain barrels. DCR also issued several other WQIF grants to entities within the Blacks Run watershed, including the City of Harrisonburg to do several other urban projects. These projects included the purchasing of another street sweeper with doubled the number of miles of streets that were swept of debris.

During 2008-2009 DCR facilitated the development of a stormwater project for the Blacks Run watershed and submitted a proposal to the National Fish and Wildlife Foundation that was subsequently awarded in August of 2009. The Department of Conservation and Recreation (DCR), the City of Harrisonburg, the Shenandoah Valley Soil and Water Conservation District (SVSWCD), James Madison University (JMU), Eastern Mennonite University (EMU), Harrisonburg Redevelopment and Housing Authority (HRHA), and the Virginia Department of Environmental Quality (DEQ) are partnering on a project that focuses on reducing stormwater pollution and enhancing stormwater management on three scales in the Blacks Run Watershed: the neighborhood/individual, the institutional, and the community/watershed scale. This project will result in the installation of over 200 stormwater best management practices (BMPs). In addition this project will build a greater awareness and understanding amongst the residents, business and property owners and local officials regarding stormwater management concepts and the impact of nonpoint source pollution; increasing the capacity of the watershed community to integrate innovative stormwater practices into residential, commercial, municipal and educational landscapes. This project will provide training and capacity building for the community and landscaping professionals to use cost-effective methodologies for the design, installation and maintenance of stormwater practices that will continue to benefit the community and watershed after this NFWF project is complete. The total NFWF contributions are \$325,000 which is matched with \$350,237 of non-federal funds and in-kind services as well as \$110,102 of federal funds in the form of the current 319 TMDL Implementation project for Blacks Run and Cooks Creek. This project will end in 2012. Below is a preliminary summary of the BMPs that are proposed to be installed:

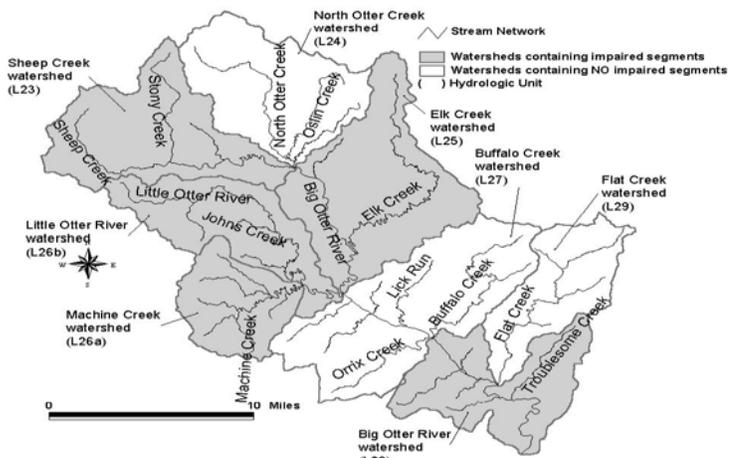
**BMPs Installed through Blacks Run & Cooks Creek Stormwater Management Projected funded by NFWF**

Best Management Practice	NEIGHBORHOOD BLACKS RUN PROJECT	COMMUNITY STORMWATER MANAGEMENT	INSTITUTIONAL - JMU	INSTITUTIONAL EMU	TOTAL Area Covered/treated (acres except for streambank stabilization)	TOTAL BMPs Installed
Bioretention/infiltration Filter or flow-through plantings (treating acres)		0.5	0.1	0.4	1	4
Stormdrain Stenciling			700			700
Green roof (250 sf, or 0.0057ac treated)				250	0.0057	1
Permeable Pavers (area in acres, 1000 sf)			1000feet		0.023	1
Conversion from pervious to impervious (acres)		75ft			0.025	1
Pet waste Digesters (treating 0.2 acres)	65				13	65
Rain Barrels (treating ~0.03 acres each)	65	104	1		5.1	170
Rain Gardens (treating ~0.2 acres each)	10				2	10
Rain Gardens (more than 0.5 acres each)			1	3	2	4
Rainwater Harvesting 100,000 gal Cistem treating 40 acres (acres)				100,000 gal treating 40 ac	40	1
Soil Tests (each treating 0.2 acres)	65				13	65
Stream bank Stabilization (linear feet)		450		1200	1650	4
Trees/Shrubs Planted (acres) 400 trees/acre	1000	2250			8.125	3250
Vegetated Riparian Buffer (acres)	1.2	3.8		2.28	7.28	6
Wetlands/riparian area created from converting detention pond (acres) (size of pond ~.28 acres, treating 20 acres)				0.28	20	1
Yard Waste Composters each treating about 0.2 acres(acres)	12				2.4	12

## Big Otter River TMDL Implementation Project 2006- June 2010

### 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 suburbs of Lynchburg; and is a tributary of the Roanoke River that empties 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. From July 1, 2009 thru June 30, 2010 a total of 46 BMPs were installed, including 21 agricultural BMPs related to livestock stream exclusion and stream protection resulting in 40,006 feet stream exclusion. These practices excluded at least 470 animals from the stream. During this period 21 residential BMPs were installed, including: five septic tank system repairs, 15 septic systems were replaced, and one alternative system installed.

Since July 2006 the agricultural program has installed 122 BMPs including 106 stream exclusion systems for livestock. These practices resulted in total of 282,886 linear feet of stream exclusion fencing, and creating 425 acres of riparian buffers. In terms of the residential septic program, to date the program has installed 100 residential BMPs, including: 25 septic tank pumpouts, 16 septic tank system repairs (RB-3), 4 connections to sewer, 51 septic system replacements (RB-4 and RB-4P), and 4 alternative waste treatment systems (RB-5). The pollution reductions as a result of the BMPs installed included below are only for 319(h) funded practices.

Control Measure*	Unit	Total	Installed	%
<b>Agricultural BMPs:</b>				
Stream Exclusion Fencing	Feet	934,560	282,886	29.4
Riparian Buffer Established	Acre		425	
Livestock Exclusion System (LE-1T, LE-2T, SL-6, WP-2T)	System	270	106	37.0
Forest Buffer (CP-22, CRFR-3)	Acre		148	
Animal Waste Control (WP-4)			2	
Pasture Management	Acre	7,001		
<b>Residential BMPs:</b>				
Septic Pump Out (RB-1)	System		25	
Connection to Sewer (RB-2)	System		4	
Septic System Repair (RB-3)	System	34	16	50.0
Septic System Installation, (RB-4, RB-4P)	System	187	51	27.3
Alternative Waste Treatment, System (RB-5)	System	26	4	15.4
*NOTE: BMP counts after 7/1/2009 only include 319 funded projects. BMPs funded by State CS, CREP or Federal EQUIP are not included after this date (though they may have been included previously)				
Water Quality Goals Met	Unit	Miles Listed	Miles Delisted	% Goal
Stream Impairment on the 303(d) list		?	?	?

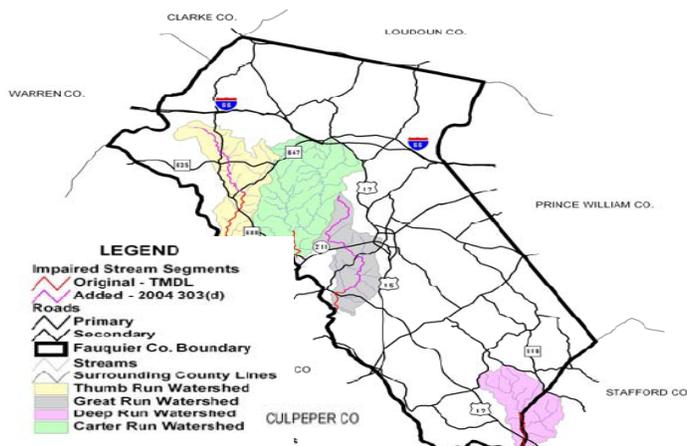
Period	Pathogens (Coliform) CFU	Nitrogen Lbs/year	Phosphorus Lbs/year	Sedimentation-Siltation tons/year
July 2006-June 2009	1.39E+16	975.7	155.89	92.44
July 2009-June 2010	1.4928E+15	11701.98	2341.72	2134.7
<b>TOTAL</b>	<b>1.54E+16</b>	<b>12677.68</b>	<b>2497.61</b>	<b>2227.14</b>

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## Thumb, Deep, Carter and Great Runs TMDL Project 2006- June 2010

### 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 Deep, Carter and Great Runs 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. From July 1, 2009 thru June 30, 2010 a total of 49 best management practices were installed. Five agricultural BMPs were installed for livestock exclusion, protecting 21,260 linear feet of stream from 455 livestock. A total of 42 residential septic practices were installed, including: 35 septic tank pumpouts, seven septic system repairs and two septic system installations. To date the project has completed 156 best management practices, including: 28 stream exclusion practices resulting in 68,780 feet of stream exclusion fencing, that excluded 1,432 livestock from streams; 4 permanent vegetative cover on cropland for 31 acres, 95 septic tank pump-outs and the repair or replacement of 26 malfunctioning septic systems or straight pipes. The pollution reductions as a result of the BMPs installed included below are only for 319(h) funded practices.

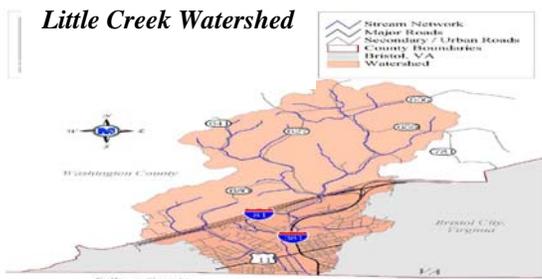
BMP Summary for the Thumb, Deep, Carter and Great Runs (July 2006-June 2010)				
Control Measure*	Unit	Total	Installed	%
<b>Agricultural BMPs:</b>				
Stream Exclusion Fencing	Feet	359,040	68,780	19.2
Riparian Buffer Established	Acre		103.48	
Livestock Exclusion System (LE-1T, LE-2T, SL-6, WP-2T)	System	167	27	16.17
Woodland Forest Buffer (FR-3)	Acre		19	
Vegetative Cover on Cropland (SL-1)	Acre		31	
Manure/ Incorporation on Cropland	Acre	5,331		
Pasture Management	Acre	16,271		
<b>Pet Waste BMPs:</b>				
Pet Waste Control Program	System	3		
CCU BMP Demonstration**	System	2		
CCU BMP Installation	System	25		
Pet Waste Landscape Demonstration	System	2	2	100
<b>Residential BMPs:</b>				
Septic Pump Out (RB-1)	System		95	
Septic System Repair (RB-3)	System	102	21	20.6
Septic System Installation, (RB-4)	System	146	5	3.4
Alternative Waste Treatment, System (RB-5)	System	44	0	0
*NOTE: BMP counts after 7/1/2009 only include 319 funded projects. BMPs funded by State CS, CREP or Federal EQUIP are not included after this date (though they may have been included previously) **CCU = Concentrated Canine Unit				

Pollution Reductions for the Thumb, Deep, Carter and Great Runs TMDL Project (July 2006-June 2010)				
Period	Pathogens (Coliform) CFU	Nitrogen Lbs/year	Phosphorus Lbs/year	Sedimentation-Siltation tons/year
July 2006-June 2009	2.99E+15	363.55	50.06	21.05
July 2009-June 2010	1.282E+15	1459.89	603.48	754.34
<b>TOTAL</b>	<b>4.27E+15</b>	<b>1823.44</b>	<b>653.54</b>	<b>775.39</b>

## Little and Beaver Creeks TMDL Implementation Project 2007- June 30, 2009

### Project Location

Beaver Creek and Little Creek watersheds are located in Washington County and the City of Bristol, Virginia. Beaver 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 from near the headwaters to the state line with Tennessee. Little Creek is a major tributary of Beaver Creek that is impaired along a 5.52 miles segment from the headwaters and continuing downstream to the Tennessee state line. 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 began administered both the agricultural and residential programs for the Beaver Creek and Little Creek TMDL Implementation Project. From July 1, 2009 thru June 30, 2010 a total of 33 best management practices were installed. Four agricultural practices were installed; including one stream exclusion practice, excluding 35 animals from 450 feet of stream. During this period a total of 29 residential BMPs were completed, including the pumping out of 20 septic tanks (RB-1) the repair of seven septic systems (RB-3), and two septic system installations.

Since the beginning of the project a total of 188 BMPs have been installed. This includes: 13 grazing land protection (SL-6) stream fencing practice, excluding 581 livestock with the establishment of 11,525 feet of fencing; eight BMPs for small grain cover crop for 209 acres; one loafing lot management system installed for 195 animals; 144 septic systems were pumped out; and fourteen septic systems were repaired or replaced. In addition 25 rain barrels were installed and one 1,300 square feet of rain garden was built that treats 2.5 acres. The pollution reductions as a result of the BMPs installed included below are only for 319(h) funded practices.

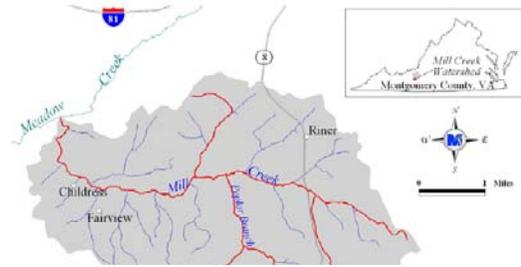
BMP Summary for the Beaver and Little Creeks TMDL Implementation Project (January 1, 2007 - June 2010) – Phase 1				
BMP	Unit	Total	Installed	%
<b>Agricultural BMPs:</b>				
Stream Exclusion Fencing	Feet	300,000	11,525	38.4
Riparian Buffer Established	Acre		95.9	
Livestock Exclusion System (LE-1T, LE-2T, SL-6, WP-2T))	S	309	13	4.2
Stream Crossing & Hardened Access	System	126		
Pasture Management	Acres	8,505		
Vegetative Cover on Cropland (SL-1)	Acre	75	19	25
Vegetative Cover on Critical Area (SL-11)	Acre		15	
Protective Cover for Specialty Crops (SL-8)	Acre	136	237	174
Manure Incorporation	Acre	110		
CREP Vegetated Buffers	Acres	16	1	6
<b>Urban/Residential BMPs (Beaver Creek)</b>				
Bioretention Filter (Acre-treated, AT)	AT	600	2.5	0.42
Rain Barrels	System		25	
Infiltration Trench	AT	1,087		
Rain Garden	AT	488	.95	0.02
Stormwater Collection Retro-fits	AT	15		
Vegetated Stream Buffer	Acre	311		
<b>Residential BMPs:</b>				
Pet Waste Control Program	Program	2		
Septic System Pump Out (RB-1)	System	144	146	101
Sewer Connection (RB-2 -Beaver Creek Only)	System	78		
Septic System Repairs (RB-3)	System	113	14	12.4
Septic System Installation ( RB-4, RB-4P))	System	55	5	9
Alternative Waste Treatment System (RB-5)	System	15		
<b>*NOTE: BMP counts after 7/1/2009 only include 319 funded projects. BMPs funded by State CS , CREP or Federal EQUIP are not included after this date (though they may have been included previously)</b>				

Pollution Reductions for the Little and Beaver Creeks TMDL Project (January 2007-June 2010)				
Period	Pathogens (Coliform) CFU	Nitrogen Lbs/year	Phosphorus Lbs/year	Sedimentation-Siltation tons/year
January 2007-June 2009	2.02E+15	765.56	215.66	107.44
July 2009-June 2010	1.21E+14	1466.19	291.87	260.6
<b>TOTAL</b>	<b>2.14E+15</b>	<b>2231.75</b>	<b>507.53</b>	<b>368.04</b>

**Mill Creek and Dodd Creek TMDL Implementation Project 2007- June 2010**

**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**



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.

**Figure 2: Dodd Creek Watershed**

**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. From July 1, 2009 thru June 30, 2010 a total of 31 best management practices were installed. During this period four grazing land protection and stream exclusion practices were installed, fencing out 113 animals and protecting 6,867 feet of stream. The residential program installed 27 residential BMPS, including 23 septic tank pumpouts, three septic repairs and one installation of a septic system. Since the beginning of the project a total of 61 practices have been installed. These included 10 livestock exclusion practices that protected 19,229 feet of stream and excluded 1,216 livestock. In terms of the residential program, 50 residential practices have been installed including 43 pump-outs and the repair or replacement of 7 septic systems. The pollution reductions as a result of the BMPs installed included below are only for 319(h) funded practices.

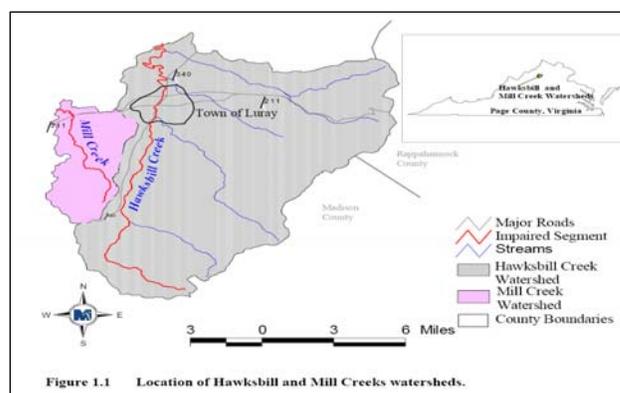
<b>BMP Summary for the Dodd Creek and Mill Creek TMDL Implementation Project – (January 2007-June 2010)</b>				
<b>Control Measure *</b>	<b>Unit</b>	<b>Total</b>	<b>Installed</b>	<b>%</b>
<b>Agricultural BMPs:</b>				
Stream Exclusion Fencing	Feet	156,223	19,229	12.3%
Riparian Buffer Established	Acre		20.2	
Livestock Exclusion System (SL-6, LE-1T, LE-2T, WP-2T)	System	100	10	10%
Waste Storage Facility (WP-4)	System	3		
Loafing Lot Management System (WP- 4B)	System	1	1	100%
Vegetative Cover on Critical Area (SL- 11)	Acre	2		
Improved Pasture Management	Acres	1,439		
<b>Residential BMPs:</b>				
Septic System Pump Out (RB-1)	System	200	43	21.5%
Septic System Repair (RB-3)	System	51	4	7.8%
Septic System Installation (RB-4)	System	183	3	1.6%
Alternative Waste Treatment Systems (RB-5)	System	27		
<b>*NOTE: BMP counts after 7/1/2009 only include 319 funded projects. BMPs funded by State CS , CREP or Federal EQUIP are not included after this date (though they may have been included previously)</b>				

<b>Pollution Reductions for the Mill and Dodd Creeks TMDL Project (January 2007-June 2010)</b>				
<b>Period</b>	<b>Pathogens (Coliform) CFU</b>	<b>Nitrogen Lbs/year</b>	<b>Phosphorus Lbs/year</b>	<b>Sedimentation-Siltation tons/year</b>
January 2007-June 2009	1.63E+15	67.17	6.72	4.65
July 2009-June 2010	4.67E+14	4352.55	687.02	794.8
<b>TOTAL</b>	<b>2.10E+15</b>	<b>4419.72</b>	<b>693.74</b>	<b>799.45</b>

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**Hawksbill Creek & Mill Creek TMDL Implementation 2008 - June 2010****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).

**Implementation Highlights**

A TMDL implementation plan was developed in 2007 that includes a list of BMP implementation goals to meet the TMDL. The Shenandoah Valley Soil and Water Conservation District began administering the project in 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. From July 1, 2009 thru June 30 2010 a total of 97 BMPs were installed, including 4 grazing land practice protecting 4,740 linear feet and 2 practices that protected 26 acres of permanent vegetative cover on cropland. In addition the District completed 103 residential BMPs. The BMPs installed were 73 septic system pumpouts, 16 septic system repairs, 11 septic system replacements and one alternative system installation.

Since the beginning of the project a total of 169 practices have been installed. These included four stream exclusion and grazing land protection practices for 7,325 feet of stream exclusion and 180 livestock excluded. In terms of the residential program 165 residential practices have been installed including 127 pump outs, the repair or replacement of 36 septic systems and the installation of two alternative waste treatment systems. The pollution reductions as a result of the BMPs installed included below are only for 319(h) funded practices.

<b>BMP Summary for the Hawksbill and Mill Creek TMDL Implementation Project (January 1, 2008 - June 2010)</b>				
Control Measure *	Unit	Total In IP	Installed	%
<b>Agricultural BMPs:</b>				
Stream Exclusion Fencing	Feet	138,828	12,065	8.7
Riparian Buffer Established	Acre		76.5	
Livestock Exclusion System (LE-1T, LE-2T, SL-6, WP-2T, CRSL-6)	System	62	8	12.9
Polywire Fencing (no cost-share)	System	24		
Pasture Management	Acre	14,739		
Waste Storage Facility (WP-4)	System	8		
Manure Incorporation	Acre	838		
Vegetative Buffer on Cropland (SL-1)	Acre	9	26	288
<b>Urban BMPs</b>				
Residential Pet Waste Program	System	1		
Residential Pet Waste Composting	Composter	1577		
Vegetated Buffers	Acre	12		
<b>Residential BMPs:</b>				
Septic System Pump Out (RB-1)	System	936	127	13.6
Septic System Repair (RB-3)	System	57	19	33.3
Septic System Installation (RB-4, RB-4P)	System	60	17	28.3
Alternative Waste Treatment (RB-5)	System	32	2	6.25
<b>*NOTE: BMP counts after 7/1/2009 only include 319 funded projects. BMPs funded by State CS, CREP or Federal EQUIP are not included after this date (though they may have been included previously)</b>				

<b>Pollution Reductions for the Hawksbill and Mill Creeks TMDL Project (January 2008-June 2010)</b>				
Period	Pathogens (Coliform) CFU	Nitrogen Lbs/year	Phosphorus Lbs/year	Sedimentation-Siltation tons/year
January 2008-June 2009	1.39E+14	78.92	0.21	1.94
July 2009-June 2010	3.10188E+14	906.71	179.91	166.58
<b>TOTAL</b>	<b>4.49E+14</b>	<b>985.63</b>	<b>180.12</b>	<b>168.52</b>

## LOONEY CREEK TMDL Implementation

### Project Location

Looney Creek is near Buchanan, Virginia within the James River Basin (Figure 1). The Looney Creek watershed is approximately 40,000 acres almost entirely within Botetourt County. The estimated human population within the Looney Creek watershed is 4,116. The major land use in this watershed is forest. Looney Creek (VAW-I26R) was listed as impaired on Virginia's 1998 Dirty Waters List due to violations of the State's water quality standards for fecal coliform. The bacteria TMDL for Looney Creek was determined for the stream as listed in the 1998 Dirty Waters List, from the confluence of Mill and Back Creek to the James River confluence, a total of 2.48 miles. This stream segment has remained on the 2002, 2004 and the 2006 lists (Figure 1). Until fecal bacteria levels are reduced in Looney Creek, full immersion swimming is discouraged. The DEQ completed the bacteria TMDL in May 2004, DCR completed the TMDL implementation plan in November 2007.

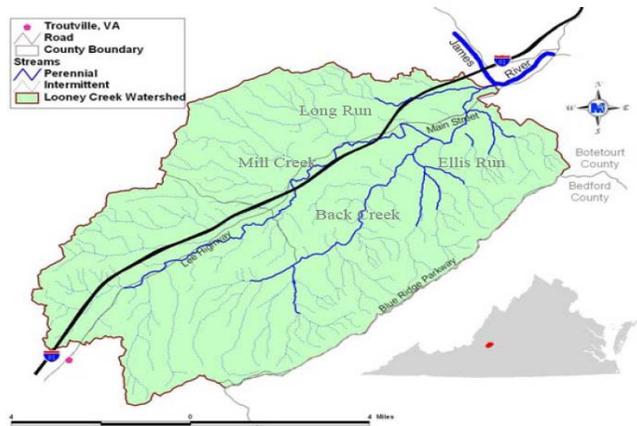


Figure 1. The Looney Creek watershed.

### Implementation Highlights

A TMDL implementation plan was developed in 2007 that includes a list of BMP implementation goals to meet the TMDL. The Mountain Castles Soil and Water Conservation District began administering the project in 2009, although during 2008 two livestock exclusion practices were completed in the IP area using state resources. Implementation during the first of the year of the project was slow as the District began making contacts with the agricultural and residential communities. From July 1, 2009 thru June 30, 2010 the District has installed nine BMPs, including one stream exclusion project and 8 residential BMPs. This includes 3 septic tank pump-outs, three repairs, one replacement/installation and the installation of one alternative system. Since the beginning of the project the District has installed two agricultural livestock stream exclusion practices protecting 5,000 feet of stream. In addition it has installed eight residential BMPs. This includes 3 septic tank pump-outs, three repairs, one replacement/installation and the installation of one alternative waste treatment system. The pollution reductions as a result of the BMPs installed included below are only for 319(h) funded practices.

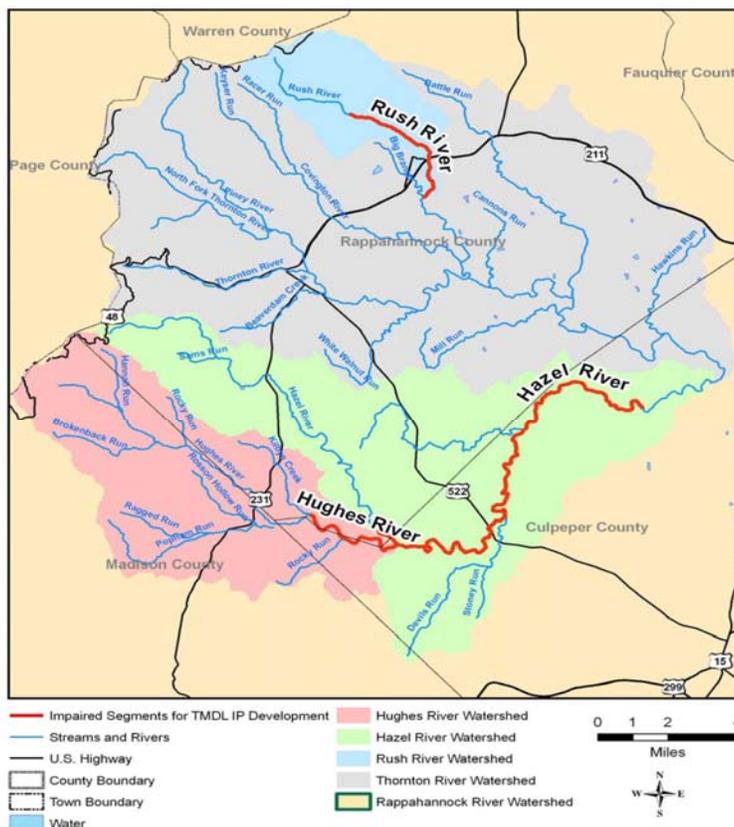
BMP Summary for the Looney Creek TMDL Implementation Project (January 2008 - June 2010)				
BMP	Unit	Total In IP	Installed	%
<b>Agricultural BMPs:</b>				
Stream Exclusion Fencing	Feet	68,583	5167	7.5
Riparian Buffer Established	Acre	-		
Livestock Exclusion Systems (LE-1T, LE-2T, SL-6AT, SL-6)	System	40	3	7.5
Stream Protection Systems (WP-2T)	System	4		
Pasture Management	Acre	9,467		
Sinkhole Protection (WO-11)	Feet	4,000		
Waste Storage Facility (WP-4)	System	2		
Manure Incorporation	Acre	318		
Vegetative Buffer on Cropland (SL-1)	Acre	4		
<b>Residential BMPs:</b>				
Vegetated Stream Buffer	Feet	100,810		
Pet waste Composters	System	453		
Septic System Pump Out (RB-1)	System	100	3	3.0
Septic System Repair (RB-3)	System	16	3	18.8
Septic System Installation (RB-4)	System	77	1	1.3
Alternative Waste Treatment (RB-5)	System	10	1	10

Pollution Reductions for the Looney TMDL Project (January 2009-June 2010)				
Period	Pathogens (Coliform) CFU	Nitrogen Lbs/year	Phosphorus Lbs/year	Sedimentation-Siltation tons/year
January 2009-June 2009	Not available at this time	n/a	n/a	n/a
July 2009-June 2010	2.014E+11	22.78	0	0
<b>TOTAL</b>	<b>2.014E+11</b>	<b>22.78</b>	<b>0</b>	<b>0</b>

US EPA ARCHIVE DOCUMENT

## HAZEL RIVER TMDL IMPLEMENTATION

**Project Area:** The Hazel River water and project area covers approximately 135,610 acres and includes the following subwatersheds: Hughes River (VAN-E03R-01), Hazel River (VAN-E04R-01), Rush River (VAN-E05R-01), Hazel River (60076), and Thornton River watersheds. The Hazel River begins in Rappahannock County, Virginia slightly south of Panorama, Virginia and continues downstream to confluence with Rappahannock River northwest of Remington, Virginia. Hughes River drains directly into Hazel River near Slate Mills, Virginia. Rush River flows into the Covington River, which flows into Thornton River, a tributary to Hazel River. The Rappahannock River forms in Fauquier County, Virginia southeast of Front Royal, Virginia and continues downstream until emptying into the Chesapeake Bay.



### Implementation Highlights

A TMDL implementation pPlan was developed in May 2009 that includes a list of BMP implementation goals to meet the TMDL. The Culpeper Soil and Water Conservation District began administering the 319 project in July 2009. From July 2009 thru June 2010 the District installed 40 BMPs. This included six livestock stream exclusion practices that fenced out 6,790 feet of stream and excluded 480 animals. This also included the establishment of 62 acres of vegetative buffer. On the residential side 31 BMPs were installed during this period. This included 15 pumpouts, seven repairs and eight replacements or installations of septic systems.

The project began receiving 319 funds in 2009, however previous to that point the District also received state agricultural cost share funds as well as state WQIF grant money to implement a residential septic program from July 2006 through June 2009. Since June 2006 the project has installed 130 best management practices, including 33 stream exclusion practices that have protected over 96,986 linear feet of stream, establishing

BMP Summary for the Upper Hazel River TMDL Implementation Project (July 1, 2006 - June 2010)				
Includes practices funded with state cost-share and WQIF grant funds				
BMP	Unit	Total In IP	Installed	%
<b>Agricultural BMPs:</b>				
Stream Exclusion Fencing	Feet	2,307,360	96,986	4.2
Riparian Buffer Established	Acre		76	
Livestock Exclusion Systems (LE-1T, LE-2T, SL-6AT, SL-6, CRSL-6)	System	1,072	33	3.1
Stream Protection Systems (WP-2T, m WP-2)	System		1	
Pasture Management	Acre	53,621		
Reforestation of erodible crop and pastureland (FR-1)	Acre	283		
Woodland buffer filter area (FR-3)	Acres		2.5	
Manure Incorporation	Acre	569		
Vegetative Buffer on Cropland (SL-1)	Acre	283	170.6	60.3
<b>Residential BMPs:</b>				
Confined Canine Unit Treatment	System	20		
Pet waste Composters	System	4,211		
Septic System Pump Out (RB-1)	System		66	
Septic System Repair (RB-3)	System	443	30	6.8
Septic System Installation (RB-4)	System	673	23	3.4
Alternative Waste Treatment (RB-5)	System	230		

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at least 76 acres of vegetated riparian buffer. All together the project has completed 119 residential septic projects, including 66 septic tank pump-outs and the repair or replacement of 53 failing/failed septic systems or straight pipes.

The pollution reductions as a result of the BMPs installed included below are only for 319(h) funded practices.

<b>Pollution Reductions for the Upper Hazel River TMDL Project (January 2009-June 2010)</b>				
<b>Period</b>	<b>Pathogens (Coliform) CFU</b>	<b>Nitrogen Lbs/year</b>	<b>Phosphorus Lbs/year</b>	<b>Sedimentation-Siltation tons/year</b>
January 2009-June 2009	Not available	Not available	Not available	Not available
July 2009-June 2010	1.66E+15	866.037	130.11	146.07
<b>TOTAL</b>	<b>1.66E+15</b>	<b>866.037</b>	<b>130.11</b>	<b>146.07</b>