

---

# COMMONWEALTH of VIRGINIA

## **2012 Clean Water Act Section 319 Nonpoint Source Pollution Management Program Annual Report**

**and**

## **2012 Progress Report on the ‘Chesapeake Bay and Virginia Waters Cleanup Plan’**

**July 1, 2011 – June 30, 2012**

## **Supplement: TMDL Watershed Implementation Progress Summary**

**April 2013**

Department of Conservation and Recreation  
Division of Soil and Water Conservation  
600 E. Main St., 24th Floor  
Richmond, VA 23219-2094  
(804) 786-2064



# TABLE OF CONTENTS

**EXECUTIVE SUMMARY** ..... III

## **INTRODUCTION: NONPOINT SOURCE POLLUTION MANAGEMENT PROGRAM**

NONPOINT SOURCE POLLUTION MANAGEMENT PROGRAM .....IV  
 FEDERAL CLEAN WATER ACTION – SECTION 319 – NONPOINT SOURCE POLLUTION .....IV  
 CHESAPEAKE BAY AND VIRGINIA WATERS CLEAN-UP AND OVERSIGHT ACT OF 2006 ( HB1150).....IV  
 WATER QUALITY INFORMATION AND RESTORATION ACT OF 1987 (WQMIRA).....IV  
 VIRGINIA WATER QUALITY IMPROVEMENT ACT OF 1997 (WQIF).....V  
 SUMMARY AND CONTENT OF THE 2012 VA NPS MANAGEMENT PROGRAM ANNUAL REPORT .....V

## **2012 SUPPLEMENTAL REPORT: TMDL IMPLEMENTATION PROGRESS SUMMARY**

### **CHAPTER 1: TMDL IMPLEMENTATION PROGRAM SUMMARY REPORT**

BACKGROUND OF TMDL IMPLEMENTATION PROGRAM ..... 1  
 TMDL IMPLEMENTATION PLANS..... 1  
 WATERSHED RESTORATION AND TMDL IMPLEMENTATION ..... 6  
     FEDERAL SECTION 319 PROJECTS ..... 6  
     STATE FUNDED WQIF TARGETED TMDL PROJECTS ..... 6  
 VIRGINIA’S TMDL IMPLEMENTATION PROGRAM IN 2012 ..... 7  
     FUNDING OF IMPLEMENTATION..... 8  
     BMP IMPLEMENTATION AND POLLUTION REDUCTIONS ..... 10  
 WATER QUALITY IMPROVEMENTS, WATERSHED RESTORATION, DELISTING AND FUTURE ACTIONS ..... 12

### **CHAPTER 2: PROGRESS REPORTS FOR TMDL IMPLEMENTATION PROJECTS**

CONTENTS ..... 13

#### ***Federal Section 319(h) TMDL Implementation: Closed Projects – Final Reports***

UPPER BLACKWATER RIVER PROJECT: SEPTEMBER 2001 – DECEMBER 2008 ..... 14  
 THREE CREEKS (MIDDLE FORK HOLSTON RIVER) PROJECT: SEPTEMBER 2001 – DECEMBER 2008 ..... 19  
 NORTH RIVER PROJECT: SEPTEMBER 2001 – DECEMBER 2008 ..... 120  
 HOLMANS CREEK PROJECT: JANUARY 2005 – JUNE 2008 ..... 23  
 CATOCTIN CREEK PROJECT: SEPTEMBER 2004 – DECEMBER 2009 ..... 26  
 COOKS CREEK AND BLACKS RUN PROJECT: MAY 2006- JUNE 2012 ..... 29  
 MILL AND DODD CREEKS: JANUARY 2007- DECEMBER 2011 ..... 33  
 LITTLE AND BEAVER CREEKS PROJECT: JANUARY 2007- JUNE 2012..... 36

#### ***Federal Section 319(h) TMDL Implementation: Current Projects***

BIG OTTER RIVER PROJECT: JULY 2006-JUNE 2012..... 39  
 UPPER HAZEL RIVER PROJECT: JULY 2009-JUNE 2012 ..... 40  
 LOONEY CREEK PROJECT: JULY 2009-JUNE 2012..... 41  
 LOWER BLACKWATER RIVER PROJECT: JANUARY 2006-JUNE 2012 ..... 42

MILL AND HAWKSBILL CREEKS PROJECT: JANUARY 2008-JUNE 2012 ..... 43  
THUMB, DEEP, CARTER AND GREAT RUNS PROJECT: JULY 2006-JUNE 2012 ..... 44  
WILLIS RIVER PROJECT: JULY 2005-JUNE 2012 ..... 45  
SLATE RIVER PROJECT: JULY 2011-JUNE 2012..... 47  
MOORES CREEK PROJECT: JANUARY 2012-JUNE 2012..... 49  
SMITH CREEK PROJECT: JANUARY 2012-JUNE 2012..... 50  
CRAIG, BROWN AND MARSH RUNS PROJECT: JANUARY 2012-JUNE 2012 ..... 51

***WQIF Targeted TMDL Implementation Projects:***

CHRISTIANS CREEK AND SOUTH RIVER TMDL IMPLEMENTATION PROJECT ..... 52  
MOFFETT CREEK, MIDDLE RIVER AND POLECAT DRAFT TMDL IMPLEMENTATION PROJECT ..... 53  
MOSSY CREEK, LONG GLADE RUN AND NAKED CREEK TMDL IMPLEMENTATION PROJECT ..... 54  
FALLING RIVER TMDL IMPLEMENTATION PROJECT ..... 55  
PIGG RIVER TMDL IMPLEMENTATION PROJECT (BLUE RIDGE SWCD)..... 56  
PIGG RIVER TMDL IMPLEMENTATION PROJECT (PITTSYLVANIA SWCD) ..... 57  
FLAT, NIBBS, DEEP AND WEST CREEKS TMDL IMPLEMENTATION PROJECT ..... 58  
SPRING, BRIERY AND SAYLERS CREEKS, LITTLE SANDY AND BUSCH RIVERS TMDL IMPLEMENTATION PROJECT ..... 59  
BLUESTONE RIVER TMDL IMPLEMENTATION PROJECT ..... 60  
UPPER CLINCH RIVER TMDL IMPLEMENTATION PROJECT ..... 61  
ASH CAMP AND TWITTYS CREEKS TMDL IMPLEMENTATION PROJECT ..... 62  
CUB, TURNIP AND BUFFALO CREEKS TMDL IMPLEMENTATION PROJECT ..... 63

**GLOSSARY OF ACRONYMS** ..... 64

## 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 (NPS) management program activities undertaken by DCR and cooperating agencies during Virginia fiscal year 2012. These activities include nonpoint source pollution management program (NPSPMP) implementation, agricultural cost-share funding allocations and best management practice (BMP) implementation, support for other NPS programs, 2011-2012 grant awards for NPS programs and projects, and planned use of recent funding. This Executive Summary includes highlights from the 2012 Chesapeake Bay and Virginia Waters Clean-up Plan (CBVWCP) as well as the 2012 Total Maximum Daily Load (TMDL) Implementation Supplement.

- **Water Quality Improvement Fund and Cooperative Nonpoint Source Pollution Programs:** During FY12, the Department of Conservation and Recreation contracted \$27.5 million to local Soil and Water Conservation Districts to cost-share the installation of agricultural best management practices. During FY 2012, WQIF funding supported agricultural BMPs that are expected to reduce edge of field nutrient and sediment losses by almost 2.8 million pounds nitrogen, 934,680 pounds phosphorus, and 699,981 tons of sediment. In addition, this funding supported statewide CREP implementation. CREP is expected to reduce annual nitrogen loads to waterways by 864,567 pounds of nitrogen, phosphorous by 167,375 pounds, and sediment by more than 159,326 tons.
- **TMDL Implementation Planning:** From July 1, 2011 thru June 30, 2012 Virginia developed six implementation plans. Since 2000, Virginia has completed 58 TMDL implementation plans addressing over 233 impairments.
- **TMDL Implementation Activities:**
- From January 1, 2011 thru June 30, 2012 there were 28 implementation projects supported by Federal EPA §319(h) funding, state WQIF and/or state VNRFCF. Collectively these projects spent \$2,276,065 of cost-share funds implementing 381 agricultural and residential BMPs. This included 267 BMPs funded with 319(h), 44 BMPs funded with VNRFCF (these were in 319 project areas) and 70 BMPs funded thru WQIF. This implementation resulted in over 365,131 feet of stream exclusion, and the reduction of 2.72041E+16 colony forming units (CFU) of fecal coliform bacteria, 107,732 pounds of nitrogen, 19,838 pounds of phosphorous, and 19,440 tons of sediment.

## **INTRODUCTION: NONPOINT SOURCE POLLUTION MANAGEMENT PROGRAM**

### ***Nonpoint Source Pollution Management Program***

Virginia's Nonpoint Source Pollution (NPS) 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, streams and estuaries by promoting and funding state and local watershed planning efforts, stream and wetland restoration and protection, education and outreach, and other measures to reduce and prevent NPS pollution 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 and non-federal grant 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 NPS Pollution Management Program.

### ***Federal Clean Water Act – Section 319 – Nonpoint Source Pollution***

Section 319 of the Federal Clean Water Act (CWA) requires that states develop and implement NPS pollution management programs. Section 10.1-104.1 of the Code of Virginia designates DCR as the lead agency for the Commonwealth's NPS pollution management program. This section assigns responsibility to DCR for the distribution of funds, identification and establishment of priorities of NPS related water quality problems, and the administration of an NPS advisory committee. In 1999, the EPA approved Virginia's NPS Pollution Management Program Plan. In 2006, state legislation was passed (House Bill 1150) directing the Commonwealth to develop a plan to address water quality impairments and protect the waters from further degradation. In 2008, it was decided that the plan established by this new legislation, the "Chesapeake Bay and Virginia Waters Clean-up Plan," (referenced as the Cleanup Plan) would serve as the update to the Commonwealth's NPS Pollution Program 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 (GA) 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 EPA. Subsequently the plan also addresses the protection of water resources not yet impaired by pollution. The resulting Cleanup 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 GA in 2007. The plan was last updated in June 2009. A progress report is produced annually as well. The latest status report was presented by the Secretary of Natural Resources of the Commonwealth of Virginia to members of the GA of Virginia in December 2012. It should be noted that this plan is very comprehensive in nature and 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. As noted the above section on the CWA Section 319 program, the relevant portions of Cleanup Plan are now considered Virginia's NPS Pollution Management Program Plan. EPA Region 3 NPS Program staff has reviewed the Cleanup Plan for its appropriateness to serve as Virginia's NPS Pollution Management Program Plan. Throughout this document the progress of this plan will be highlighted.

### ***Water Quality Monitoring, Information and Restoration Act of 1997***

In 1997, the Virginia General Assembly enacted the Water Quality Monitoring, Information, and Restoration Act (WQMIRA), §62.1-44.19:4 through 19:8 of the Code of Virginia. This statute directs the Department of Conservation and Recreation (DEQ) to develop a list of impaired waters, a Total Maximum Daily Load (TMDL) for each

impairment, and implementation plans for these TMDLs. WQMIRA directs the Virginia Department of Environmental Quality (DEQ) to “develop and implement a plan to achieve fully supporting status for impaired waters.” In order for IPs to be approved by the Commonwealth, they must meet the requirements as outlined by WQMIRA.

### ***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 GA 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 was the principle 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” (SR); 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 WQIA, 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. In 2009 the Virginia General Assembly created the Virginia Natural Resources Commitment Fund (VNRFCF) which is a sub-fund of WQIF specifically set-aside for agricultural cost-share program and practices.

### ***Summary of the 2012 Virginia NPS Pollution Management Program Annual Report***

The 2012 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 Progress Report” and the second part is the “TMDL Implementation Supplement”. As stated previously, Virginia has a NPS planning document called the Chesapeake Bay Virginia Waters Cleanup Plan that has progress reports and strategy updates submitted to the Virginia GA on an annual basis. The annual NPS report requirement will be fulfilled by the annual progress report for the Cleanup Plan. The second part of the NPS annual report is a supplement describing the progress made in watershed TMDL implementation. This report is a comprehensive summary of the activities accomplished by the Commonwealth in TMDL implementation plan development and implementation.

## **2012 NPS ANNUAL TMDL 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 (CD) the development of TMDL implementation plans (IPs) and the implementation of TMDLs through focused watershed restoration. To meet the NPS annual reporting requirement for 2012 and to summarize the activities from July 1, 2011 through June 30, 2012 (FY12), DCR has developed this ***TMDL Implementation Program Summary Report***. This report summarizes the accomplishments of the TMDL implementation program, focusing on Virginia's fiscal year 2012. Additional information regarding this program can be found in Chapter 2, which contains case studies of both the state Water Quality Improvement Fund (WQIF) and Federal Section 319 funded TMDL implementation projects. This year DCR officially closed eight previously funded TMDL implementation projects, summaries of those projects are included in Chapter 2.

#### ***TMDL Implementation 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 TMDLs.

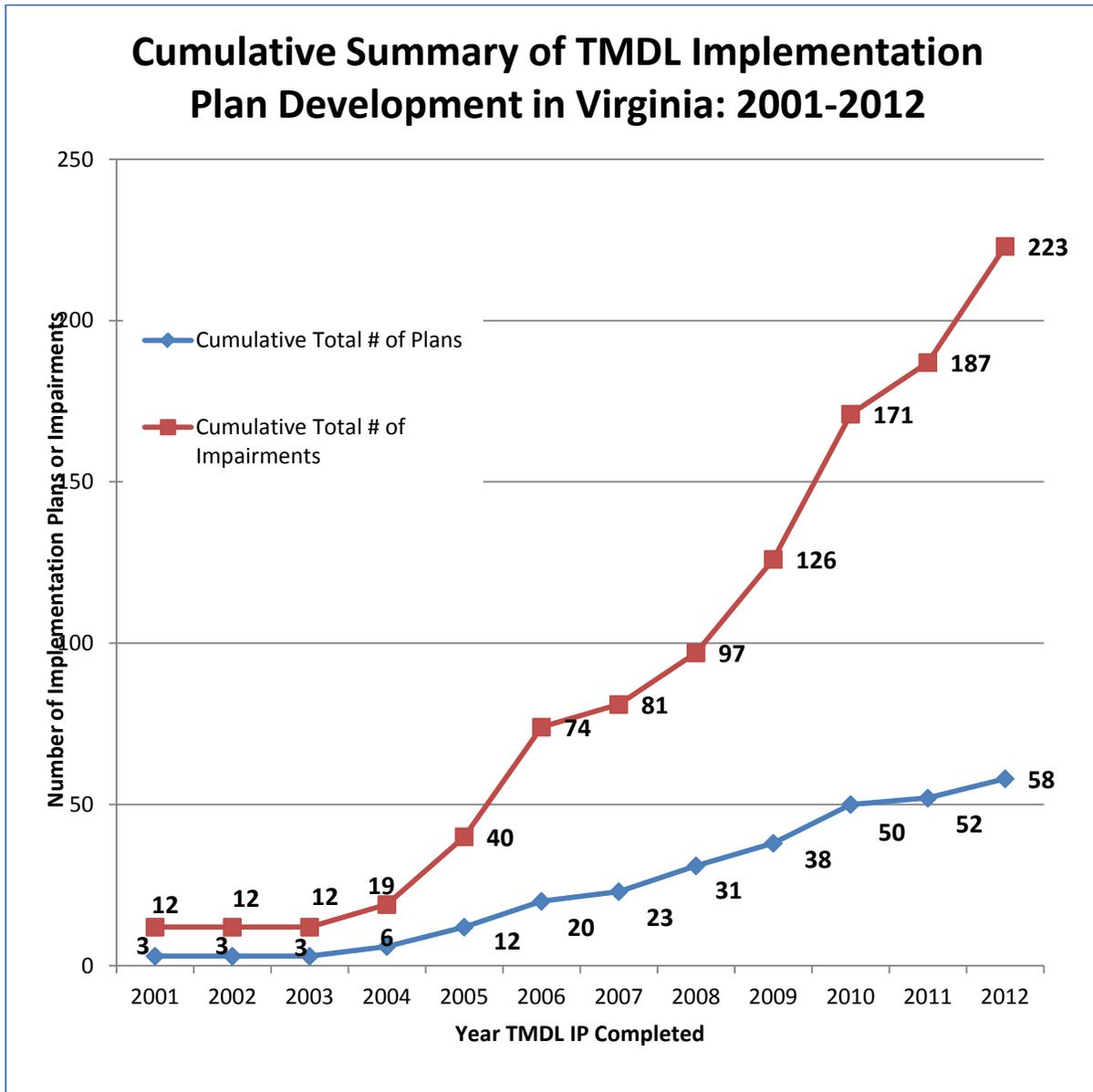
The goal of TMDL program is to achieve attainment of water quality standards. The Commonwealth achieves this goal by means of a three-phase process: TMDL development, development of TMDL IPs and/or permit conditions, and implementation of permit conditions and/or best management practices. TMDL reports, implementation plans and implementation progress updates are available on the Department of Environmental Quality's (DEQ) TMDL website at <http://www.deq.state.va.us/Programs/Water/WaterQualityInformationTMDLs/TMDL.aspx>.

#### ***TMDL Implementation Plans***

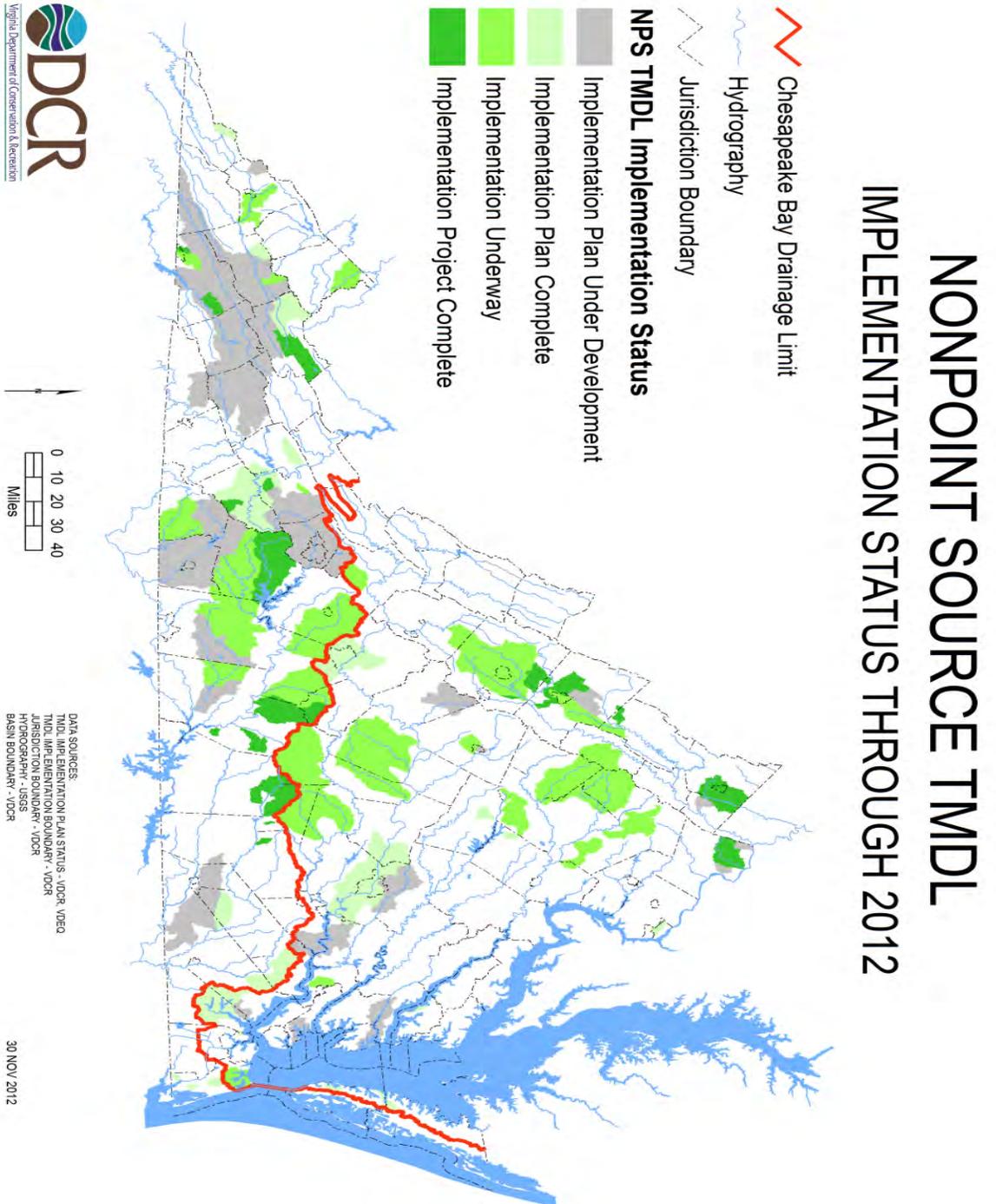
Virginia state law, WQMIRA, requires the development of a TMDL IP after a TMDL is developed and approved by EPA. The IP describes the measures that must be taken to meet the TMDL, and includes a, estimated costs, and a monitoring plan. In FY2012, DCR, DEQ and other partners developed six IPs covering 46 impaired segments. In addition, 11 implementation plans covering 58 impaired segments (see Table I-1) were started in 2012, but were not completed by the end of the fiscal year. Since 2000, Virginia has completed 58 IPs, addressing 210 TMDL impaired stream segments and 233 impairments.

Figures I-1 summarizes TMDL implementation plan development in Virginia since 2001. In the majority of cases, watersheds that have a completed implementation plan also have TMDL implementation projects underway. A summary of completed TMDL implementation plans is provided in Table I-1, while Figure I-2 shows the location of TMDL planning/implementation watersheds across the state.

Figure I-1. Cumulative summary of TMDL Implementation Plan development



Map I-1. Status of TMDL Implementation planning in Virginia



**Table I-1.** Completed TMDL Implementation Plans, January 2001- June 2012

Watershed (# of impairments / # of impaired segments)	Location (county or city)	Impairment	Lead	Completion date
Middle Fork Holston (3/3)	Washington	Bc	DCR	2001 (a)
North River (Muddy, Lower Dry, Pleasant, and Mill Creek) (5/4)	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 (9/9)	Multiple Counties	Bc	DEQ*	2005
Moores Creek (1/1)	Charlottesville, Albemarle	Bc	DEQ*	2005 (c)
Guest River (5/5)	Wise, Scott, Dickenson	Be	DEQ*	2005 (a,c)
Lower Blackwater, Maggoddee and Gills Creek (3/3)	Franklin	Bc	DCR*	2005 (a,b)
Lynnhaven (shellfish) (2/2)	VA Beach	Bc	DEQ*	2005 (c)
Cooks Creek and Blacks Run (6/2)	Rockingham, Harrisonburg	Bc, Be	DCR	2006 (a,b,c,d)
Thumb, Deep, Carter and Great Runs (4/4)	Fauquier, Stafford	Bc	DCR	2006 (a,b)
Big Otter (8/8)	Bedford, Campbell	Bc	DCR	2006 (a,b,c)
Mill and Dodd Creeks (2/2)	Floyd, Montgomery	Bc	DCR	2006 (a)
Little and Beaver Creek (3/2)	Bristol, Washington	Bc, Be	DCR	2006 (a,b,c)
Stroubles Creek (1/1)	Montgomery	Be	DEQ*	2006 (c)
Back Creek (2/1)	Pulaski	Bc, Be	DEQ*	2006/2007
Abrams and Opequon Creek (8/5)	Frederick, Winchester	Bc, Be	DEQ*	2006 (b)
Knox and PawPaw Creek (4/2)	Buchanan	Bc, Be	DEQ*	2007 (a)
Hawksbill and 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, Appomattox	Bc	DCR	2008 (b)
Dumps Creek (2/1)	Russell	TSS, TDS	DEQ*	2008
Bluestone River (1/2)	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, Briery Creek, Bush River, Little Sandy River and Sayers Creek (5/5)	Prince Edward, Amelia	Bc	DCR	2008 (b)
Appomattox River – Flat, Nibbs, Deep and West Creeks (4/4)	Amelia, 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 (5/3)	Augusta, Rockingham	Bc, Be (sed)	DCR	2009 (b)
Back Bay Watershed (1/1)	City of Virginia Beach	Bc	DEQ*	2009
North Landing Watershed (4/4)	City of Virginia Beach	Bc	DEQ*	2009
Pigg River and Old Womans Creek (8/8)	Franklin, Pittsylvania	Bc	DEQ	2009 (b,c)
Cub, Turnip, Buffalo and UT Buffalo Creeks (4/4)	Appomattox, 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)(3/2)	Lancaster	Bc	DCR*	2010
Ash Camp and Twitty's Creek (2/2)	Charlotte	Be (sed)	DCR*	2010 (b)
Upper & Lower Middle River, Moffett Creek & Polecat Draft (7/5)	Augusta	Bc, Be (sed)	DCR	2010 (b)
Mill and Powhatan Creek (2/2)	James City County	Bc	DEQ*	2010
Lewis Creek (1/1)	Russell	Be (sed)	DCR	2010 (a,c)
Browns, Craig and Marsh Runs (3/3)	Fauquier	Bc	DCR	2010 (a, b,c)
Little Dark Run and Robinson River (3/3)	Culpeper & Madison	Bc	DCR	2010 (b,c)
Rock Island, Austin, Frisby, Troublesome Creeks, North and Slate Rivers (6/6)	Buckingham	Bc	DCR	2010 (a)
Hays, Moffatts, Otts and Walker Creeks (4/4)	Augusta & Rockbridge	Bc	DCR*	2010 (c)
Christians Creek and South River (6/3)	Augusta & Waynesboro	Bc, Be (sed)	DCR	2010 (b)

South James River, Ivy, Tomahawk, Burton, Judith, Fishing, Blackwater and Beaver Creeks (8/8)	Campbell, Bedford, Amherst, Lynchburg	Bc	DEQ	2010
Nansemond River, Shingle Creek (3/3)	Suffolk	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 Whitethorn Creeks (5/5)	Pittsylvania	Bc	DCR	2011(b)
York Basin Watersheds – Beaver Creek, Goldmine Creek, Mountain Run, Pamunkey Creek, Plentiful Creek, Terry's Run (6/6)	Louisa, Orange, Spotsylvania	Bc	DCR	2011(a)
James River Watersheds- James River and Bernards, Powhite Reedy, Gilles, Almond, Goode, Falling and Noname Creeks (10/10)	Chesterfield, Powatan, Henrico, Richmond	Bc	DEQ	2011 (d)
Little River Watershed – Little River, Meadow Run, Pine, West Fork Dodd, Dodd, Meadow, Brush, Laurel, Big Indian Creeks (26/26)	Montgomery & Floyd	Bc, Be (sed), Temp	DEQ	2012
Clinch River: Coal, Middle, and Plum Creeks (7/7)	Tazewell	Bc, Be (sed)	DEQ	2012
Hoffler Creek (1/1)	Suffolk & Portsmouth	Bc	DEQ	2012
Mill Creek (1/1)	Northampton	Be (DO, pH)	DEQ	2012
Linville Creek (2/1)	Rockingham	Bc, Be (sed)	DCR	UD
Middle Fork Holston River & Wolf Creek (8/6)	Abingdon, Smyth, Washington, Wythe	Bc, Be (sed)	DCR	UD
Spout Run (4/3)	Clarke	Bc, Be (sed)	DCR	UD
Piankatank River, Milford Haven, Gwynns Island (16/16)	Matthews, Middlesex, Gloucester	Bc	DCR	UD
Mill Creek, Cove Creek, Miller Creek, Stony Fork, Tate Run, S.F. Reed Creek, Reed Creek (9/9)	Wythe	Bc	DEQ	UD
Turley Creek, Long Meadow (2/2)	Rockingham	Be (sed)	DEQ	UD
Rockfish River (4/4)	Nelson	Bc, Be (sed)	DEQ	UD
Moore's Creek, Lodge Creek, Meadows Creek and Schenks Branch (4/4)	Albemarle and Charlottesville	Be (sed)	DEQ	UD
Lower Banister River, Polecat Creek, Sandy Creek	Halifax, Pittsylvania	Bc	DCR	UD
Beaverdam, Boatwain Creek, Chickahominy River, Collins Run, Stony Run	Hanover, Henrico, Charles City, Richmondv	Bc	DEQ	UD
Darden Mill Run, Mill Swamp, Three Creek		Bc	DEQ	UD
<b>Total IPs Completed: 58 Plans, 233 Impairments, 210 Impaired segments; Total IPs Under Development (UD): 11 IPs, 62 impairments, and 58 impaired segments.</b>				

Impairment types: Bc = bacteria, Bn = Benthic, TSS = Total suspended solids, TDS = Total dissolved solids, Sed = sediment

NOTE: All IPs were funded by 319(h) except those done in house by either DCR or DEQ, indicated by an (\*). For all completed IPs, as of 6/30/12, 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 other non 319 and non state grants (e.g. 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, identified in TMDL IPs, which will result in water quality improvements and subsequent delisting of impaired streams. Virginia uses a staged approach that 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.

From January 1, 2011 thru June 30, 2012 there were 28 implementation projects supported by Federal EPA §319(h) funding, state WQIF and/or state Virginia Natural Resources Conservation Fund (VNRFCF). Collectively these projects spent \$2,276,065 of cost-share funds implementing 381 agricultural and residential BMPs. This included 267 BMPs funded with 319(h), 44 BMPs funded with VNRFCF (these were in 319 project areas) and 70 BMPs funded thru WQIF. This implementation resulted in over 365,131 feet of stream exclusion, and the reduction of 2.72041E+16 colony forming units (CFU) of fecal coliform bacteria, 107,732 pounds of nitrogen, 19,838 pounds of phosphorous, and 19,440 tons of sediment.

**Federal §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 Upper Blackwater River, Middle Fork Holston River, and North River. The first two projects ended in 2007 while the North River finished in August 2008. Since initiation of these pilot projects, DCR has initiated a total of 18 additional TMDL implementation projects across the state (Table I-2) with 319(h) funding. In addition, as of June 2012 DCR has completed and closed implementation for eight projects. More information on closed projects can be found in Chapter 2. In 2012 implementation was started in 4 project areas (Smith Creek Watershed, Moores Creek Watershed, Craig, Brown and Marsh Runs Watershed, and Lewis Creek Watershed).

These projects are primarily funded with Section 319 federal funds; however, several projects have also received non-federal money to fund urban and/or septic BMP installation (Hazel River, Big Otter River, Cooks Creek and Blacks Run, Little and Beaver Creek, etc.). In addition DCR was successful in securing over \$4.5 million of state VNRFCF to augment federal 319 funds for agricultural BMPs. In 2012 a total of 13 projects were implemented using Federal 319 funds; of these projects eight (Big Otter, Little and Beaver Creeks, Thumb/Deep/Carter/Great Runs, Lower Blackwater River, Hazel River, Craig/Brown/Marsh Runs, Moores Creek, Lewis Creek and Guest River) received state WQIF money to fund agricultural practices. It is hoped that DCR will eventually fund all agricultural practices for TMDL implementation projects using non-319 sources (state cost-share, Natural Resources Conservation Service (NRCS), private funds, etc.), while 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 WQIF. These projects were the start of the state's "WQIF Targeted TMDL" program. Currently these projects receive funding for agricultural practices through the state cost-share program, while several project sponsors have pursued competitive grant funds to implement urban and septic management practices. 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. Implementation on most of these projects will continue through the end of 2012.

**Virginia's TMDL Implementation Program in 2012**

As of June 2012, Virginia's TMDL Implementation Program includes 21 implementation projects currently or previously funded with Federal 319(h) funds as well as some state funds (Table I-2, sections A and B), 2 projects that received one time allotments of a variety of federal, state, local and non-profit sources (Table I-2, section C) and 14 projects (section D) receiving state funds for agricultural implementation.

**Table I-2. Summary of Virginia TMDL Implementation, January 2001-June 2012**

Watershed Area	TMDL Segment	Status	Years of Implementation	Lead Agency	Funds Used
<b>A. Eight projects received 5-7 years of continuous funding from 319(h) administered by DCR. These projects are no longer receiving DCR TMDL funds, but may continue to receive funding from other sources.</b>					
Middle Fork Holston River	VAS-005R	Moderate improvement, Success Story 2005	2001-2008	DCR	\$319(h)
Upper Blackwater	LAW-L08R	Some improvement	2001-2007	DCR	\$319(h)
North River	VAN-B21R, B22R, B27R, B29R	Improvement, Muddy Creek delisted for nitrate-N 2010	2001-2008	DCR	\$319(h)
Holmans Creek	VAV-B45R	Some improvement	2005-2008	DCR	\$319(h)
Catoctin Creek	VAN-A-02R	Some improvement	2005-2009	DCR	\$319(h)
Cooks Creek and Blacks Run	VAV-B25R, B26R	Some improvement	2006-2012	DCR	\$319 RFP, NFWF
Mill and Dodd Creeks	VAW-N20R, N21R	None reported	2007-2011	DCR	\$319 & VNRCF
Little and Beaver Creeks	VAS-007	None reported	2007-2012	DCR	\$319, VNRCF, RFP
<b>B. Thirteen projects funded by Federal 319(h) as well as State WQIF and VNRCF administered by DCR between July 2011 and June 2012</b>					
Big Otter River	VAW-L23R, L25R, L27R, L28R	Improvement, segment delisted 2008	2006-2012	DCR	\$319, VNRCF, RFP
Lower Blackwater	VAW-L09R, L10R and L11R	Some improvement, candidate for delisting 2008	2006-2012	DCR	\$319(h), VNRCF
Willis River	VAC-H36R	Improvement, Delisted (3), Success Story 2010	2005-2013	DCR	\$319(h), VNRCF
Thumb, Great, Carter and Deep Runs	VAN-E01R, E02R & E10R	Some improvement, Carter Run identified for Success Story, possible delisting	2006-2013	DCR	\$319(h), VNRCF
Hawksbill and Mill Creeks	VAN-B38R, B39R	Too Early	2008-2012	DCR	\$319(h), VNRCF
Looney Creek	VAW-I26R	Too Early	2009-2013	DCR	\$319, VNRCF
Hazel River	VAN-E03R, E04R, E05R	Too Early	2009-2013	DCR	\$319, VNRCF, WQIF RFP
Slate River and Rock Island Creek	VAC-H11R, H21R, H22R	Too Early	2010-2014	DCR	\$319, VNRCF
Craig Run, Browns Run and Marsh Run	VAN-E08R	Too Early	2012-2014, special funding since 2011	DCR	\$319(h), VNRCF, VNCR-CBLEI
Moores Creek	VAV-H28R	Some improvement	2012-2014 (sporadically since 2005)	DCR	\$319, VNRCF, WQIF RFP
Smith Creek	VAV-1347R	Too Early	2012-2014, 2008+ for NRCS	DCR	\$319(h), NRCS
Guest River	VAS-P11R	None reported	20,12-2014 (sporadically since 2005)	DCR	\$319, VNRCF, WQIF RFP
Lewis Creek		Too Early	2012-2014	DCR	\$319(h), VNRCF
Total projects initiated = 37, under implementation w/ 319 funds (A&B) = 21, Implemented with minimal DCR funds (C) = 2, Implemented with WQIF (D) = 14, NFWF=National Fish and Wildlife Fund grant, NRCS – USDA Natural Resource Conservation Service, VNRCF=Virginia Natural					

<i>Resource Commitment Fund</i>					
<b>C. Two projects receiving minimal, one time funding through DCR (RFPs etc)</b>					
Stroubles Creek	VAW-N22R	Some Improvement	2006+	N/A	WQIF RFP
Little Dark Run and Robinson River	VAN-E15R	Too early	2011	DCR	WQIF RFP, CBLEI-TMDL (WQIF)
<b>D. Fourteen projects receiving WQIF/VNRCF funds for agricultural BMPs (and RFP for septic work)</b>					
Nottoway	VASC-K14R	N/A	2005-2009 +(Ag)	DCR	WQIF, VNRCF
Falling River	VAW-L34R	Some improvement	2007+(Ag)	DCR	WQIF, VNRCF
Mossy and Naked Creeks, Long Glade Run	VAV-B19R, B24R, B28R	Some improvement	2007+(Ag)	DCR	WQIF, VNRCF
Pigg River (Blue Ridge SWCD)	VAW-L14R, L15R, L16R, L17R	Improvement	2007+(Ag)	DCR	WQIF, VNRCF, RFP
Pigg River (Pittsylvania SWCD)	VAW-L13R, L17R, L18R	Some improvement	2007+(Ag)	DCR	WQIF, VNRCF, RFP
Twittys and Ash Camp Creeks	VAC-L39R	Inadequate data	2007+(Ag)	DCR	WQIF, VNRCF
Abrams and Opequon Creeks	VAV-B08R, B09R	N/A	2006+	DCR	WQIF, VNRCF
Cub, Turnip and Buffalo Creeks	VAC-L36R, L37R, L40R	No data	2007+(Ag)	DCR	WQIF, VNRCF
Flat, Nibbs, Deep and West Creeks	VAP-J08R, L09R, J11R	Improvement, Flat Creek identified for Success Story	2007+(Ag)	DCR	WQIF, VNRCF
Moffett Creek, Middle River, Polecat Draft	VAV-B10, B13, B15	Some improvement	2007+(Ag)	DCR	WQIF, VNRCF
Christians Creek and South River	VAV-B14, B30	Improvement	2007+(Ag)	DCR	WQIF, VNRCF
Upper Clinch River	VAS-P01R	Inadequate data	2007+(Ag)	DCR	WQIF, VNRCF
Bluestone River	VAS-N36R	Some improvement	2007+(Ag)	DCR	WQIF, VNRCF
Briery, Little Sandy, Spring, Saylers Creeks and Bush River	VAC-J02, J03, J04, J05 AND J06R	Some improvement	2007+(Ag)	DCR	WQIF, VNRCF
Total projects initiated = 37, under implementation w/ 319 funds (A&B) = 21, Implemented with minimal DCR funds (C) = 2, Implemented with WQIF (D) = 14, <i>NFWF=National Fish and Wildlife Fund grant, NRCS – USDA Natural Resource Conservation Service, VNRCF=Virginia Natural Resource Commitment Fund</i>					

### 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, which provide technical assistance with 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 resources from the Water Quality Improvement Fund and the Virginia Natural Resources Commitment Fund. This program is summarized in the 2012 Virginia Waters Cleanup Plan. A summary of targeted TMDL cost share funds spent in FY2012 is provided in Tables I-3 and I-4.

**Table I-3.** Summary of targeted TMDL cost-share funds spent on TMDL implementation: July 2011 – June 2012

Funding Source	Cost-share paid
Federal 319(h)	\$416,846
State VNRCF	\$963,826
State WOIF	\$895,393
<b>TOTAL</b>	<b>\$2,276,065</b>

Note: VNRCF cost-share was for agricultural BMPs only and was in conjunction with Federal 319(h) funded projects.

**Table I-4.** Summary of cost-share funds spent on TMDL implementation by TMDL watershed: July 2011 – June 2012

TMDL Watershed	BMPs	Cost-share Funding	Match
Beaver Creek and Little Creek	8	\$ 33,698.42	\$ 200.00
Big Otter River Watershed	16	\$ 174,370.87	\$ 102,174.50
Carter Run, Great Run, Deep Run and Thumb Run	58	\$ 38,555.53	\$ 6,803.92
Cooks Creek and Blacks Run	7	\$ 281,321.13	\$ 120,956.79
Craig Run, Marsh Run and Browns Run	2	\$ 11,760.43	\$ 2,012.31
Dodd Creek	5	\$ 7,790.30	\$ 7,790.29
Hawksbill Creek and Mill Creek	104	\$ 15,065.16	\$ 1,469.09
James River (Slate River) Watershed	17	\$ 39,771.69	\$ 7,018.54
Looney Creek	7	\$ 23,455.79	\$ 4,139.26
Lower Blackwater River, Maggodee and Gills Creek	11	\$ 600.00	\$ 650.00
Smith Creek Watershed	6	\$ 78,856.60	\$ 24,847.90
Upper Hazel River	33	\$ 70,314.27	\$ 14,727.14
Willis River Watershed	31	\$ 123,788.04	\$ 133,775.06
Bluestone River	2	\$ 16,487.10	\$ 9,299.68
Christians Creek and South River Watersheds	3	\$ 14,582.75	\$ 8,937.03
Cub Creek, Turnip Creek and UT to Buffalo Creek	2	\$ 178,730.58	\$ 60,213.47
Cub Creek, Turnip Creek, Buffalo Creek and UT to Buffalo Creek	1	\$ 77,808.03	\$ 17,413.70
Falling River	6	\$ 45,226.96	\$ 9,687.12
Flat, Nibbs, Deep and West Creeks	8	\$ 22,328.51	\$ 32,788.33
Middle River Watershed	11	\$ 219,880.24	\$ 70,100.03
Mossy Creek, Naked Creek and Long Glade Run	2	\$ 226,750.68	\$ 41,191.31
Opequon Creek Watershed	1	\$ 10,650.00	\$ 10,912.26
Pigg River and Old Womans Creek Watersheds	13	\$ 112,523.11	\$ 20,916.68
Robinson River, Little Dark Run	6	\$ 430.69	\$ 143.56
Spring Creek, Briery Creek, Bush River, Little Sandy River and Saylers Creek	12	\$ 80,530.48	\$ 14,211.27
Twittys and Ash Camp Creeks	1	\$ 183,889.57	\$ 95,846.96
Upper Clinch River	2	\$ 73,950.17	\$ 13,015.71
Upper Nottoway River Watershed	6	\$ 112,948.13	\$ 37,283.50
<b>Grand Total</b>	<b>381</b>	<b>\$ 2,276,065.23</b>	<b>\$ 868,525.40</b>

## BMP Implementation and Pollution Reductions

Tracking both BMP implementation and water quality improvements in TMDL watersheds is critical in measuring success within the TMDL program. BMPs are effective and practical ways to prevent or reduce pollution from nonpoint sources to ensure water quality. While DCR has a highly effective BMP tracking program in place to account of BMPs installed using state or federal cost share funds, tracking BMPs installed voluntarily (without government assistance) has proven challenging. DCR is currently developing a mechanism by which voluntary practices can be accounted for; however, BMP implementation and associated pollutant reductions reported to date are largely practices installed with government cost share funds. Table I-5 provides a summary of BMPs installed in targeted TMDL project areas in FY2012, Table I-6 shows associated pollutant reductions by BMP funding source, and Table I-7 breaks down BMP implementation and pollution reductions by TMDL watershed and. An additional break down of BMP implementation by Project area can be found in Chapter 2 for specific TMDL Implementation projects.

From January 1, 2011 thru June 30, 2012, there were 28 active implementation projects jointly funded by Federal EPA §319(h), state Water Quality Improvement funds, and state Virginia Natural Resources Commitment Funds implemented 381 agricultural and residential BMPs. This implementation resulted in over 365,131 feet of stream exclusion and the reduction of 2.078E+16 colony forming units (CFU) of fecal coliform bacteria, 107,732 pounds of nitrogen, 19,838 pounds of phosphorous, and 19,440 tons of sediment.

**Table I-5.** Summary of BMP implementation for Targeted TMDL Projects from 7/1/11-6/30/12

Practice	Practice Description	Units	BMP Extent	# of BMP
FR-1	Reforestation of crop and pastureland	Acres	0	0
FR-3	Woodland buffer filter	Acres	1	0
LE-1T	Livestock exclusion with riparian buffers for TMDL implementation	Linear feet	299,605	84
LE-2T	Livestock exclusion with reduced setback for TMDL implementation	Linear feet	16,341	9
RB-1	Septic tank pumpout	System	185	185
RB-2	Connection to public sewer	System	402	402
RB-3	Septic system repair	System	40	40
RB-4	Septic system replacement	System	14	14
RB-4P	Septic system installation/replacement with pump	System	4	4
RB-5	Alternative waste treatment system	System	2	2
SL-1	Permanent vegetative cover on cropland	Acres	54	4
SL-6	Stream exclusion with grazing land management	Linear feet		1
SL-6T	Stream exclusion with grazing land management for TMDL implementation	Linear feet	22,127	15
SL-7T	Support for extension of CREP watering systems for TMDL implementation	Acres	109	7
SL-8B	Small grain cover crop for nutrient management	Acres	0	0
SL-11	Permanent Vegetative Cover on Critical Areas	Acres	1	1
WP-2T	Stream protection for TMDL implementation	Linear feet	27,058	0
WP-3	Sod waterway	Acres	0	0
WP-4	Animal waste control facility	System	1	1
WP-4B	Loafing lot management system	System	2	2
			<b>TOTAL</b>	<b>381</b>

**Table I-6.** Summary of Pollutants Reduced from 7/1/2011 - 6/30/2012 thru Targeted TMDL Implementation

Data	Federal 319(h)	State VNRFCF	State WOIF	Grand Total
Number of BMPs Installed	267	44	70	381
Total Pounds Nitrogen Reduced	18,172	41,058	48,503	107,732
Total Pounds Phosphorus	2,876	6,514	10,447	19,838
Total Tons Sediment Reduced	2,977	7,547	8,916	19,440
Total of Bacteria Reduced	3.14E+15	1.00E+16	7.64E+15	2.078E+16

Note: VNRCF was for agricultural BMPs and was in conjunction with 319(h) projects. Thus a total of 400 BMPs were installed in 319 project areas.

**Table I-7.** Summary of BMPs Installed and Pollution Reductions by TMDL Watershed from July 2011 - June 2012 through Targeted TMDL Implementation

TYPE	TMDL Watershed	BMPs	Pounds Nitrogen	Pounds Phosphorous	Pounds Sediment	Bacterial (CFU)
319H	Beaver Creek and Little Creek	8	354.78	52.28	46.68	6.94E+13
319H	Big Otter River Watershed	16	7,410.00	1,456.29	1,323.90	1.20E+15
319H	Carter Run, Great Run, Deep Run and Thumb Run	58	34,950.58	5,085.93	6,357.42	2.79E+15
319H	Cooks Creek and Blacks Run	7	75.63	-	-	1.25E+11
319H	Craig Run, Marsh Run and Browns Run	2	2.80	-	-	1.73E+14
319H	Dodd Creek	5	34.31	-	-	5.72E+10
319H	Hawksbill Creek and Mill Creek	104	2,488.14	437.51	321.70	6.93E+14
319H	James River (Slate River) Watershed	17	996.47	121.32	168.50	2.01E+14
319H	Looney Creek	7	549.66	76.44	91.00	1.21E+14
319H	Lower Blackwater River, Maggodee and Gills Creek	11	7,563.28	1,496.94	1,386.06	1.62E+15
319H	Smith Creek Watershed	6	37.11	-	-	6.22E+10
319H	Upper Hazel River	33	1,573.39	218.07	263.48	1.72E+15
319H	Willis River Watershed	31	1,569.75	206.83	267.06	2.85E+15
WQIF	Bluestone River	2	8,598.68	1,580.64	1,580.64	6.92E+13
WQIF	Christians Creek and South River Watersheds	3	502.33	99.73	92.34	1.94E+14
WQIF	Cub Creek, Turnip Creek and UT to Buffalo Creek	2	250.24	50.14	46.00	2.94E+14
WQIF	Cub Creek, Turnip Creek, Buffalo Creek and UT to Buffalo Creek	1	145.25	29.10	26.70	2.08E+14
WQIF	Falling River	6	2,035.65	355.48	374.20	4.81E+14
WQIF	Flat, Nibbs, Deep and West Creeks	8	3,713.34	1,215.90	682.60	1.45E+15
WQIF	Middle River Watershed	11	5,279.36	1,048.11	970.47	6.11E+14
WQIF	Mossy Creek, Naked Creek and Long Glade Run	2	2,256.46	447.97	414.79	6.57E+14
WQIF	Opequon Creek Watershed	1	1,534.08	248.16	282.00	2.08E+14
WQIF	Pigg River and Old Womans Creek Watersheds	13	7,821.03	1,550.66	1,437.69	1.41E+15
WQIF	Robinson River, Little Dark Run	6	1,623.84	238.80	298.50	1.73E+15
WQIF	Spring Creek, Briery Creek, Bush River, Little Sandy River and Saylers Creek	12	6,883.01	1,265.26	1,265.26	1.28E+15
WQIF	Twittys and Ash Camp Creeks	1	228.21	45.73	41.95	0.00E+00
WQIF	Upper Clinch River	2	4,012.00	737.50	737.50	1.12E+14
WQIF	Upper Nottoway River Watershed	6	5,243.07	1,773.05	963.80	6.58E+14
<b>28</b>	<b>Grand Total</b>	<b>381</b>	<b>107,732.45</b>	<b>19,837.84</b>	<b>19,440.24</b>	<b>2.08E+16</b>

Note: Some 319H funding projects also have received State VNRCF funding for agricultural BMPs. Robinson River and Little Dark Run was provided limited state resources for agricultural BMPs but did not receive full project implementation support.

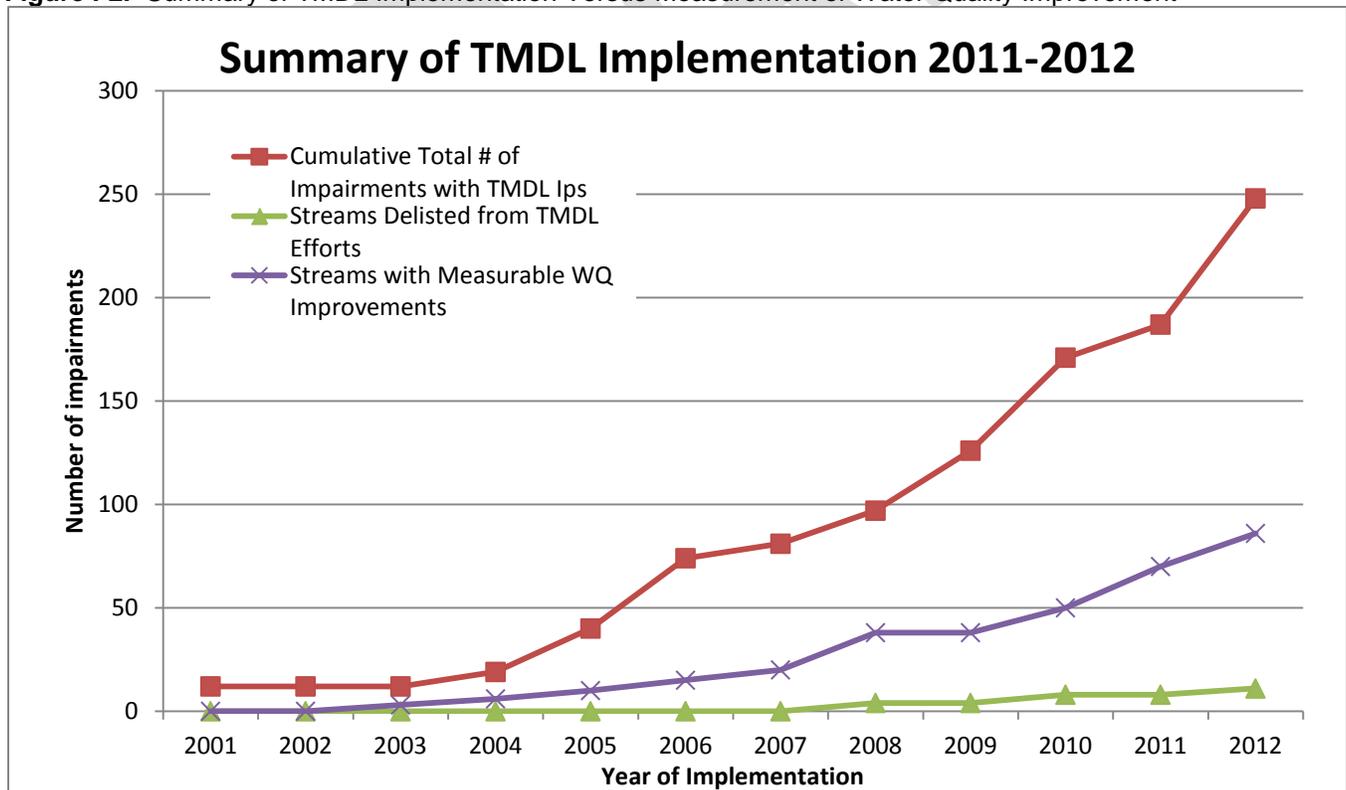
**Water Quality Improvements, Watershed Restoration, Delisting and Future Actions**

Translating TMDLs developed at an ambitious pace into actual water quality improvements is a growing challenge in the TMDL program. Virginia has been implementing TMDLs using existing nonpoint source programs and funding sources despite inadequacies in staffing 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. Virginia also offers grant funding for the implementation of BMPs and for technical assistance funding in watersheds with approved implementation plans.

Despite the challenges in attaining water quality standards, Virginia's TMDL program has shown that properly applied and maintained best management practices can result in measurable improvements in water quality (Table I-11). Virginia's natural resource agencies will continue to engage and work with watershed communities to restore their local rivers and streams using existing programs and resources, and exploring innovative ideas and funding strategies for the future.

DCR developed two Success Stories in 2012 for submittal to EPA. These include a story on the Flat Creek Watershed in Amelia and Nottoway Counties within the James River Basin. This 90,752-acre watershed has a 8.95 mile stream segment violating the primary contact recreation standard for *E. coli*. Since 2007 more than 150 agricultural BMPs have been installed in the watershed and a significant decline in violations of the bacteria standard has been observed. A story was also developed for Carter Run in Fauquier County within the Rappahannock River Basin. The primary contact recreation standard is also being violated in Carter Run. The impaired stream segment should be removed from the Impaired Waters List in 2014 based on bacteria monitoring data for the 2007 – 2012 assessment period.

**Figure I-2. Summary of TMDL Implementation Versus Measurement of Water Quality Improvement**



## CHAPTER 2: Progress Reports for TMDL Implementation Projects

This chapter provides annual and comprehensive summaries of the following TMDL implementation projects:

**Federal Section 319(h) TMDL Implementation: Closed Projects – Final Reports.** DCR began funding implementation in 2001 and over the course of the last 11-12 years eight projects have begun and have been completed. Some projects were active for longer than the original five years due to their progress. Other projects were closed after less than five years due lack of progress. The closeout reports contained here represent the final project reports for these TMDL implementation projects. These projects are funded mainly with Federal 319(h) but some projects have received supplemental state funding from state-funded Virginia Natural Resources Commitment Fund

- 1) Upper Blackwater River Project: September 2001 – December 2007
- 2) Three Creeks (Middle Fork Holston River) Project: September 2001 – December 2008
- 3) North River Project: September 2001 – December 2008
- 4) Holmans Creek Project: January 2005 – June 2008
- 5) Catoctin Creek Project: September 2004 – December 2008
- 6) Cooks Creek and Blacks Run Project: May 2006 - June 2012
- 7) Mill and Dodd Creeks: January 2007- December 2011
- 8) Little and Beaver Creeks Project: January 2007 - June 2012

**Federal Section 319(h) TMDL Implementation Projects – Current Projects:** These projects address agricultural, residential septic, urban BMP activities. These projects are funded mainly with Federal 319(h) but some projects have received supplemental state funding from either the Water Quality Improvement Fund or the Virginia Natural Resources Commitment Fund

- 1) Big Otter River Project: July 2006 - June 2012
- 2) Upper Hazel River Project: July 2009 - June 2012
- 3) Looney Creek Project: July 2009 - June 2012
- 4) Lower Blackwater River Project: January 2006 - June 2012
- 5) Mill and Hawksbill Creeks Project: January 2008 - June 2012
- 6) Thumb, Deep, Carter and Great Runs Project: July 2006 - June 2012
- 7) Willis River Project: July 2005 - June 2012
- 8) Slate River Project: July 2011 - June 2012
- 9) Moores Creek Project: January 2012 - June 2012
- 10) Smith Creek Project: January 2012 - June 2012
- 11) Craig, Brown and Marsh Runs Project: January 2012 - June 2012

**WQIF Targeted TMDL Implementation Projects:** These projects are exclusively funded by State WQIF resources to address agricultural BMPs. All projects started around July 2006 and most project were still active thru June 2012.

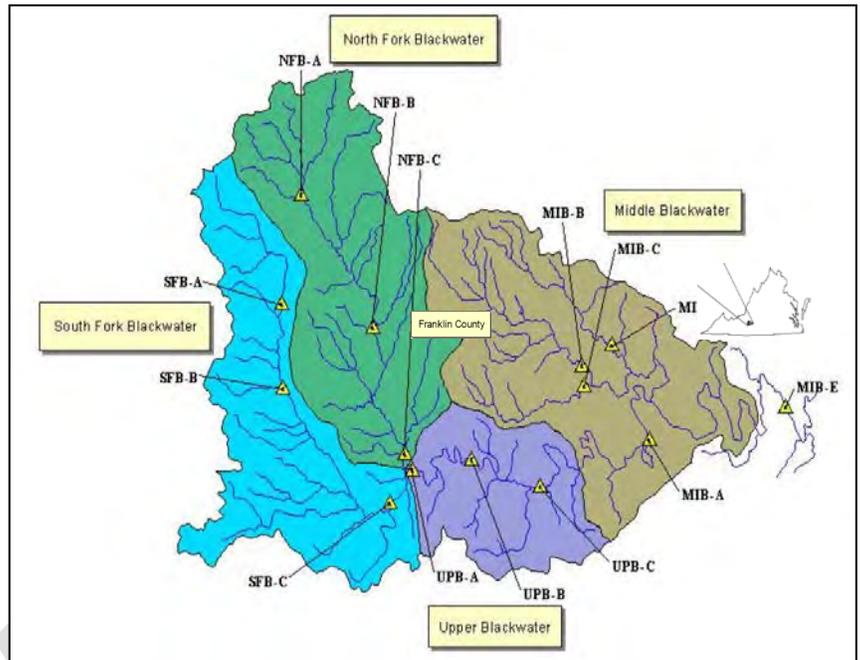
- 1) Christians Creek and South River TMDL Implementation Project
- 2) Moffett Creek, Middle River and Polecat Draft TMDL Implementation Project
- 3) Mossy Creek, Long Glade Run and Naked Creek TMDL Implementation Project
- 4) Falling River TMDL Implementation Project
- 5) Pigg River TMDL Implementation Project (Blue Ridge SWCD)
- 6) Pigg River TMDL Implementation Project (Pittsylvania SWCD)
- 7) Flat, Nibbs, Deep and West Creeks TMDL Implementation Project
- 8) Spring, Briery and Saylers Creeks, Little Sandy and Bush Rivers TMDL Implementation Project
- 9) Bluestone River TMDL Implementation Project
- 10) Upper Clinch River TMDL Implementation Project
- 11) Ash Camp and Twittys Creeks TMDL Implementation Project
- 12) Cub, Turnip and Buffalo Creeks TMDL Implementation Project

## Closeout Report: Upper Blackwater TMDL Implementation Project 2001-2007

### *Watershed Description and Water Quality Conditions*

The project area consists of 70,303 acres and focuses on a portion of the Blackwater River Watershed, located in Franklin County, Virginia approximately 15 miles south of Roanoke. The area contains four watersheds – North and South Forks of the Blackwater River, Upper Blackwater River and Middle Blackwater River, which ultimately drain into Smith Mountain Lake, a reservoir of the Roanoke River. The Roanoke River flows southeast through two additional reservoirs, eventually emptying into the Abermarle Sound.

In 1998, the North Fork, South Fork, Upper and Middle Blackwater River were placed on the Virginia 303(d) List of Impaired Waters for violations of the fecal coliform water quality standard, and the North Fork and Upper Blackwater were listed for violations of the general standard – benthic impairments. The fecal coliform TMDLs were completed in 2000 and the benthic TMDLs were approved in 2004. The implementation project was begun by the Department of Conservation and Recreation in conjunction with the Blue Ridge Soil and Water Conservation District in 2001, funded entirely with Section 319H funds, and ended in 2007.



### *Summary of Implementation Activity*

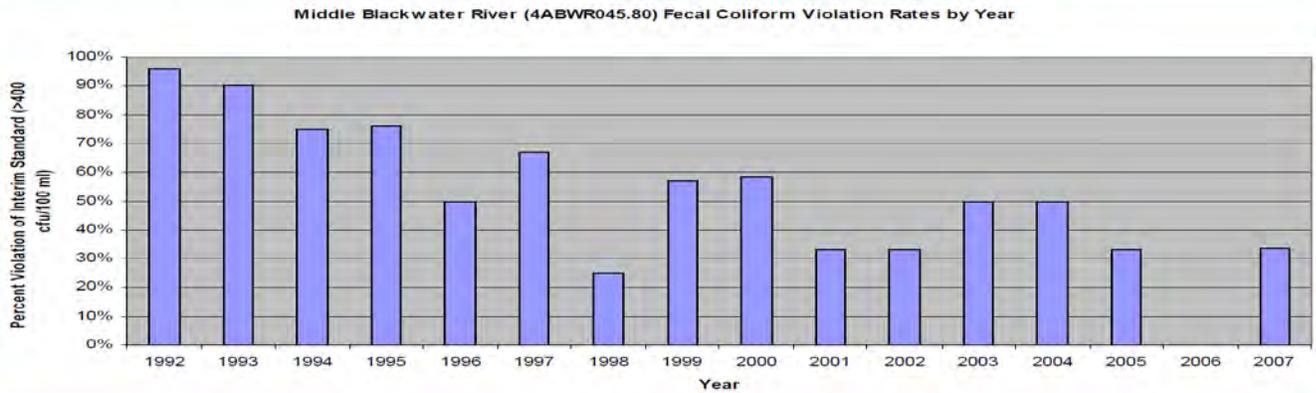
During the 2001- 2007 project period this project lagged in BMP implementation, especially in the agricultural program. Only 10 stream exclusion fencing miles out of the 74 mile goal were installed (14%). Six loafing lot management systems and three animal waste control facilities were installed at local dairies.

The residential program did have telling success with the installation of 27 new septic systems to replace failing systems, three septic systems were repaired, one failing septic was replaced with an alternative waste treatment system, and one failing system was connected to public sewer. This resulted in the correction of 32 on-site sewage disposal systems or straight pipes that were sources of human bacteria in the Upper Blackwater watershed. The implementation plan had documented that only 15 systems needed to be corrected.

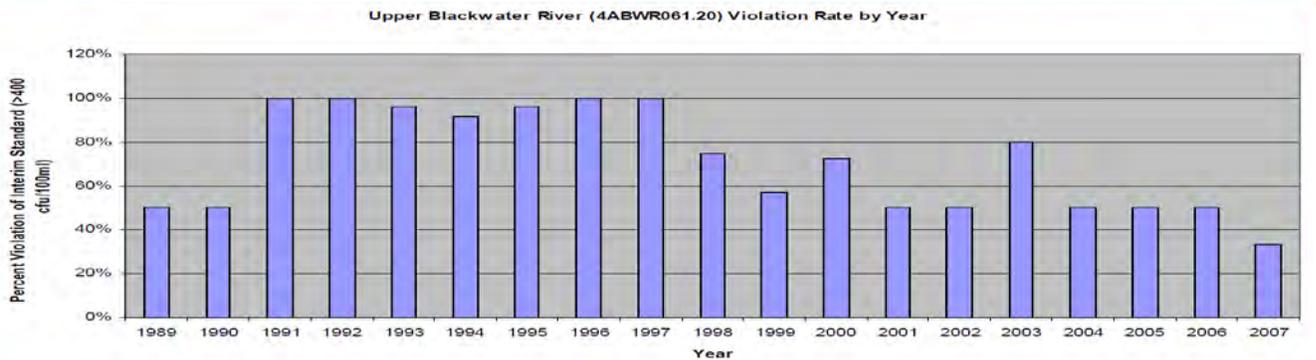
### *Summary of Water Quality Impacts*

While none of the four impaired stream segments were de-listed, the mainstem of the Blackwater River has demonstrated a decreasing trend in the bacteria standard violation rate over time. Monitoring results at station 4ABWR045.80 at river mile 45.80 in the Middle Blackwater indicated the 400 cfu/100 ml fecal coliform standard being violated 32% when the implementation project began in 2002 and the violation rate in 2007 was at 32%. However, the trend for the 15-year period of 1992 – 2007 does indicate a decreasing trend in the bacteria violation rate.

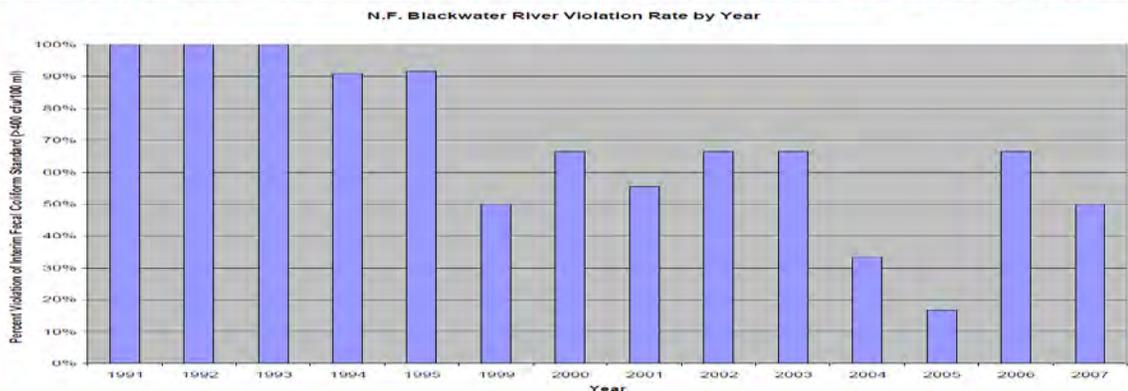
## Blackwater River Monitoring Station at Rt. 812 SE of Gogginsville



## Blackwater River Monitoring Station at Rt. 641 Bridge East of Callaway



## North Fork Blackwater River Monitoring Station at Rt. 740 Bridge SW of Retreat



Considering the levels of BMP implementation, technical assistance funds invested, and water quality monitoring results; DCR decided to discontinue targeted 319 funding to the Upper Blackwater River project area in 2008 due to several reasons which included:

- Poor implementation progress for the agricultural program.
- BRSWCD had taken on another 319-funded TMDL implementation project in the Lower Blackwater River in Franklin County (spring of 2006).
- Water quality monitoring results indicated that none of the four impaired stream segments North Fork, South Fork, Upper or Middle of the Blackwater River watershed were likely to be de-listed for bacteria in the near future.
- The BRSWCD historically has been well funded through the state's Agricultural Cost-Share Program and state funding should be adequate to handle implementation of future agricultural BMPs in the subject watersheds.

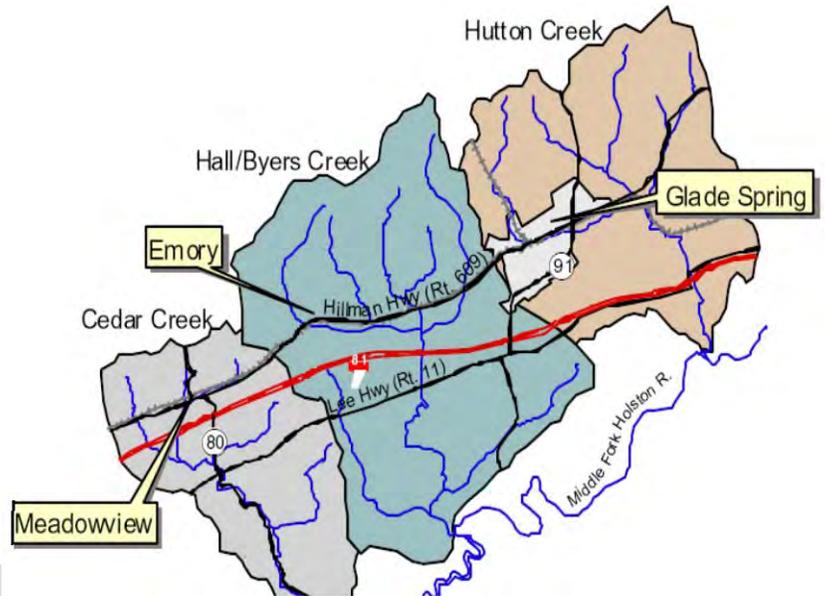
### ***Lessons Learned***

- 1) It is imperative to work through all community concerns/issues in the IP planning process before moving into an implementation project. Local public negativity directed at the TMDL program impacted participation by agricultural producers in the initial stages of the project.
- 2) Community meetings every 2-3 years are important to update the stakeholders on implementation progress and water quality monitoring results. The Steering Committee that was formed during the IP development process is ideal for organizing and assisting in the facilitation of such meetings.
- 3) The bacteria water quality standard being modified twice during the project period made attainment of the bacteria standard more impracticable. This was also reflected in TMDLs that were developed post-standard revisions and the significant increases in the required reductions of bacteria land loads during runoff events in order to meet the revised standards.
- 4) 4) There are not enough regulations in place to motivate the clean-up of impaired stream segments.
- 5) Need to find ways to get local governments more engaged in improving local water quality and promoting the implementation and long-term preservation of conservation practices.
- 6) It is cost-effective to open up new project areas to local sponsors such as a Soil and Water Conservation District to take advantage of trained staff and outreach and educational products that have been developed in an existing project. As a result, subsequent projects get off to a much faster start and implementation results are seen much earlier.

## Closeout Report: Middle Fork Holston River (Three Creeks) TMDL Implementation Project 2001-2008

### *Watershed Description and Water Quality Conditions*

Cedar, Hall/Byers and Hutton Creeks (also known as Three Creeks), are located in southwest Virginia in Washington County approximately 10 miles east of Abingdon (Figure 1). All three creeks drain to the Middle Fork Holston watershed in the Tennessee/Big Sandy River Basins. The Cedar, Hall/Byers and Hutton Creek watersheds consist of 21,770 acres and the predominant land uses are agriculture (69%), urban and residential land (13%) and forest (18%). The total number of livestock in the watersheds (primarily dairy cattle and beef) is 6,590. There are a total of 1,139 residents and businesses in the watersheds served by septic systems.



Cedar, Hall/Byers and Hutton Creeks were placed on the Virginia 303(d) List of Impaired Waters in 1998 for violations of the bacteria water quality standard and for general standard - benthic impairments due to excess inputs of sediment. Various agricultural and residential best management practices (BMPs) have been installed through a TMDL implementation project initiated by the Virginia Department of Conservation and Recreation (DCR) in 2001. These BMPs address primarily livestock and cropland management, and the improvement of on-site sewage disposal at residences in the watersheds. The DCR began the project in 2001 in conjunction with the Holston River Soil and Water Conservation District and it ended in 2008.

### *Summary of Implementation Activity*

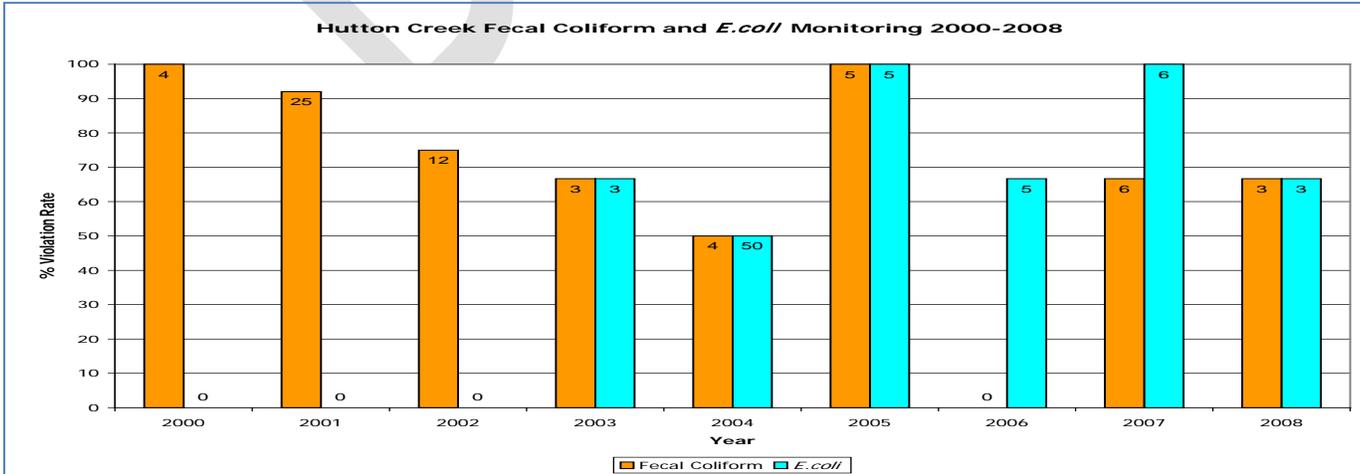
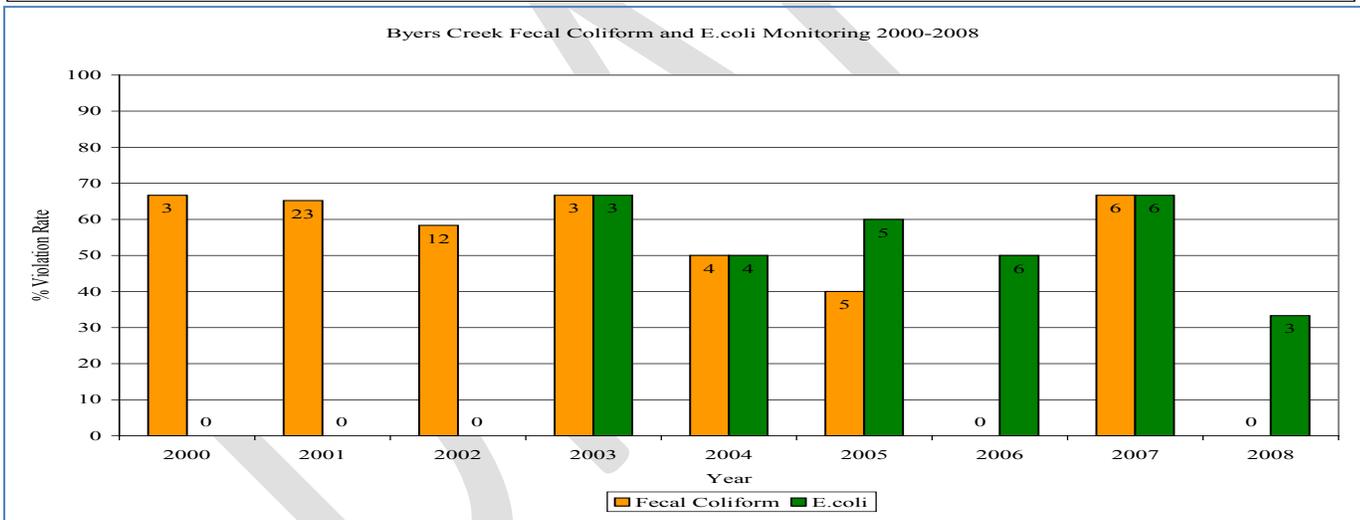
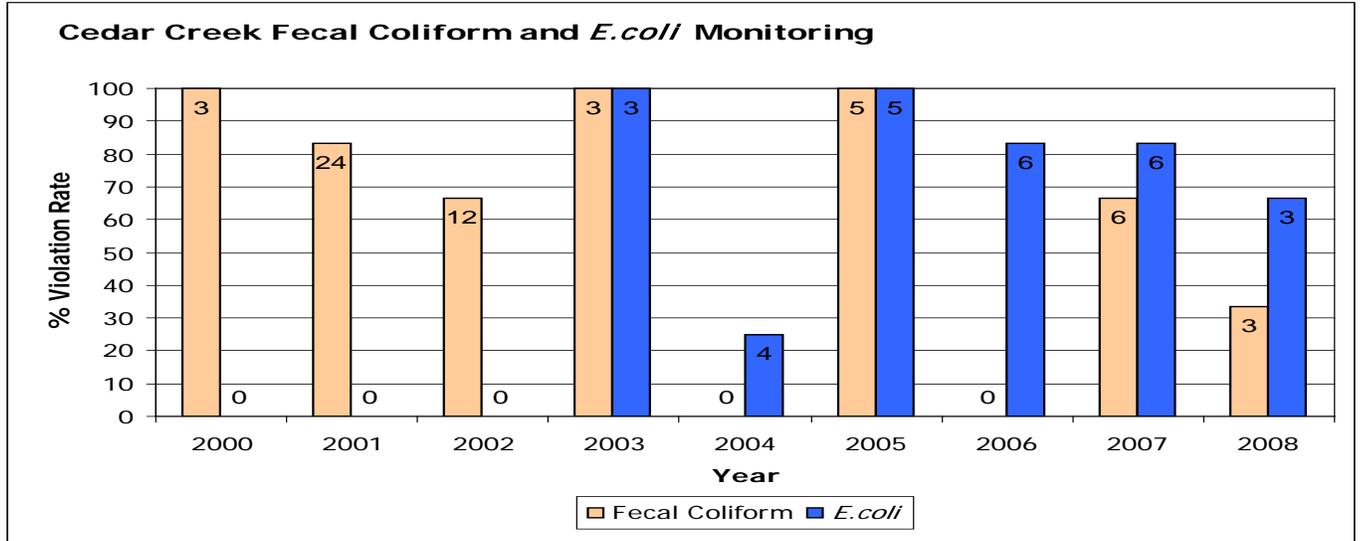
Of the three pilot TMDL implementation projects that DCR initiated in 2001 the Middle Fork Holston (also known as Three Creeks) project was the most successful in regards to BMP implementation. The project resulted in the installation of 24 miles of stream exclusion fencing, excluding 3,850 livestock from streams, or 62% of the TMDL implementation goal of 39 miles. A total of 62 stream exclusion systems were installed that also improved pasture management and reduced bacteria runoff during storm events.

The residential program also had implementation success with 240 septic tank pump outs and 12 straight pipes and failing septic systems replaced or connected to public sewer. Also, 16 failing septic systems were repaired.

Partners and other funding sources for the project included:

- Natural Resources Conservation Service
- Tennessee Valley Authority
- U.S. Fish & Wildlife Service
- Virginia Department of Health
- Virginia Department of Environmental Quality
- Holston River Soil and Water Conservation District
- Virginia Department of Conservation and Recreation
- U.S. Environmental Protection Agency Region 3

While none of the three impaired stream segments were de-listed during the project period, Cedar Creek and Hall/Byers demonstrated a decreasing trend in the bacteria standard violation rate over time; whereas, Hutton Creek did not. Unfortunately the data set per year was small with DEQ scheduled to collect bimonthly samples (six per year), but this did not occur on a consistent basis and the sample size annually varied from 0-6 samples. In 2007 and 2008, the *E. coli* violation rate in Cedar Creek was 82% and 67%, respectively; Hall/Byers' violation rates were 67% and 33%, and Hutton Creek was violating at 100% and 67%.



Fecal coliform and E.coli data collected by DEQ. Graphs shows the % violation rate of the instantaneous fecal coliform and E.coli water quality standards of 400 cfu/100 mL and 235 cfu/100 mL, respectively. The number of samples that were collected each year is shown inside each bar.

Considering the levels of BMP implementation, technical assistance funds invested, and water quality monitoring results; DCR decided to discontinue targeted 319 funding to the Middle Fork Holston River project area in 2007 due to several reasons which included:

- Implementation progress for the agricultural program was abating.
- HRSWCD had taken on another 319-funded TMDL implementation project in the Beaver Creek watershed in Washington County and the City of Bristol, and Little Creek in Washington County (January 2007).
- Water quality monitoring results indicated that none of the three impaired stream segments Cedar, Hall/Byers and Hutton Creeks were likely to be de-listed for bacteria in the near future based on the E. coli standard.
- The HRSWCD historically has been well funded through the state's Agricultural Cost-Share Program and state and federal funding should be adequate to handle implementation of future agricultural BMPs in the subject watersheds.

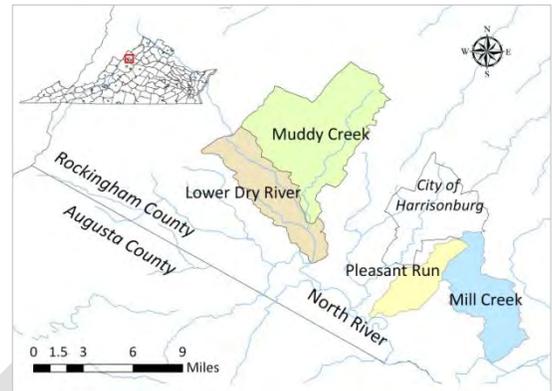
### **Lessons Learned**

- 1) Community meetings every 2-3 years are important to update the stakeholders on implementation progress and water quality monitoring results. The Steering Committee that was formed during the IP development process is ideal for organizing and assisting in the facilitation of such meetings.
- 2) 2) The bacteria water quality standard being modified twice during the project period made attainment of the bacteria standard more impracticable. This was also reflected in TMDLs that were developed post-standard revisions and the significant increases in the required reductions of bacteria land loads during runoff events in order to meet the revised standards.
- 3) 3) There are not enough regulations in place to motivate the clean-up of impaired stream segments.
- 4) 4) Need to find ways to get local governments more engaged in improving local water quality and promoting the implementation and long-term preservation of conservation practices.
- 5) 5) There needs to be funding or manpower and materials assistance available for the maintenance and replacement of stream fencing damaged by flooding. During the project period a flood event damaged fencing installed in the project area. The Tennessee Valley Authority provided funding to replace the damaged fencing.
- 6) 6) It is cost-effective to open up new project areas to local sponsors such as a Soil and Water Conservation District to take advantage of trained staff and outreach and educational products that have been developed in an existing project. As a result, subsequent projects get off to a much faster start and implementation results are seen much earlier.
- 7) 7) Implementation projects need more water quality data to measure progress especially in regards to attaining water quality standards and removing the impaired waterbody from the Impaired Waters List.

## Closeout Report: North River TMDL Implementation Project 2001-2008

### *Watershed Description and Water Quality Conditions*

In 2006 DCR, in conjunction with the Shenandoah Valley Soil and Water Conservation District (SVSWCD) in Rockingham County, Virginia, completed its fifth year of a 5-year TMDL implementation project to reduce fecal coliform, and nitrate levels and address benthic impairments in four creeks that drain to the North River (Dry River, Muddy Creek, Pleasant Run, and Mill Creek) through implementation of agricultural and residential BMPs in accordance with previously published and approved TMDLs and a TMDL watershed IP. North River is a tributary of the South Fork of the Shenandoah River (HUC 02070005), which in turn is a tributary of the Potomac River, which discharges into the Chesapeake Bay. The project area is located approximately 3-5 miles west or southwest of Harrisonburg, VA, in Rockingham County. DCR started its implementation project in partnership with the Shenandoah Valley Soil and Water Conservation District in 2001 and it ended in 2008.



During the 2001- 2008 project period most of the agricultural and residential practices installed were in the Muddy Creek and Lower Dry River watersheds and implementation lagged in Mill Creek and Pleasant Run even with increased outreach and incentives for property owners.

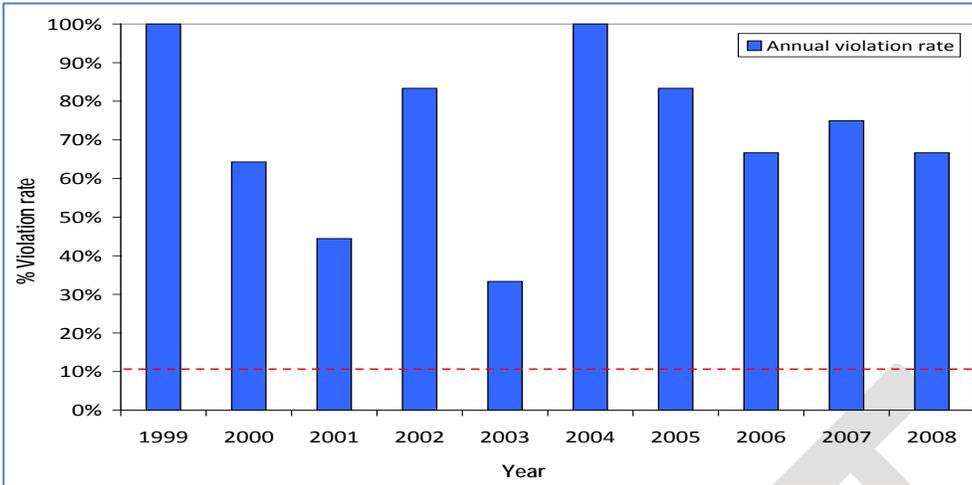
### *Summary of Implementation Activity*

In Mill Creek only 2.5 miles of stream fencing were installed during the project period and no straight pipes and failing septic systems were corrected. There were a total of 27 agricultural BMPs installed but 80% of the practices were sediment reduction practices such as conversion of cropland to pasture or hay, cover crops, and forest buffers. Most of these are land management BMPs that provide farmers incentive payments. A minimal amount of bacteria reduction BMPs installed was reflected in the bacteria water quality monitoring data which did not indicate improvement during the project period.

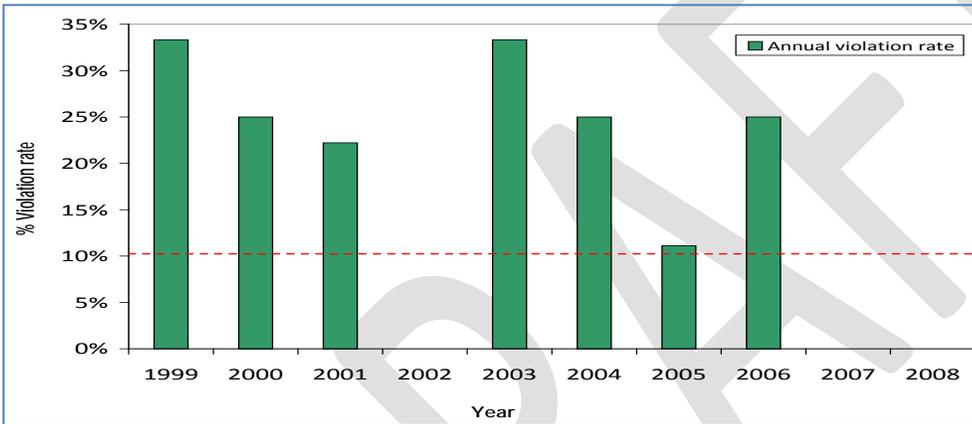
In Pleasant Run only 400 feet of stream exclusion fencing was installed. There was a total of 95 agricultural and residential practices installed. At the eight large dairies in this watershed 81 cover crop practices were installed on cropland acres. One loafing lot management system was installed. However, with federal agricultural cost-share programs (CREP and EQIP) and 319 funding available these dairy operations did not take advantage of this funding to exclude the dairy herds from streams and develop alternative sources of water and improve pasture management.

There were eight septic tank pump-outs completed, but there was only one septic system replaced. Like Mill Creek there was minimal implementation of the bacteria reduction BMPs identified in the TMDL implementation plan. Bacteria water quality monitoring data collected by DEQ indicates that the violation rate for Pleasant Run has been more than 90% for the past 10 years. Of the four creeks in the North River project area, Pleasant Run is experiencing the most development pressure.

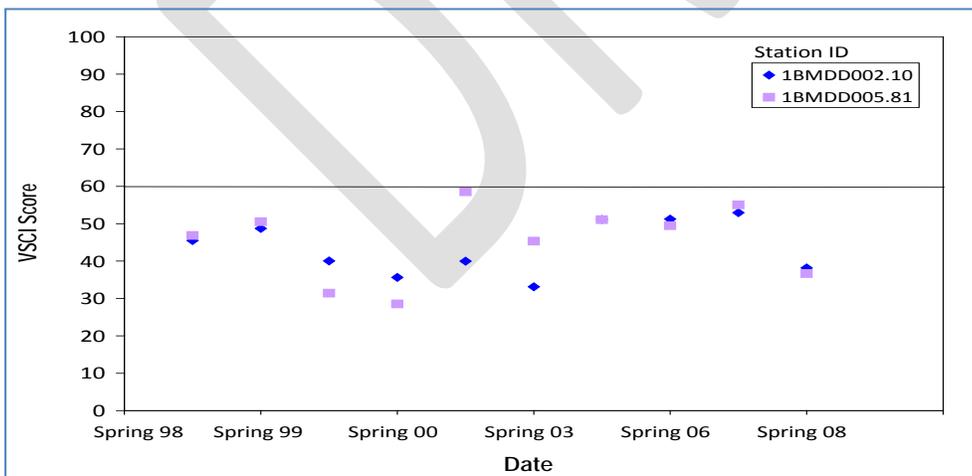
In Muddy Creek and Lower Dry River more than 178 agricultural and residential BMPs were completed and many of these were voluntary practices installed by Old Order Mennonites. A total of 10.8 miles of stream fencing was installed. The Mennonites have historically installed best management practices without accepting monies from government cost-share programs. However, they are open to receiving technical assistance from government conservation agencies to improve water quality and soil and water resources on their farmland. The increased amount of implementation in these two watersheds was reflected in water quality improvements by reductions in the percentage of the violation rates of the bacteria water quality standard in Muddy Creek and Lower Dry River, and improvements in biological monitoring in Muddy Creek.



Muddy Creek (station 1BMD00.40) annual violation rate of the instantaneous fecal coliform water quality standard (400 cfu/100 mL). Note: Red line indicates violation rate at which de-listing may occur.



Lower Dry River (station 1BDUR000.02) annual violation rate of the instantaneous fecal coliform water quality standard (400 cfu/100 mL). Note: Red line indicates violation rate at which de-listing may occur.



Muddy Creek biological monitoring stations. Note: A VSCI score of 60 or above is considered good, while any score below 60 is considered poor.

Considering the levels of BMP implementation, technical assistance funds invested, and water quality monitoring results; DCR decided to discontinue targeting 319 funding to the North River project area in 2008 due to several

reasons which included:

- Poor implementation progress in Mill Creek and Pleasant Run.
- DCR agreed to allow the SVSWCD 319-funded agricultural specialist to continue to outreach to the Old Order Mennonite farmers in Muddy Creek and Lower Dry River.
- SVSWCD had taken on two other 319-funded TMDL implementation projects in the Blacks Run and Cooks Creek watershed in Rockingham County (summer of 2006) and the Hawksbill Creek and Mill Creek watersheds (2008) in Page County.
- Water quality monitoring results indicated that the Lower Dry River watershed was the one impairment that was mostly likely to be de-listed for bacteria, but a de-listing was not likely to occur before the end of 2010 based on the bacteria standard violation rate for E. coli.
- The SVSWCD historically has been well funded through the state's Agricultural Cost-Share Program and state funding should be adequate to handle implementation of future agricultural BMPs in the subject watersheds.

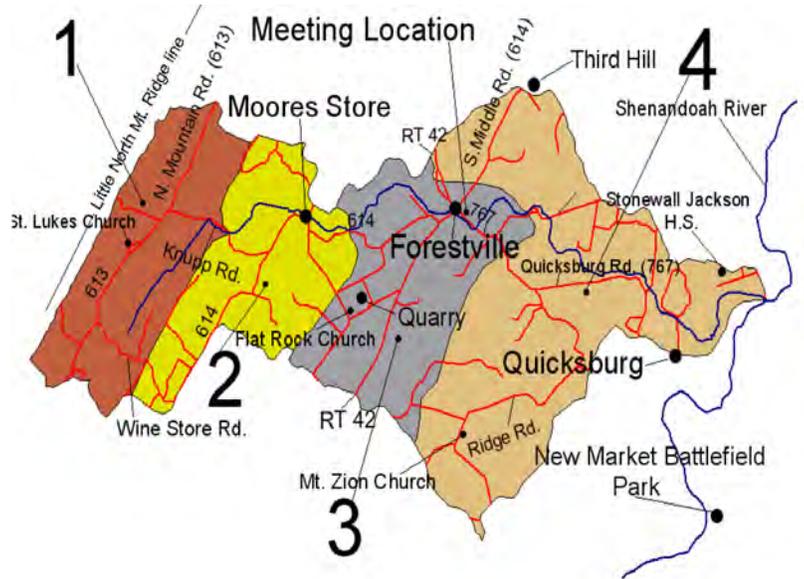
## Lessons Learned

- 1) Community meetings every 2-3 years are important to update the stakeholders on implementation progress and water quality monitoring results. The Steering Committee that was formed during the IP development process is ideal for organizing and assisting in the facilitation of such meetings.
- 2) The bacteria water quality standard being modified twice during the project period made attainment of the bacteria standard more impracticable. This was also reflected in TMDLs that were developed post-standard revisions and the significant increases in the required reductions of bacteria land loads during runoff events in order to meet the revised standards.
- 3) There are not enough regulations in place to motivate the clean-up of impaired stream segments. The one means that was most successful in increasing participation over time was increasing financial incentives through higher cost-share rates and tax credits.
- 4) Need to find ways to get local governments more engaged in improving local water quality and promoting the implementation and long-term preservation of conservation practices.
- 5) In order for government programs to be successful in the Old Order Mennonite community you have to have local staff that have earned the trust of the people.
- 6) Working in headwater streams is cost-effective and can result in water quality improvements in downstream stream orders as was reflected in water quality improvements documented in the main stem of the North River during the period of 2001 – 2008.

## Closeout Report: Holmans Creek TMDL Implementation Project 2004-2008

### *Watershed Description and Water Quality Conditions*

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



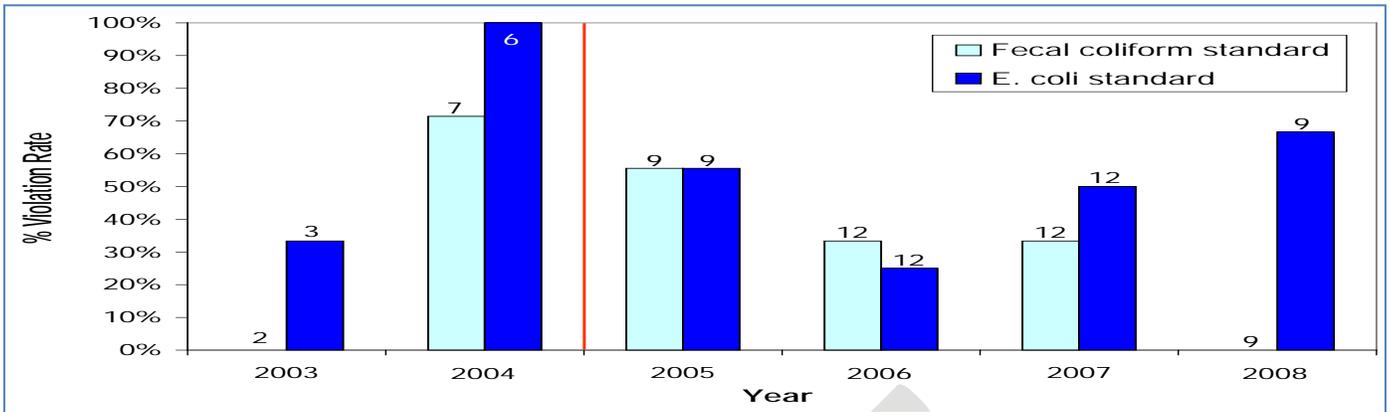
### *Summary of Implementation Activity*

The Holmans Creek project was initiated in the fall of 2004 but was not fully operational until the first of 2005 due to hiring of agricultural and residential specialists. The project was terminated in June 2008 after 3.5 years due to the lack of participation in the agricultural program.

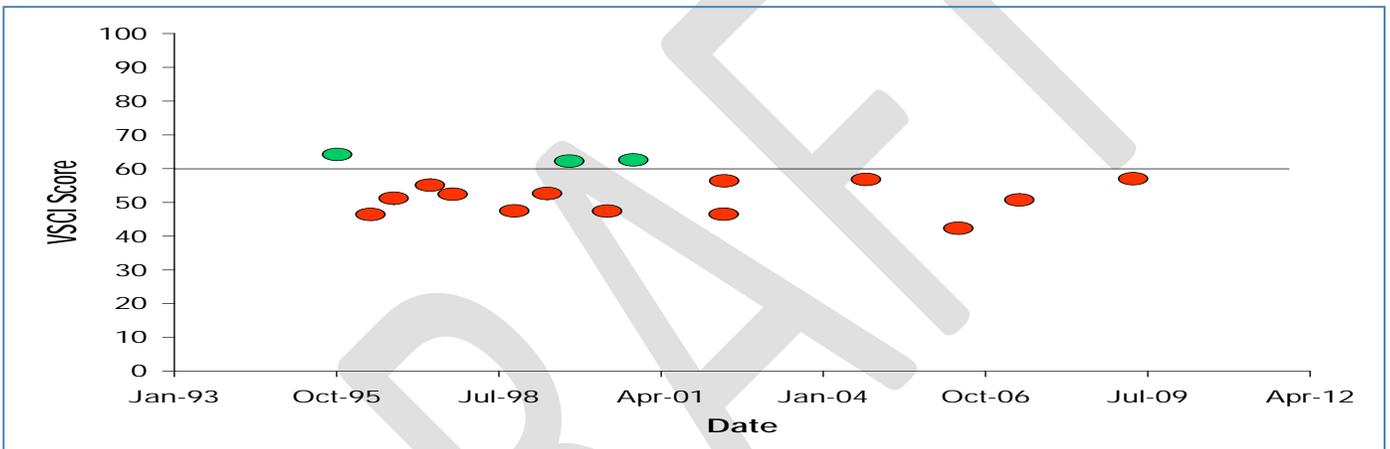
The level of agricultural BMP implementation to address the bacteria and sediment TMDL load allocations over the project period was dismal especially the amount of stream exclusion fencing with only 1.8 miles of the 53 miles needed (3%) actually installed. Some 474 acres of cover crops were installed along with 66 acres of vegetative cover on cropland. These land management practices are sediment reduction practices and are generally well-received by farmers because they provide incentive payments and some cost-share on eligible component costs (i.e., seed, fertilizer, herbicides, pesticides and labor).

The residential implementation was more successful based on the number of septic tank pump outs and 10 septic systems were repaired and one failing system was replaced.

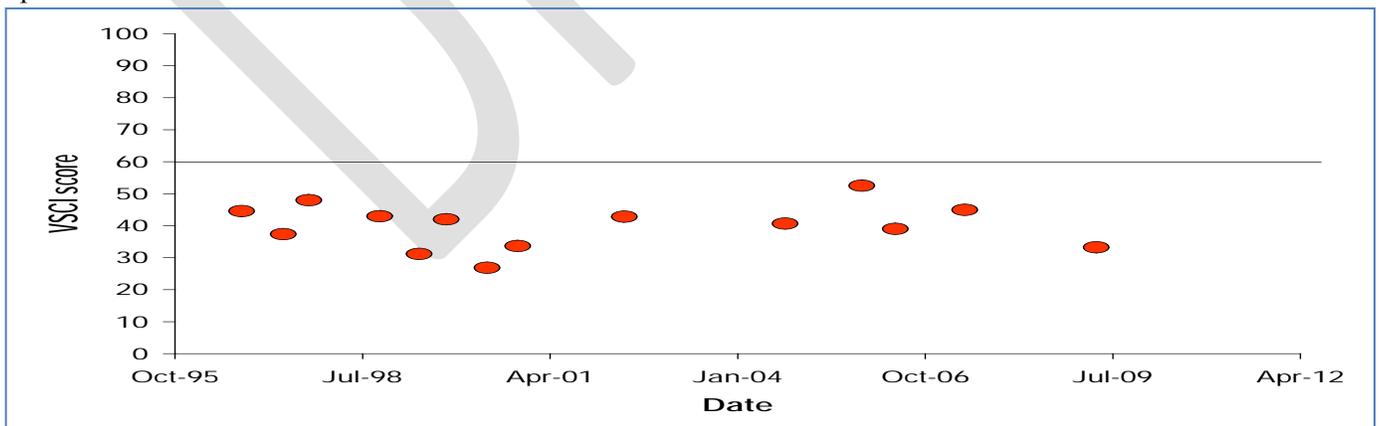
The violation rate of the 400 cfu/100 ml fecal coliform bacteria standard did show a downward trend, but the E. coli standard that became effective in 2003 is the standard that has to be met to remove Holmans Creek from the Impaired Waters List for bacteria. The monitoring results for E. coli did not indicate improving conditions. Also, the biological monitoring data at two stations in Holmans Creek have historically indicated “poor” conditions and are not showing that the aquatic communities are improving.



Fecal coliform and E.coli data collected by DEQ. Graph shows the % violation rate of the instantaneous fecal coliform and E.coli water quality standards of 400 cfu/100 mL and 235 cfu/100 mL, respectively. The red line indicates the year that the implementation project began (2005). The number of samples that were collected each year is shown above each bar.



DEQ biological monitoring results from station 1BHMN002.09, located at river mile 2.09. A Virginia Stream Condition Index (VSCI) score of 60 or above is considered “good” while a score of 59 or below is considered “poor.”



DEQ biological monitoring results from station 1BHMN007.59, located at river mile 7.59. A Virginia Stream Condition Index (VSCI) score of 60 or above is considered “good” while a score of 59 or below is considered “poor.”

Considering the levels of BMP implementation, technical assistance funds invested, and water quality monitoring results; DCR decided to discontinue targeted 319 funding to the Holmans Creek project area in 2008 due to several reasons which included:

- Poor implementation progress in Holmans Creek, especially on agricultural land.
- Other federal cost-share programs such as CREP and EQIP in conjunction with 319 were not able to stimulate participation.
- Amount of technical assistance funding being invested was greater than the return on BMP dollars spent.
- Significant water quality improvements were not evident.
- An aging farmer population, few landowners holding large tracts, and low income of households were impediments to stream exclusion fencing. In addition, uncertainty of whether the land would stay in agriculture and reluctance to take on increased maintenance and management requirements associated with stream exclusion and grazing systems was impacting implementation.

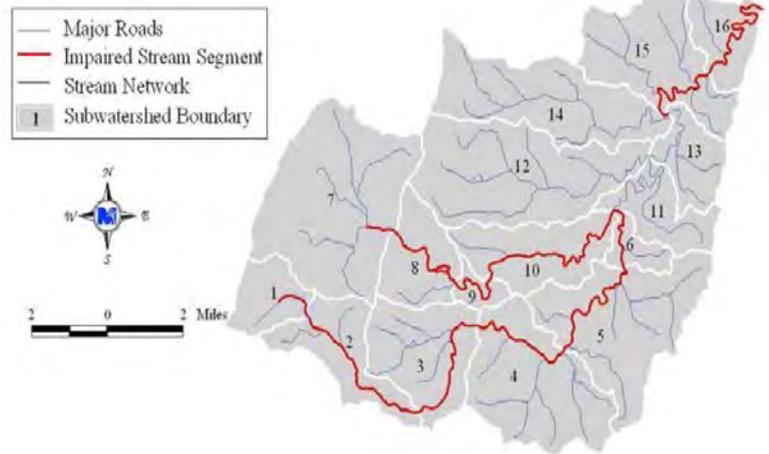
## Lessons Learned

- The bacteria water quality standard being modified twice during the project period made attainment of the bacteria standard more impracticable. This was also reflected in TMDLs that were developed post-standard revisions and the significant increases in the required reductions of bacteria land loads during runoff events in order to meet the revised standards.
- 2) There are not enough regulations in place to motivate the clean-up of impaired stream segments. The one means that was most successful in increasing participation over time was increasing financial incentives through higher cost-share rates and tax credits.
  - 3) Need to find ways to get local governments more engaged in improving local water quality and promoting the implementation and long-term preservation of conservation practices.
  - 4) The administrative set-up of a grant funded project is a critical piece of a successful project. In Holmans Creek there was a local watershed committee that took on the role of administering the implementation project and directing the roles and responsibilities of the field staff. DCR entered into a grant agreement with the local Soil and Water Conservation District to administer the technical assistance and cost-share funds. It was somewhat of an awkward arrangement and at times resulted in poor communication and unresolved differences in opinions on project direction.
  - 5) Not all watershed implementation projects will be successful, and conservation partners have to critically assess when to phase out the commitment of targeted resources.

## Closeout Report: Catoctin Creek TMDL Implementation Project 2004-2009

### *Watershed Description and Water Quality Conditions*

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



### *Summary of Implementation Activity*

The Catoctin Creek project was initiated in the fall of 2004 (September) but was not fully operational until 2005 due to hiring of an agricultural specialist by the Loudoun Soil and Water Conservation District and a residential specialist by the Loudoun County Health Department. The project was terminated at the end of calendar year 2009 after 5 years of targeted implementation efforts.

The level of agricultural BMP implementation to address the bacteria TMDL load allocations over the project period was dismal especially the amount of stream exclusion fencing with only 4.4 miles of the 32 miles needed (14%) actually installed. There was a total of 36 livestock exclusion systems installed but most of these were systems for equine, small beef operations and other livestock. Large beef operations in Catoctin Creek watershed did not participate in the implementation project either through cost-share or on a voluntary basis. A total of 323 acres of cover crops were planted in the South Fork Catoctin Creek to reduce sediment loads contributing to the benthic impairment.

The residential implementation was more successful based on the number of practices installed including 12 septic tank pump outs, 17 septic system repairs, and the installation of 15 septic systems and 9 alternative waste treatment systems to replace failing septic systems or straight pipes. The implementation plan projected that 20 straight pipes needed to be replaced.

Partners and other funding sources for the project included:

- Natural Resources Conservation Service
- Loudoun County Health Department
- Virginia Department of Environmental Quality
- Loudoun Soil and Water Conservation District
- Loudoun Watershed Watch
- Virginia Department of Conservation and Recreation
- U.S. Environmental Protection Agency Region 3

During the period of 2003 – 2008, the violation rate of the 235 cfu/100 ml E. coli standard at three monitoring stations on the North Fork ranged from 40% to 86%, and the violation rate for two stations on the South Fork ranged from 29% to 60%. The monitoring results for E. coli did indicate improving conditions on the mainstem of Catoctin

Creek with a 20% violation rate with 16 out of 79 samples collected exceeding the standard.

### DEQ Bacteria Monitoring in Catoctin Creek for 2003 – 2008.

Stream Name	Number of Samples	Number of Exceedances	E. coli Exceedance Rate
Catoctin Creek	79	16	20%
N.F. Catoctin Creek	12	8	67%
N.F. Catoctin Creek	7	6	86%
N.F. Catoctin Creek	10	4	40%
S.F. Catoctin Creek	21	6	29%
S.F. Catoctin Creek	10	6	60%

Considering the levels of BMP implementation, technical assistance funds invested, and water quality monitoring results; DCR decided to discontinue targeted 319 funding to the Catoctin Creek project area in 2008 due to several reasons which included:

- Poor implementation progress on agricultural land in Catoctin Creek.
- Other federal cost-share programs such as CREP and EQIP in conjunction with 319 were not able to stimulate participation.
- Amount of technical assistance funding being invested was approximately equal to the cost-share provided for BMP implementation.
- Significant water quality improvements were not evident in the North Fork and South Fork of Catoctin Creek. The mainstem of Catoctin Creek for the project period of 2003 – 2008 did indicate improvement and even the 30-year record has shown a decreasing trend, but it is not likely to be de-listed in the near future.
- An aging farmer population, landowners holding large tracts, and large tracts of pasture with substantial acreage in the flood plain were impediments to stream exclusion fencing. Even an increase in the cost-share rate for stream exclusion practices from 75% to 85% in January 2009 did not bring in large landowners, but it did increase sign-up amongst the small livestock operations.

### Lessons Learned

- 1) Community meetings every 2-3 years are important to update the stakeholders on implementation progress and water quality monitoring results. The Steering Committee that was formed during the IP development process is ideal for organizing and assisting in the facilitation of such meetings.
- 2) The bacteria water quality standard being modified twice during the project period made attainment of the bacteria standard more impracticable. This was also reflected in TMDLs that were developed post-standard revisions and the significant increases in the required reductions from bacteria land loads during runoff events, in order to meet the revised standards.
- 3) There are not enough regulations in place to motivate the clean-up of impaired stream segments.
- 4) Need to find ways to get local governments more engaged in improving local water quality and promoting the implementation and long-term preservation of conservation practices.
- 5) Eastern Virginia is rapidly being urbanized especially Northern Virginia. The rural landscape in Loudoun County is changing rapidly. This project demonstrated that it will be difficult to implement TMDLs on agricultural land in this part of Virginia because farmers are reluctant to invest in structural BMPs when based on increasing land value they are uncertain as to how long they will hold on to the land. Options that may improve this situation would be for counties to identify areas of the county where the goal is to preserve farmland by establishing forest and agricultural districts. Also, the counties could establish minimum conservation practices that must be unstalled (e.g., exclude livestock from perennial streams) to stay in

agricultural land use taxation.

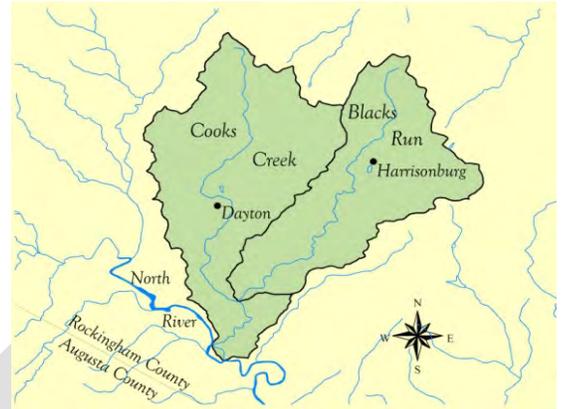
- 6) Agricultural land is being divided into smaller tracts and managed by landowners who are not aware of basic soil and water conservation practices, and especially the programs and agencies that provide technical and some financial assistance. Such government programs have not yet adapted outreach efforts to this changing client base.
- 7) Future potential project need to be aware of any pre-existing divisions amongst stakeholder groups before initiating a watershed improvement project. If these groups have not been working cooperatively in the past, this carryover will likely impact the success of the project.

This was the first 319 TMDL implementation project where the local Health Department was the lead agency for the residential implementation and this arrangement was very productive. The Health Department often is aware of pre-existing situations where on-site sewage disposal systems are failing or need repairs. A number of these notifications come through complaints directly to the Health Department from local citizens. Once they investigate a complaint and talk with the property owner(s) about corrective actions they are also in a position to offer grant funds. Soil and Water Conservation Districts who also administer residential programs are relying on citizens contacting them about pre-existing conditions or on-going problems with an on-site system. Citizens may be reluctant to do this without any knowledge of what type of expenses and timeline that may be facing in order to repair or replace a straight pipe or failing on-site sewage disposal system.

## Closeout Report: Cooks Creek and Blacks Run TMDL Implementation Project: May 2006-June 2012

### Watershed Description and Water Quality Conditions

The Blacks Run and Cooks Creek watersheds are located in Rockingham County and the City of Harrisonburg, Virginia. The streams flow into the North River near Mount Crawford, into the South Fork Shenandoah River, then on 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. The watershed is 12,256 acres and is largely urban in northern sections as the stream flows through the City of Harrisonburg, becoming increasingly rural as it nears Cooks Creek. Cooks Creek is impaired for 13.69 miles, extending from its headwaters to the confluence with the North River. The Cooks Creek watershed is 15,919 acres, and is largely 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 was administered by the Shenandoah Valley Soil and Water Conservation District (SVSWCD). The table on the right shows BMPs implemented in the watersheds since the project began in May 2006 and overall implementation goals established for the project areas. Between July 1, 2011 and June 30, 2012, five septic tank pumpouts and two septic connections to public sewer system were completed in the watersheds. No agricultural best management practice was installed during this period. Cooks Creek is home to a large population of Mennonite farmers who typically do not accept cost share funding. Consequently, considerable agricultural BMP implementation has occurred on a voluntary basis. Efforts to capture and report voluntary BMP implementation was somewhat successful.

### Blacks Run NFWF Grant Project Summary

In order to achieve the extensive urban and residential BMP goals established in the implementation plan, the SVSWCD formed close partnerships with the City of Harrisonburg, the Harrisonburg Housing and Redevelopment Authority, James Madison University and Eastern Mennonite University. These partners worked collaboratively to implement a series of urban stormwater management practices through a National Fish and Wildlife Foundation (NFWF) grant that began in 2009. Partners awarded a total of \$325,000 for implementation of approximately 200 stormwater management practices. Project partners used this funding to leverage over

Control Measure**	Units*	Needed	Installed	%
Agricultural				
Stream Exclusion Fencing	M	50	3.6	7
Stream Exclusion Fencing	S	17	2	12
Riparian Buffer	Ac	-----	15.1	-----
Voluntary Exclusion Systems	F	86,914	14,389	17
Waste Storage Facility	S	46	1	2
Loafing Lot Management	S	-----	1	-----
Pasture Management	Ac	758	-----	0
Conservation Tillage	Ac	4,748	-----	0
Small Grain Cover Crop	Ac	-----	1,468	-----
Veg. Cover on Cropland	Ac	-----	11.5	-----
Nutrient Management	Ac	3,565	25	1
Woodland Buffer Filter Area	Ac	-----	0.5	-----
Urban/Residential				
Pet Litter Control Program	P	2	1	50
Pet Waste Digesters	S	-----	41	-----
Pet waste Stations	Stations	-----	15	-----
Rain Barrels	Barrels	-----	454	-----
Bioretention Filters	AT	1,025	6.4	1
Retention Ponds	AT	400	-----	0
Street Sweeping	LM	7,574	16,978	224
Streambank Stabilization	F	7,000	8,000	114
Vegetated Buffer	F	197,704	9,650	5
Rain Gardens	AT	600	1	0
Nutrient Management	Ac	1,100	11.5	1
Residential Septic				
Septic Tank Pump Out	S	100	27	27
Sewer Connection	S	3	5	167
Septic System Repair	S	24	4	17
Septic System Installation	S	14	1	7
Alternative Waste Treatment	S	14	5	36

\* AT = Acres Treated, Ac = Acres, S = System, F = Feet of stream, P = Program, LM= Lane/mi/yr, M = miles of stream \*\* BMP counts after 7/1/2009 only include 319 funded projects. BMPs funded by State CS, CREP or Federal EQIP are not included after this date (though they may have been included previously)

\$415,000 in matching funds. Project highlights for 2010-2012 included the formation of a neighborhood stewardship group, installation of a 10,000 gallon cistern, completion of a 650 foot streambank project, and the installation of a bioretention filter and a pervious sidewalk treating over two acres of impervious runoff. The table below provides a summary of implementation goals and progress. Over the past two years, this project built a greater awareness and understanding of stormwater management amongst the residents and local officials, increased the capacity of the watershed community to integrate innovative stormwater practices into residential, commercial, municipal and educational landscapes, and provided training and capacity building for the community and landscaping professionals in installation and maintenance of stormwater practices. At the end of the NFWF grant project the partners were so excited about the process and results they expressed a desire to work on a subsequent project in the near future.

Grantee	Deliverable	Completion date
James Madison University	Install 500 storm drain markers	Complete
	Install bioretention filter & pervious concrete walkway (300 ft <sup>2</sup> )	Complete
	Restore and buffer 650 linear feet of streambank	Complete
	Install 10,000 gallon cistern on Wayland Hall	Complete
	Restore and buffer 1200 linear feet of streambank	Complete
Eastern Mennonite University	Restore and buffer 1150 linear feet of streambank	Complete
	Flow through planter at Cedarwood dorm	Complete
	Bioretention filter at Cedarwood parking lot	Complete
	Install green roof on bike shed	Complete
	Remove asphalt lot at Parkwood Apt.	Complete
	Install cistern and restore downstream stream bank	Complete
Shen Valley SWCD	Install 15 rain barrels around campus	Complete
	Install rain garden at Parkwood Apt	Complete
	Hold rain garden training at Boxerwood	Complete
	Hold 5 neighborhood meetings	Complete
HRHA	Install 7 residential rain gardens and a cistern	Complete
	Hold 2 rain barrel workshops	Complete
City of Harrisonburg	Install 104 rain barrels, develop maintenance guide	Complete
	Hold 3 Blacks Run Clean Up events	2 Complete
	Write riparian buffer maintenance manual	Complete
	Host riparian buffer maintenance workshop(s)	Complete
	Conduct quarterly monitoring	Ongoing

**Pollution Reductions for Cooks Creek and Blacks Run: March 2006-June 2012**

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 are based on BMPs installed only for 319(h) funded practices.

Period	Pathogens (Coliform) CFU	Nitrogen Lbs/year	Phosphorus Lbs/year	Sedimentation-Siltation tons/year
March 2006-June 2011	1.19E+15	10,792	2,437	1,629
July 2011-June 2012	1.25E+11	76	0	0
<b>TOTAL</b>	<b>1.19E+15</b>	<b>10,868</b>	<b>2,437</b>	<b>1,629</b>

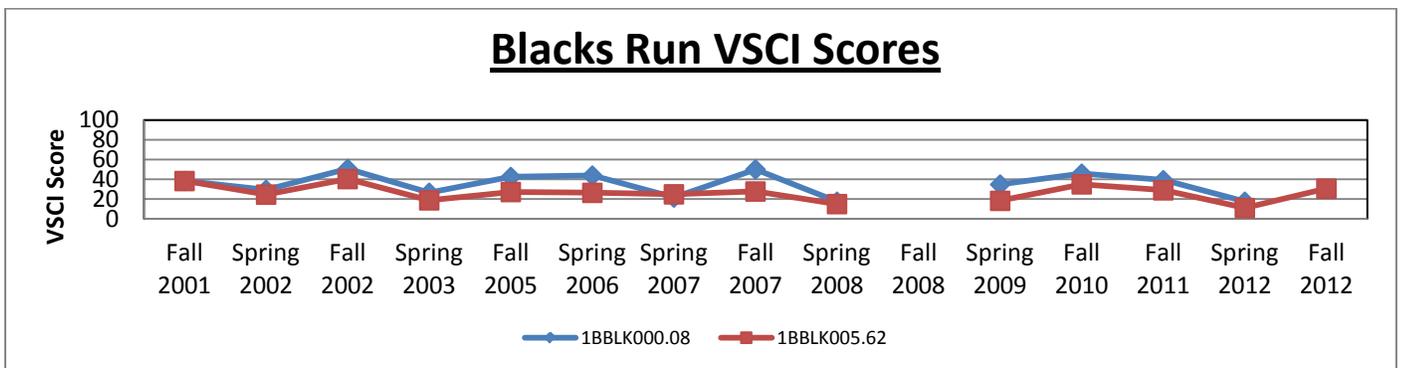
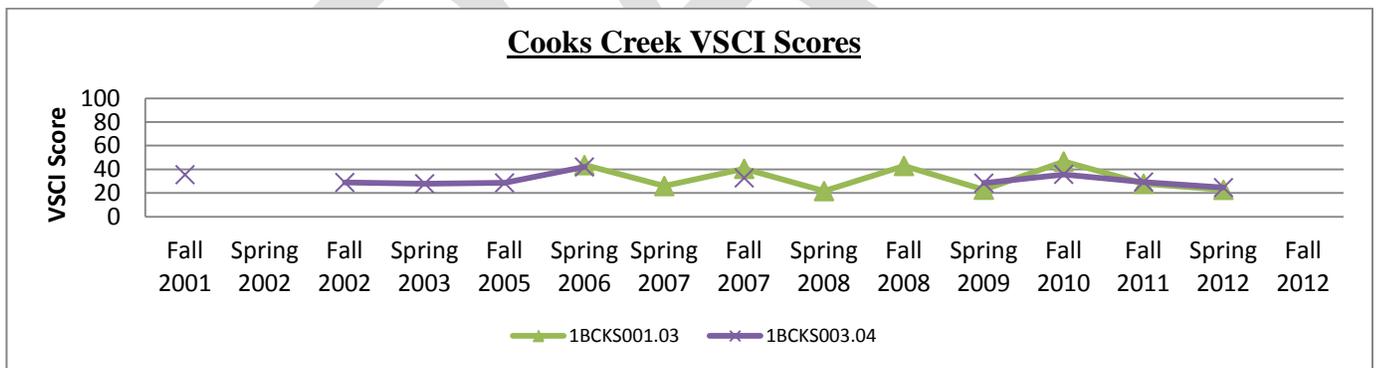
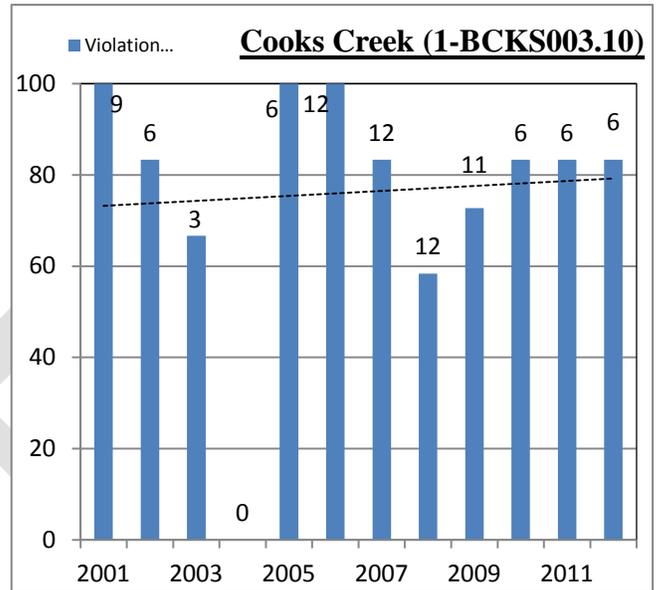
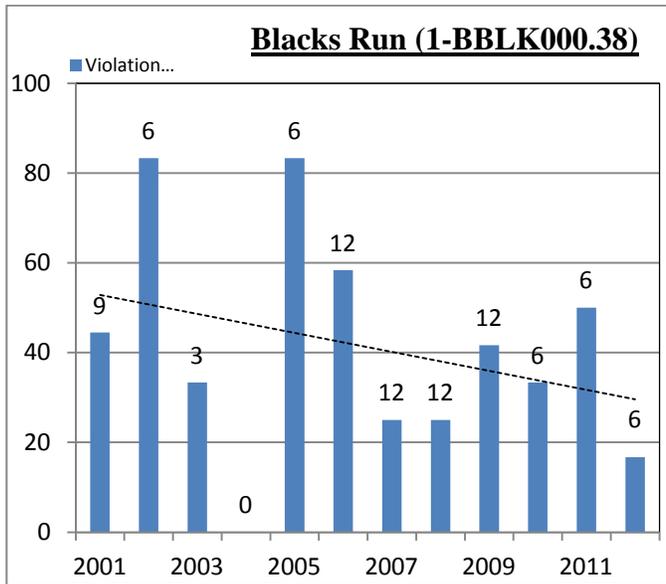
**Water Quality Conditions**

The biological and *E. coli* data were obtained from DEQ, which conducted water quality sampling at various monitoring stations within the watershed, at their pre-assigned water quality monitoring schedule. The *E. coli* data was available for 2001 through 2012 for Cooks Creek (at river mile 3.10) and Blacks Run (at river mile 0.38). The biological data of fall and spring seasons was available for 2001 through 2012 for Cooks Creek and Blacks Run. The biological status of water bodies as measured through an index developed by DEQ and EPA, Virginia Stream Condition Index (VSCI), is shown in graphical forms. The available *E. coli* data was analyzed to determine the impact of implemented BMPs on bacteria violation rates and the trend, if any, in water quality conditions.

The bar graph shows the percent violation rate for water quality samples collected annually that did not meet the water quality standard of 235 cfu/100 mL. The number of samples that were collected each year are shown above each bar within the graph. Linear trend fitted to Cooks Creek data show an increasing trend in violation rate,

indicating deterioration in water quality conditions. Similarly, VSCI scores did not show any improvement in biological conditions in Cooks Creek.

The linear trend fitted to Black Run *E. coli* data shows decreasing, but no-significant trend in violation rates, indicating no-significant improvement in water quality condition. Also, VSCI scores were same and did not show any improvement in biological status of the Blacks Run.



Considering the levels of BMP implementation, technical assistance funds invested, and water quality monitoring results; DCR decided to discontinue targeted 319 funding to the Cooks Creek and Blacks Run project area in June 2012 due to several reasons which included:

- Poor implementation progress on agricultural land in Cooks Creek.
- Change over in the Agricultural Conservation Specialist position at SVSWCD impacted success in Cooks Creek because it takes time for the culture of the Mennonite Community to be comfortable with new personnel.
- The installation of on-site sewage disposal systems had some success.
- Interest was demonstrated by local partners DCR, City of Harrisonburg, James Madison University, Eastern Mennonite University, and Shenandoah Valley Soil and Water Conservation District to promote stormwater BMPs, stream monitoring, and educational outreach in the Blacks Run watershed through a NWWF grant in 2010-2012.
- Other federal cost-share programs such as CREP and EQIP in conjunction with 319 were not able to stimulate participation.
- Amount of technical assistance funding being invested was not justifiable based on the amount of agricultural and residential BMP cost-share sign-up.
- Significant water quality improvements were not evident in the Cooks Creek and Blacks Run watersheds for either bacteria (*E. coli*) or biological conditions.

### **Lessons Learned**

- 1) Community meetings every 2-3 years are important to update the stakeholders on implementation progress and water quality monitoring results. The Steering Committee that was formed during the IP development process is ideal for organizing and assisting in the facilitation of such meetings.
- 2) There are not enough regulations in place to motivate the clean-up of impaired stream segments.
- 3) Need to find ways to get local governments more engaged in improving local water quality and promoting the implementation and long-term preservation of conservation practices.
- 4) Need to invest more staff time in the assessment and tracking of voluntary conservation practices to account for progress in meeting implementation goals in TMDL implementation plans.

## Closeout Report: Mill and Dodd Creeks TMDL Implementation Project: January 2007 - December 2011

### Watershed Description and Water Quality Conditions

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

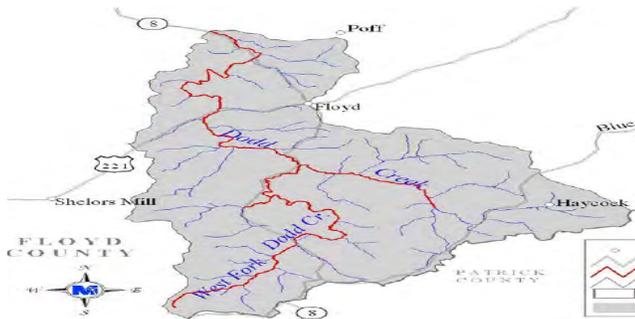


Figure 2: Dodd Creek Watershed

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.

### Implementation Highlights

The Skyline Soil and Water Conservation District began administering the agricultural and residential programs for the Mill and Dodd Creek TMDL Implementation Project in January 2007. The project addressed fecal coliform impairments in the Mill Creek and Dodd Creek watersheds. From July 1, 2011 thru June 30, 2012, five residential BMPS were completed through the residential program, including four septic tank pumpouts and one septic repair. No agricultural best management practices were installed during this period.

Since the beginning of the project a total of 76 practices were installed. This includes 12 livestock exclusion practices protecting 21,545 feet of stream, 54 pump-outs, six septic system repairs and three septic system installations and/or replacements. The pollution reductions occurring as a result of the BMPs installed included below are only for 319(h) funded practices.

### Mill and Dodd Creek BMP Summary: January 2007-June 2012

Control Measure *	Unit	Total	Installed	%
<b>Agricultural</b>				
Stream Exclusion Fencing	Feet	156,223	21,545	14
Stream Exclusion Fencing	System	100	12	12
Riparian Buffer Established	Acres		22.1	
Waste Storage Facility	System	3		
Loafing Lot Management System	System	1	1	100
Vegetative Cover on Critical Area	Acres	2		
Improved Pasture Management	Acres	1,439		
<b>Residential</b>				
Septic System Pump Out	System	200	54	27
Septic System Repair	System	51	6	12
Septic System Installation	System	183	3	2
Alternative Waste Treatment Systems	System	27		

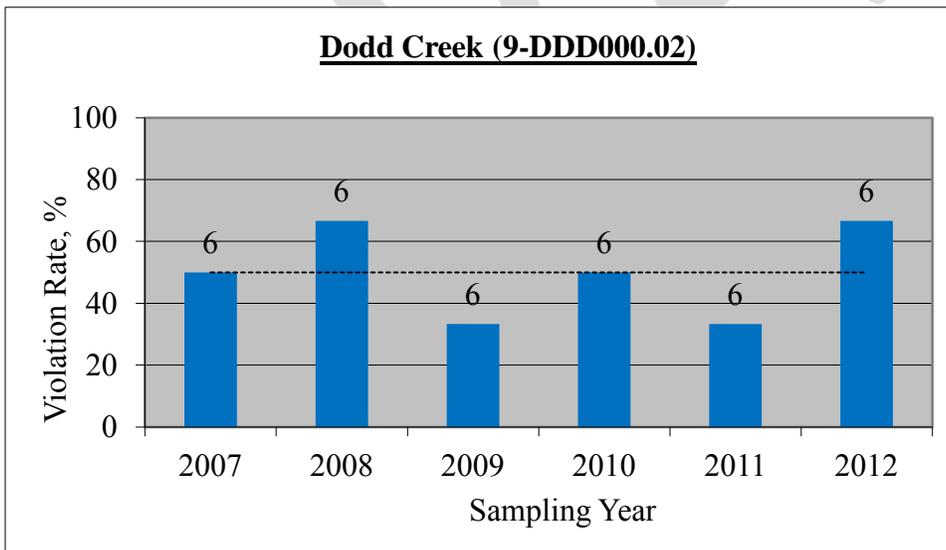
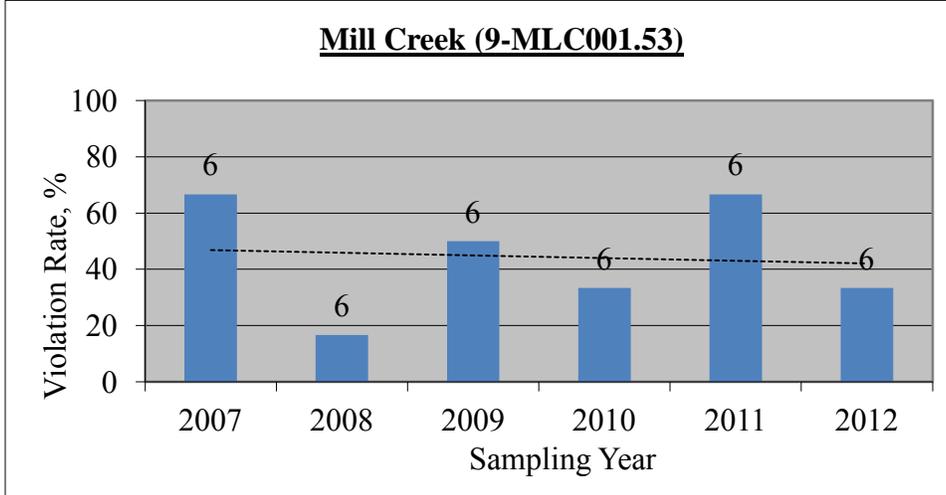
\*NOTE: BMP counts after 7/1/2009 only include 319 funded projects. BMPs funded by State CS, CREP or Federal EQIP are not included after this date (though they may have been included previously)

### Pollution Reductions for Mill and Dodd Creeks: January 2007-June 2012 Water Quality Conditions

January 2007-June 2011	Pathogens (Coliform) CFU	Nitrogen Lbs/year	Phosphorus Lbs/year	Sedimentation-Siltation tons/year
July 2011-June 2012	2.21E+15	4430	704	1,144
<b>TOTAL</b>	5.72E+10	34	0	0
	2.21E+15	4464	704	1144

The *E. coli* data was obtained from DEQ, which conducted water quality sampling at various monitoring stations within the watershed, at their pre-assigned water quality monitoring schedule. The data was available for a time period 2007 through 2012. Mill Creek (at river mile 1.53) and Dodd Creek (at river 0.02). The available *E. coli* data was analyzed to determine the impact of implemented BMPs on bacteria violation rate and the trend, if any, in water quality conditions.

The bar graph shows the percent violation rate for stream samples collected annually that did not meet the water quality standard of 235 cfu/100 mL. The number of samples that were collected each year are shown above each bar within the graph. The water quality data show that violation rates in Mill and Dodd Creeks are still high and have not decreased since the BMPs implementation started. Linear trends fitted to data show no-significant trends in violation rates, indicating no improvements in water conditions of both, Mill and Dodd Creeks.



Considering the levels of BMP implementation, technical assistance funds invested, and water quality monitoring

results; DCR decided to discontinue targeted 319 funding to the Mill and Dodd Creeks project area in December 2011 due to several reasons which included:

- Poor implementation progress on agricultural land in Mill and Dodd Creeks with only 4.1 miles of stream fencing with a implementation goal of 29.6 miles
- Only six septic systems were repaired and the implementation goal was six, three new septic systems were installed and the implementation plan calls for 210 new septic systems or alternative waste treatment systems to replace straight pipes and failing septic systems.
- Lack of cohesiveness and project support amongst partnering agencies.
- Small project area totally only 23,748 acres.
- Water quality improvements were not evident in Mill Creek and Dodd Creek for bacteria (*E. coli*) during the project period.
- Amount of technical assistance funding being invested was not justifiable based on the amount of agricultural and residential BMP cost-share sign-up. DCR funded an Agricultural Conservation Specialist and a Residential Conservation Specialist to work in the project area for the first four years and reduce the technical assistance to only one position for the fifth year.
- Other federal cost-share programs such as CREP and EQIP in conjunction with 319 were not able to stimulate participation.

### **Lessons Learned**

- 1) Community meetings every 2-3 years are important to update the stakeholders on implementation progress and water quality monitoring results. The Steering Committee that was formed during the IP development process is ideal for organizing and assisting in the facilitation of such meetings.
- 2) There are not enough regulations in place to motivate the clean-up of impaired stream segments.
- 3) Need to find ways to get local governments more engaged in improving local water quality and promoting the implementation and long-term preservation of conservation practices.
- 4) Level of public participation in the TMDL implementation plan (IP) process along with local social and cultural barriers that often are openly discussed in a historical perspective (i.e., resistance to fence cattle out of streams, lack of government trust, etc.) during IP development need to be carefully considered prior to committed targeted Implementation funds.

## Closeout Report: Little and Beaver Creeks TMDL Implementation Project: January 2007 – June 2012

### Watershed Description and Water Quality Conditions

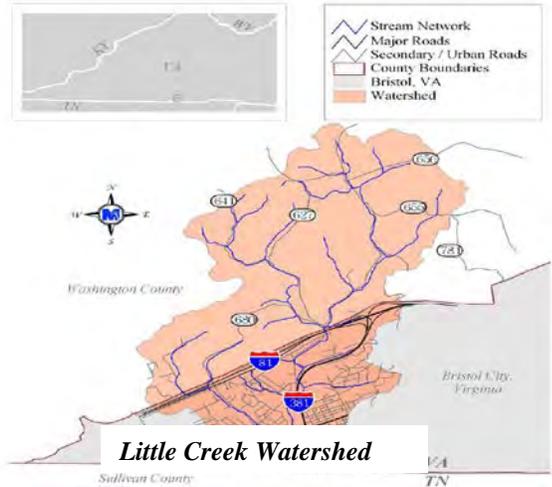
Beaver Creek and Little Creek watersheds are located in Washington County and the City of Bristol, Virginia. Beaver Creek flows into South Fork Holston River eventually flowing into the Tennessee River and the Gulf of Mexico.



Beaver Creek Watershed

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.



Little Creek Watershed

### Implementation Highlights

Beginning in the fall of 2006, the Holston River Soil and Water Conservation District began administering the Beaver Creek and Little Creek TMDL Implementation Project. From July 1, 2011 thru June 30, 2012 a total of eight best management practices were installed including one stream exclusion practices (5,000 feet of stream exclusion fencing), three septic tank pumpouts, two septic system repairs, and two septic system replacements/installation.

Since the beginning of the project 256 BMPs have been installed. This includes: 17 stream fencing practices establishing 19,025 feet of fencing; 421 acres of cover crops, one loafing lot management system for 195 animals; 186 septic tank pumpouts, 23 septic systems repairs, and 12 septic system replacement/installation. In addition 25 rain barrels were installed and 1,300 square feet of rain garden was built treating 2.5 acres. The pollution reductions as a result of the BMPs installed included below are only for 319(h) funded practices.

### Beaver and Little Creeks BMP Summary: January 2007 - June 2012

BMP	Unit	Total	Installed	%
<b>Agricultural</b>				
Stream Exclusion Fencing	Feet	300,000	19,025	6.4
Stream Exclusion Fencing	System	309	17	5.5
Riparian Buffer Established	Acres		97.9	
Stream Crossing & Hardened Access	System	126		
Pasture Management	Acres	8,505		
Vegetative Cover on Cropland	Acres	75	19	25
Vegetative Cover on Critical Area	Acres		15	
Protective Cover for Specialty Crops	Acres	136	449	330
Manure Incorporation	Acres	110		
CREP Vegetated Buffers	Acres	16	1	6
<b>Urban/Residential (Beaver Creek)</b>				
Bioretention Filter	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</b>				
Pet Waste Control Program	Program	2		
Septic System Pump Out	System	144	186	129
Sewer Connection (Beaver Creek)	System	78		
Septic System Repairs	System	113	23	20
Septic System Installation	System	55	12	22
Alternative Waste Treatment System	System	15		
*NOTE: BMP counts after 7/1/2009 only include 319 funded projects. BMPs funded by State CS, CREP or Federal EQIP are not included after this date (though they may have been included previously). AT = Acres treated				

Period	Pathogens (Coliform) CFU	Nitrogen Lbs/year	Phosphorus Lbs/year	Sedimentation-Siltation tons/year
January 2007-June 2011	2.80E+15	2292	568	3505
July 2011-June 2012	6.94E+13	355	52	47
<b>TOTAL</b>	<b>2.87E+15</b>	<b>2647</b>	<b>620</b>	<b>3552</b>

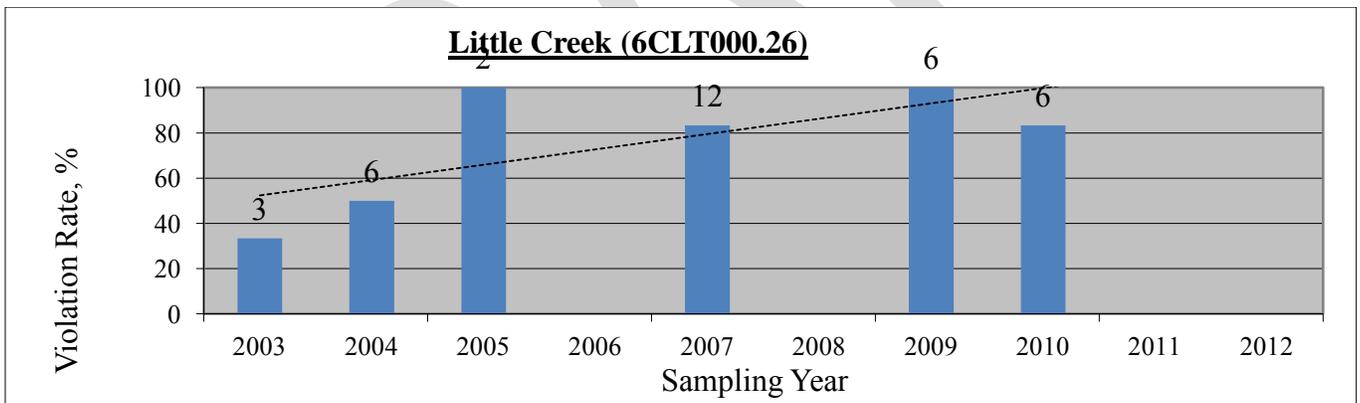
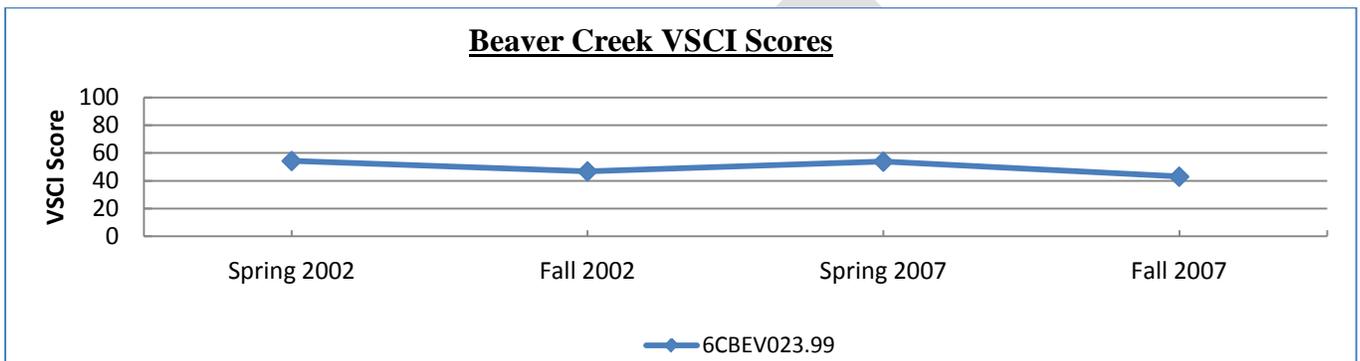
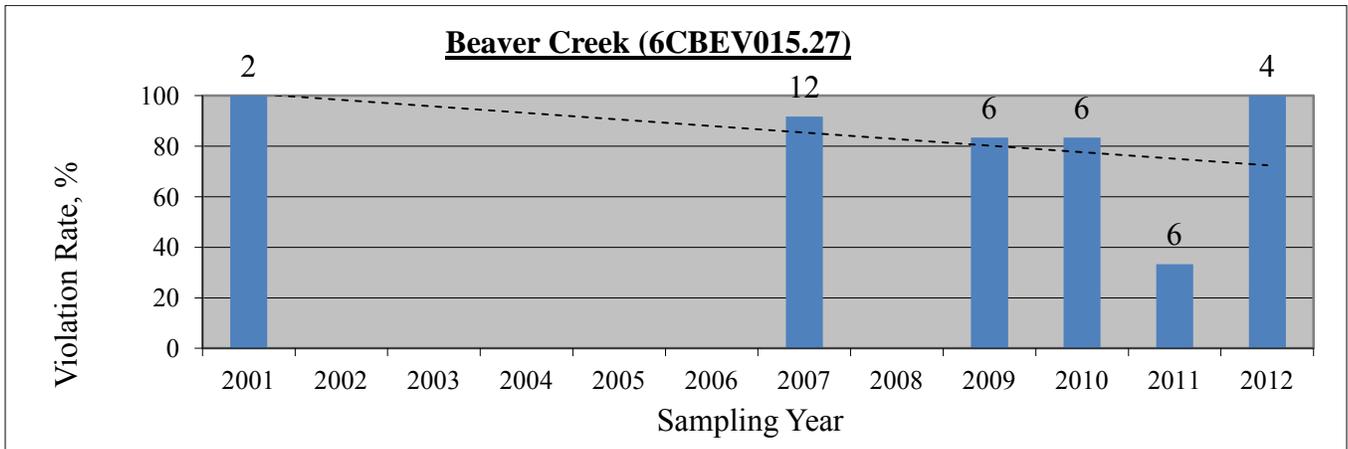
### ***Water Quality Conditions***

The biological and *E. coli* data were obtained from DEQ, which conducted water quality sampling at various monitoring stations within the Beaver and Little Creeks watersheds, at their pre-assigned water quality monitoring schedule. The *E. coli* data for Little Creek was available for 2003 through 2010 (at river mile 0.20), and for 2001 and 2007 through 2012 for Beaver Creek (at river mile 15.27). The biological data for Beaver Creek was available only for fall and spring seasons of 2002 and 2007. The biological status of water bodies measured through an index developed by DEQ and EPA, Virginia Stream Condition Index (VSCI), is shown in graphical forms. The available *E. coli* data was analyzed to determine the impact of implemented BMPs on bacteria violation rates and the trend, if any, in water quality conditions.

The bar graph shows the percent violation rate for water quality samples collected annually that did not meet the water quality standard of 235 cfu/100 mL. The number of samples that were collected each year are shown above each bar within the graph. The violation rates for Little and Beaver Creeks remained consistently higher during the period of analysis. Little Creek data show an increasing trend in violation rate, indicating deterioration in water quality conditions. The linear trend fitted to Beaver Creek *E. coli* data shows decreasing, but higher violation rates during the monitoring period, indicating no improvement in water quality condition. Also, VSCI scores were same and did not show any improvement in biological status of Beaver Creek

Considering the levels of BMP implementation, technical assistance funds invested, and water quality monitoring results; DCR decided to discontinue targeted 319 funding to the Mill and Dodd Creeks project area in December 2011 due to several reasons which included:

- Poor implementation progress on agricultural land in Little and Beaver Creeks with only 3.6 miles of stream fencing with a implementation goal of 56.8 miles.
- There was a total of 483 acres of cropping practices implemented to reduce sediment loadings in Beaver Creek.
- There was some success with the implementation of septic system practices with the repair or replacement of 35 septic systems.
- Urban practices installed within the City of Bristol in Beaver Creek included a raingarden, bioretention filter, and rain barrels.
- Soil and Water Conservation Districts generally lack staff with expertise in the design and layout of stormwater BMPs and they need to partner with other agencies and stakeholders in addressing pollutant sources in urban areas in order to be successful.
- Water quality improvements were not evident in Little Creek and Beaver Creek for bacteria (*E. coli*) during the project period. Biological monitoring data collected in Beaver Creek in 2002 and 2007 did not demonstrate any change. Biological monitoring by DEQ needs to be better funded and supported in the Abingdon Regional Office coverage area to access biological conditions on impaired streams and areas with implementation projects.
- Amount of technical assistance funding being invested was not justifiable based on the amount of agricultural and residential BMP cost-share sign-up.
- Other federal cost-share programs such as CREP and EQIP in conjunction with 319 were not able to stimulate participation.



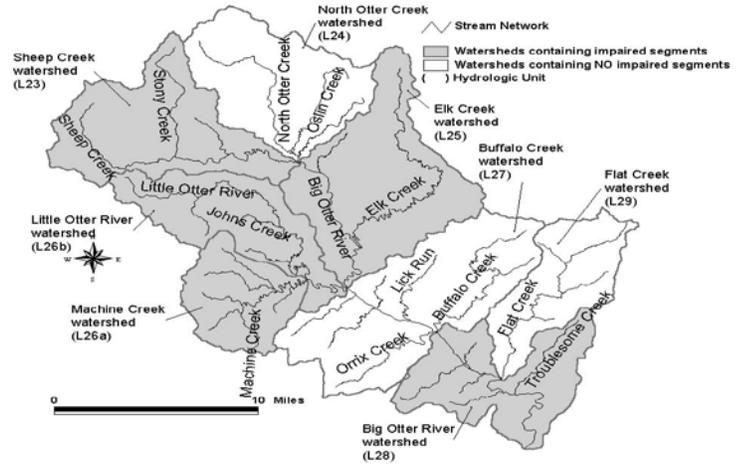
**Lessons Learned**

- 1) Community meetings every 2-3 years are important to update the stakeholders on implementation progress and water quality monitoring results. The Steering Committee that was formed during the IP development process is ideal for organizing and assisting in the facilitation of such meetings.
- 2) There are not enough regulations in place to motivate the clean-up of impaired stream segments.
- 3) Need to find ways to get local governments more engaged in improving local water quality and promoting the implementation and long-term preservation of conservation practices.
- 4) Level of public participation in the TMDL implementation plan (IP) process along with local social and cultural barriers that often are openly discussed in a historical perspective (i.e., resistance to fence cattle out of streams, lack of government trust, etc.) during IP development need to be carefully considered prior to committed targeted implementation funds

## Current 319H Project Report - Big Otter River TMDL Implementation Project: July 2006 – June 2012

### 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 impairments, but are included in the project area because they drain directly to the project area and contribute to the pollution load.



Big Otter River BMP Summary: July 2006-June 2012

### Implementation Highlights

Since the July 2006, the Peaks of Otter Soil & Water Conservation District has administered the Big Otter TMDL Implementation Project. From July 1, 2011 through June 30, 2012 a total of 16 BMPs were installed as part of this effort, which are included in the total column in the table on the right. A total of seven agricultural BMPs were installed during this period including 40,626 feet of stream exclusion fencing. In addition, nine residential BMPs were completed including four septic tank system repairs and five septic systems installations/replacements.

Since July 2006 150 agricultural BMPs have been installed including 134 stream exclusion systems resulting in 374,648 linear feet of stream exclusion fencing, and creating approximately 498 acres of riparian buffers. In addition, 136 residential BMPs have been installed including 25 septic tank pumpouts, 23 septic tank system repairs, five connections to public sewer, 78 septic system replacements/installations, and five alternative waste treatment systems. 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</b>				
Stream Exclusion Fencing	Feet	934,560	374,648	40
Riparian Buffer Established	Acre		74	
Livestock Exclusion System	System	270	134	50
Forest Buffer	Acre		148	
Animal Waste Control			2	
Pasture Management	Acre	7,001		
<b>Residential</b>				
Septic Pump Out	System		25	
Connection to Sewer	System		5	
Septic System Repair	System	34	23	68
Septic System Installation	System	187	79	42
Alternative Waste Treatment System	System	26	5	19
*NOTE: BMP counts after 7/1/2009 only include 319 funded projects. BMPs funded by State CS, CREP or Federal EQIP are not included after this date (though they may have been included previously)				
Water Quality Goals Met	Unit	Miles Listed	Miles Delisted	%
Stream Impairment on the 303(d) list on the 3 3030303(d) list	Miles	76.78	-	-

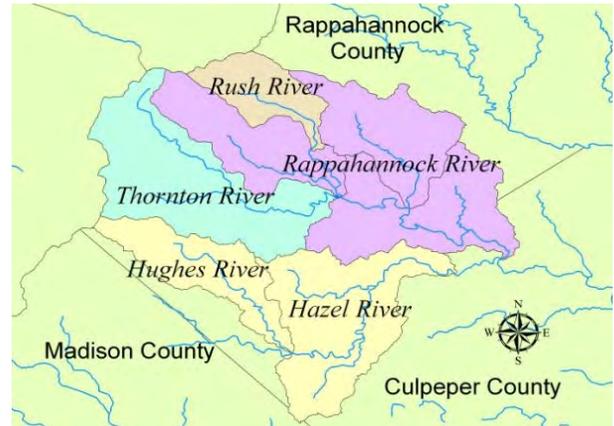
Pollution Reductions for the Big Otter River: July 2006-June 2012

Period	Pathogens (Coliform) CFU	Nitrogen Lbs/year	Phosphorus Lbs/year	Sedimentation-Siltation tons/year
July 2006-June 2011	1.84E+16	12,726	2,546	4,994
July 2011-June 2012	1.2E+15	7,410	1,456	1,324
<b>TOTAL</b>	<b>1.96E+16</b>	<b>20,136</b>	<b>4,002</b>	<b>6,318</b>

## Current 319H Project Report - Upper Hazel River TMDL Implementation Project: July 2009 – June 2012

### Project Location

The Hazel River watershed covers approximately 135,610 acres and includes, along with the Hazel River, the Hughes, Rush, and Thornton Rivers. The Hazel River begins in Rappahannock County, Virginia south of Panorama and continues downstream to its confluence with Rappahannock River northwest of Remington, Virginia. The Rappahannock River forms in Fauquier County, Virginia southeast of Front Royal and continues downstream to the Chesapeake Bay. The Hazel River and its tributaries were placed on Virginia's 303(d) list of impaired waters for violations of the fecal coliform bacteria standard between 2002 and 2004. A TMDL was developed to address these impairments in 2007.



### Implementation Highlights

A TMDL implementation plan was developed for the Hazel River in May 2009. The Culpeper Soil and Water Conservation District (CSWCD) began administering the residential and agricultural BMP programs in July 2009. The table on the right shows BMPs implemented in the project area since it began and cumulative implementation goals established in the plan.

From July 2011 thru June 2012 the CSWCD installed 33 BMPs. This included nine livestock stream exclusion practices that fenced out over 28,574 feet of stream and created 16.26 acres of riparian buffers on pasture. An additional 22 acres of permanent vegetative cover was installed on cropland during this period. In the residential program 21 BMPs were installed between July 2011 and June 2012. This included 17 pumpouts, three septic system repairs and one replacement.

Pollution reductions resulting from BMP installations since 2009 are summarized in the table below.

Hazel River BMP Summary: July 2009 – June 2012

Control Measure**	Units*	Needed	Installed	%
<b>Agricultural</b>				
Stream Exclusion Fencing	F	2,307,360	139,620	6
Stream Exclusion Fencing	S	1,072	55	5
Riparian Buffer	Ac	-----	102	-----
Manure Incorporation	Ac	569	-----	0
Pasture Management	Ac	53,621	-----	0
Woodland buffer filter	Ac	-----	2.5	-----
Reforestation of erodible crop and pasture land	Ac	283	-----	0
Permanent vegetative cover on cropland	Ac	-----	22	-----
Veg. buffer on cropland	Ac	283	185	65
<b>Residential</b>				
CCU Treatment*	S	20	-----	0
Pet waste Composters	S	4,211	-----	0
<b>Residential Septic</b>				
Septic Tank Pump Out	S	-----	91	-----
Septic System Repair	S	443	37	8
Septic System Installation	S	673	30	4
Alternative Waste Treatment	S	230	1	<1

\* Ac = Acres, S = System, F = Feet, CCU = Confined Canine Unit

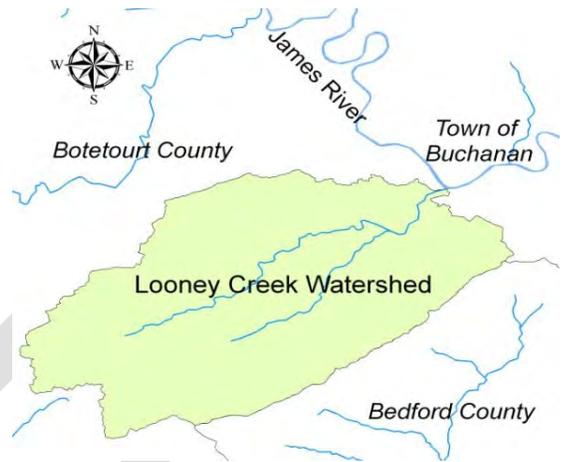
Pollution Reductions for Hazel River: July 2009-June 2012

Period	Pathogens (Coliform) CFU	Nitrogen Lbs/year	Phosphorus Lbs/year	Sedimentation-Siltation tons/year
July 2011 – June 2012	1.72E+15	1,573	234	263
July 2009-June 2012	4.91E+15	3,601	510	572

## Current 319H Project Report - Looney Creek TMDL Implementation Project: July 2009- June 2012

### Project Location

Looney Creek is located in Botetourt County, Virginia. The creek empties directly into the James River south of the Town of Buchanan. The Looney Creek watershed is approximately 40,000 acres with an estimated population of just over 4,100 people. The major land use in this watershed is forest. Looney Creek was listed as impaired on Virginia's 1998 303(d) list due to violations of the State's water quality standards for fecal coliform bacteria from the confluence of Mill and Back Creek to the James River confluence, a total of 2.48 miles. The VA Department of Environmental Quality completed a bacteria TMDL for Looney Creek in May 2004, and DCR completed the TMDL implementation plan in November 2007.



### Implementation Highlights

The Looney Creek TMDL implementation project is administered by the Mountain Castles Soil and Water Conservation District (MCSWCD). The table on the right shows BMPs implemented in the watershed since the project began in July 2009 and overall implementation goals for the project area. Landowner participation in the cost share program has been variable from year to year, with a considerable amount of livestock exclusion fencing going in between 2010 and 2011, but very little the following year.

Between July 1, 2011 and June 30, 2012, one livestock exclusion practice was completed resulting in 1,000 linear feet of stream exclusion fencing and 0.8 acres of riparian buffers on pasture in the watershed. This landowner also installed a woodland buffer filter area. In addition, three septic tank pumpouts, one septic system repair and one replacement were completed. Pollution reductions resulting from BMPs installation since 2009 are summarized in the table below.

Looney Creek BMP Summary: July 2009 – June 2012

Control Measure**	Units*	Needed	Installed	%
<b>Agricultural</b>				
Stream Exclusion Fencing	F	68,583	22,078	32
Stream Exclusion Fencing	S	44	9	20
Riparian Buffer	Ac	-----	14	-----
Waste Storage Facility	S	2	1	50
Manure Incorporation	Ac	318	-----	0
Pasture Management	Ac	9,467	-----	0
Sinkhole Protection	F	4,000	-----	0
Veg. Buffer on Cropland	Ac	4	-----	0
<b>Residential</b>				
Pet Waste Digesters	S	453	-----	0
Vegetated Buffer	F	100,810	-----	0
<b>Residential Septic</b>				
Septic Tank Pump Out	S	100	12	12
Septic System Repair	S	16	6	38
Septic System Installation	S	77	4	5
Alternative Waste Treatment	S	10	1	10

\* Ac = Acres, S = System, F = Feet

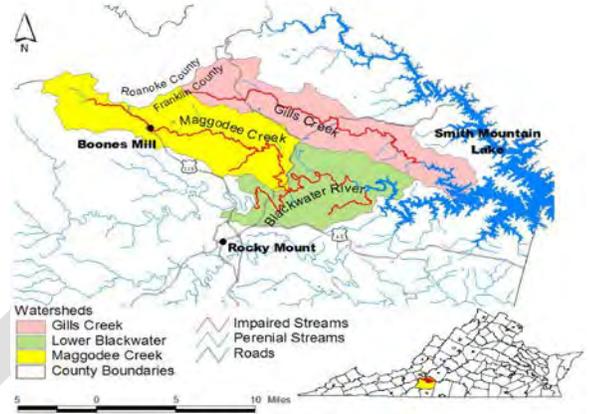
Pollution Reductions for Looney Creek: July 2009-June 2012

Period	Pathogens (Coliform) CFU	Nitrogen Lbs/year	Phosphorus Lbs/year	Sedimentation-Siltation tons/year
July 2011 – June 2012	1.21+14	550	76	91
July 2009-June 2012	1.13E+15	5,219	777	925

## Current 319H Project Report - Lower Blackwater TMDL Implementation Project: January 2006- June 2012

### Project Location

The Lower Blackwater River, Maggoodee 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 Smith Mountain Lake. Maggoodee 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



Lower Blackwater River BMP Summary: March 2006-June 2012

### Implementation Highlights

DCR and local stakeholders completed the TMDL implementation plan for the Lower Blackwater River, Maggoodee Creek and Gills Creek in January 2006. Project implementation started in March 2006 by the Blue Ridge SWCD. From July 2011 thru June 2012 a total of 11 BMPs were completed. Eight fencing practices installed resulted in 15,792 feet of stream exclusion fencing. One animal waste control facility and one loading lot management system were completed. During this period, one septic system repair was completed. This project has been closed and as of July 2012 is no longer receiving 319(h) funding.

From March 2006 through June 2012, 52 agricultural practices have been completed resulting in approximately 24 miles of stream fencing, and establishing 116 acres of riparian buffer. In addition 80 residential BMPs have been installed, including 69 septic tank pumpouts and eleven septic system repairs/replacements. The pollution reductions resulting from BMPs installed included below are only for 319(h) funded practices.

Control Measure*	Unit	Units Needed	# Installed	%
<b>Agricultural</b>				
Stream Exclusion Fencing	Feet	147,840	125,445	85
Stream Exclusion Fencing	System	77	40	52
Riparian Buffer Established	Acre		116.52	
Waste Storage Facility	System		4	
Loafing Lot Management	System	3	2	66
Vegetative Cover on Critical Area	Acre		2	
Animal Waste Control Facilities	System		1	
<b>Residential</b>				
Septic System Pump Out	System	100	69	69
Septic System Repair	System		3	
Septic System Installation	System	65	8	12
Alternative Waste Treatment System	System	7		
*NOTE: BMP counts after 7/1/2009 only include 319 funded projects. BMPs funded by State CS, CREP or Federal EQIP are not included after this date (though they may have been included previously)				
<b>Water Quality Goals Met</b>	<b>Unit</b>	<b>Miles Listed</b>	<b>Miles Delisted</b>	<b>%</b>
Impaired miles on the 303(d) list	Miles	69.1	4.41	6

Pollution Reductions for the Lower Blackwater River, Maggoodee Creek and Gills Creek: March 2006-June 2012

Period	Pathogens (Coliform) CFU	Nitrogen Lbs/year	Phosphorus Lbs/year	Sedimentation-Siltation tons/year
March 2006-June 2011	11.19E+15	1,842	498	569
July 2011-June 2012	1.62E+15	7,563	1,497	1,386
<b>TOTAL</b>	<b>12.81E+15</b>	<b>9,405</b>	<b>1,995</b>	<b>1,955</b>

## Current 319H Project Report - Mill and Hawksbill Creek TMDL Implementation Project: Jan 2008- June 2012



### Project Location

Mill Creek and Hawksbill Creek are located in Page County in the South Fork Shenandoah watershed. Additionally, Hawksbill Creek runs through the Town of Luray. Mill Creek watershed is 8,178 acres and Hawksbill Creek watershed is 56,951 acres. The creeks 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).

### Mill and Hawksbill Creek BMP Summary: January 2008 – June 2012

Control Measure**	Units*	Needed	Installed	%
<b>Agricultural</b>				
Stream Exclusion Fencing	F	138,828	29,667	21
Stream Exclusion Fencing	S	62	17	27
Riparian Buffer	Ac	-----	89	-----
Voluntary Exclusion Systems	S	24	0	0
Waste Storage Facility	S	8	-----	0
Manure Incorporation	Ac	838	0	0
Pasture Management	Ac	14,739	0	0
Veg. Buffer on Cropland	Ac	9	26	289
<b>Urban/Residential</b>				
Pet Litter Control Program	P	1	0.5	50
Pet Waste Digesters	S	1,577	4	<0
Vegetated Buffer	Ac	12	0	0
<b>Residential Septic</b>				
Septic Tank Pump Out	S	936	265	28
Septic System Repair	S	57	60	105
Septic System Installation	S	60	27	45
Alternative Waste Treatment	S	32	3	9

\* Ac = Acres, S = System, F = Feet of stream, P = Program

### Implementation Highlights

The Mill and Hawksbill Creek TMDL implementation project is administered by the Shenandoah Valley Soil and Water Conservation District (SVSWCD). The table on the right shows BMPs implemented in the watersheds since the project began in January 2008 and overall implementation goals for the project areas.

The residential septic program has been a great success in Mill and Hawksbill Creeks, with the septic repair goal exceeded and the number of septic system replacements approaching 50% of the implementation goal. Participation in livestock exclusion BMPs has been steady in recent years, with the extent of exclusion installed to date approaching 25% of the overall implementation goal.

Between July 1, 2011 and June 30, 2012, 9,089 linear feet of stream exclusion fencing was installed in the watersheds. In addition, 82 septic tank pumpouts, 17 septic system repairs, four replacements, and one alternative waste treatment system were completed. Pollution reductions resulting from BMPs installation since 2008 are summarized in the table below. These figures do not include the Urban/ Residential (non-septic) practices due the fact that the pollution reductions for these practices were not available at the time of this report.

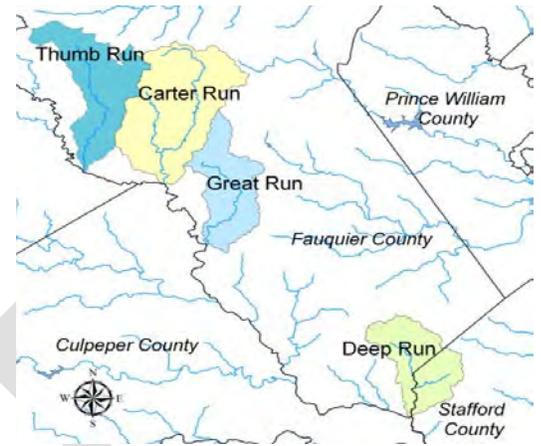
### Pollution Reductions for Mill and Hawksbill Creeks: January 2008-June 2012

Period	Pathogens (Coliform) CFU	Nitrogen Lbs/year	Phosphorus Lbs/year	Sedimentation-Siltation tons/year
July 2011-June 2012	6.93E+14	2,488	610	322
January 2008-June 2012	2.01E+15	9,162	2,000	1,380

## Current 319H Project Report - Thumb, Deep, Carter and Great Runs TMDL Project July 2006- June 2012

### Project Location

Thumb Run, Carter Run, Great Run, and Deep Run are part of the Rapidan-Upper Rappahannock Basin in the Chesapeake Bay watershed. The Thumb Run, Carter Run and Great Run watersheds are located in Fauquier County, Virginia. The northern portion of Deep Run watershed lies in Fauquier County with the southern portion in Stafford County. The 92,800 acre project area is made up of forest (60%), agricultural (39%) and residential (1%) land uses. A TMDL implementation plan was developed to address a fecal coliform impairment on Thumb Run and *E. coli* impairments on Deep, Carter and Great Runs. Deep Run was first listed as impaired for fecal coliform on the 1996 303(d) list (DEQ, 1996). Thumb, Carter and Great Runs followed in 1998.



### Implementation Highlights

The Thumb, Deep, Carter and Great Runs TMDL implementation project is administered by the John Marshall Soil and Water Conservation District (JMSWCD) and the Fauquier County Health Department. The Health Department was contracted to provide technical assistance and educational outreach to homeowners while JMSWCD delivers the agricultural BMP program and associated education and outreach. The table on the right shows BMPs implemented in the watersheds since the project began in July 2006 and implementation goals established for the project areas. Outreach efforts for the project have included newspaper articles, of mailing to landowners in the watersheds, and presentations to community organizations. Between July 2011 and June 2012, seven livestock exclusion projects were completed in the watersheds totaling approximately 77,670 feet of streamside fencing. In addition, 40 septic tank pumpouts, nine septic system repairs and two replacements were completed.

Thumb, Deep, Carter and Great Runs BMP Summary:  
July 2006 – June 2012

Control Measure**	Units*	Needed	Installed	%
<b>Agricultural</b>				
Stream Exclusion Fencing	F	421,947	146,450	35
Stream Exclusion Fencing	S	167	40	24
Riparian Buffer	Ac	-----	216	-----
Pasture Management	Ac	16,271	-----	0
Manure incorp. on cropland	Ac	5,331	-----	0
Veg. Cover on Cropland	Ac	-----	31	-----
Woodland Buffer Filter Area	Ac	-----	19	-----
<b>Urban/Residential Pet Waste</b>				
Pet Litter Control Program	P	3	-----	0
CCU BMP Demonstration*	S	2	-----	0
CCU BMP Installation*	S	25	-----	0
Pet waste landscape demo.	S	2	2	100
<b>Residential Septic</b>				
Septic Tank Pump Out	S	-----	202	-----
Septic System Repair	S	102	40	39
Septic System Installation	S	146	11	8
Alternative Waste Treatment	S	44	-----	0

\*Ac =Acres, S =System, F = Feet, P = Program, CCU = Concentrated Canine Unit

\*\* BMPs funded by State CS, CREP or Federal EQIP are not included after 7/1/2009 (though they may have been included previously)

The pollution reductions resulting from BMP installations beginning in 2006 are summarized in the table below.

Pollution Reductions for Thumb, Deep, Carter and Great Runs: July 2006-June 2012

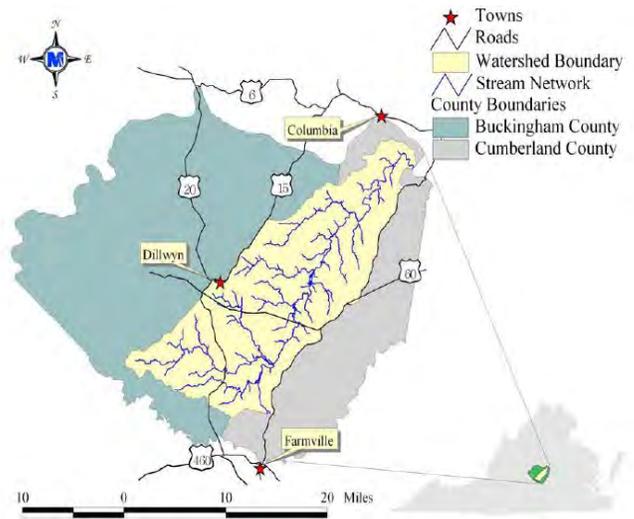
Period	Pathogens (Coliform) CFU	Nitrogen Lbs/year	Phosphorus Lbs/year	Sedimentation-Siltation tons/year
July 2011-June 2012	2.79E+15	34,951	6,220	6,357
July 2006-June 2012	9.73E+15	43,833	7,912	8,430

## **Current 319H Project Report - Willis River TMDL Implementation Project: July 2005-June 2012**

### **Project Location**

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 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, and livestock stream exclusion with grazing

land protection systems, riparian buffers, septic tank pump-outs, septic system repairs and replacements.



### **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, 2011 thru June 30, 2012 four livestock stream exclusion practices were installed protecting 23,445 feet of stream and creating 18.9 acres of riparian buffer area. During this period 17 septic pump outs, two septic system repairs and one septic system replacement were also completed. Since the beginning of the project in July 2005 (through June 30, 2012), there have been 78 agricultural practices completed. Approximately 40.7 miles of stream fencing has been installed, establishing almost 166 acres of buffer. For the residential program, to date, 57 septic projects have been implemented including 43 septic tank pump out, nine septic systems repairs and five septic

systems replacements. The pollution reductions as a result of the BMPs installed included at the bottom of the page are only for 319(h) funded practices.

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. 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.

**Willis River BMP Summary: August 2005-June 2012**

Control Measure*	Unit	Units Needed	# Installed	% Goal
<b>Agricultural</b>				
Stream Exclusion Fencing	Miles	475,000	218,245	46
Stream Exclusion Fencing	System	318	60	19
Riparian Buffer Established	Acre		66	
Stream Crossing & Hardened Access	System		6	
Loafing Lot Management	System		1	
Animal Waste Storage Facility	System		4	
Composting Facility	System		3	
<b>Residential</b>				
Septic System Pump Out	System	100	43	43
Septic System Repair	System	3	9	300
Septic System Installation	System	2	5	250
<i>BMP counts after 7/1/2010 only include 319, WOIF and VNRFC funded projects. BMPs funded by State CS CREP or Federal EQIP are not included after this date (though they may have been included previously)</i>				
<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	34.5	57

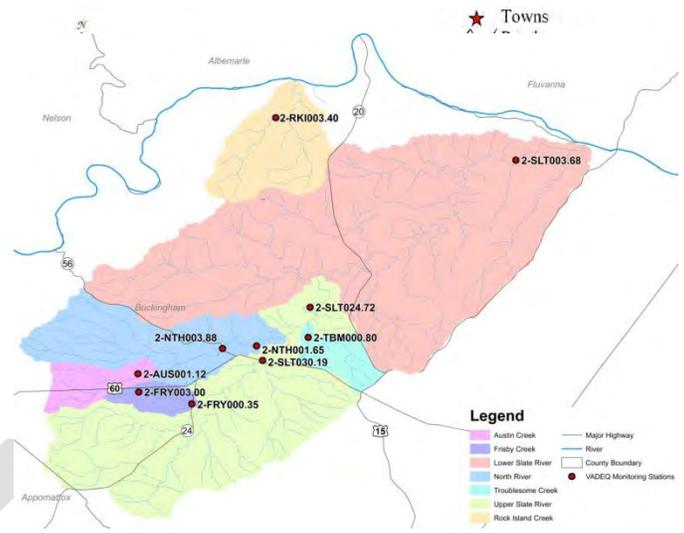
**Pollution Reductions for the Willis River: August 2005-June 2012**

Period	Pathogens (Coliform) CFU	Nitrogen Lbs/year	Phosphorus Lbs/year	Sedimentation-Siltation tons/year
July 2005-June 2011	1.52E+16	4,865	1,057	935
July 2011-June 2012	2.85E+15	1,570	207	267
<b>TOTAL</b>	<b>1.81E+16</b>	<b>6,435</b>	<b>1,264</b>	<b>1,202</b>

## Current 319H Project Report - Slate River TMDL Implementation Project: July 2011-June 2012

### Project Location

Located approximately 60 miles west of Richmond in the Piedmont, the Slate River and Rock Island Creek and its tributaries in Buckingham County were listed as not meeting water quality standards on Virginia's 2002 and 2004 303(d) lists of impaired waters. The impairment was due to violations of the State's 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, a water quality improvement plan was started to install various agricultural and residential best management practices (BMPs) through a Total Maximum Daily Load (TMDL) implementation project funded with EPA Section 319(h) funds that began in July 2011.



During first year of the project, 10 farm visits and meetings were conducted to promote various agricultural and residential best management practices among the land owners of the watersheds. Three agricultural best management practices have been installed, including two stream exclusion fencing practices and one extension of CREP watering system. Also, 26 residential practices were completed during first year of the project.

### Project Background and Problem Identification

The Slate River and Rock Island Creek watersheds are located in Buckingham County and are part of the James River Basin (HUC 02080205). The Slate River watershed is approximately 156,940 acres, and is comprised of forest (87%), pasture/cropland (10%), water/wetland (2%), and residential (1%) land uses. The Rock Island Creek watershed is approximately 13,050 acres with forest as the primary land use (92%), followed by pasture/cropland (6%), water/wetland (2%), and residential (1%) land uses.

In 2002, the lower and upper Slate River and its tributaries (Frisby Branch and North River) in 2002 were placed on the Commonwealth of Virginia's 303(d) list because of violations of the bacteria water quality standard. Rock Island Creek, Austin Creek and Troublesome Creeks were listed in 2004, also for violations of the bacteria standard. The impaired stream segments include 6.14 miles of Austin Creek, 3.83 miles of Frisby Branch, 8.44 miles of North River, 0.95 miles of Troublesome Creek, 16.92 miles of the Slate River, and 8.84 miles of Rock Island Creek. The Slate River empties into the James River, and Rock Island Creek, a tributary of the James River, empties into the James west of the confluence of the Slate and James Rivers.

The bacteria TMDL study for the Slate River and Rock Island Creek was completed by DEQ in 2007. In 2010, DCR and Peter Francisco Soil and Water Conservation District, with extensive input from other stakeholders, completed a TMDL implementation plan and commenced the implementation project to reduce bacteria levels in the Slate River and Rock Island Creek watersheds. The implementation project also covers Muddy Creek and Turpin Creek, which were listed as impaired due to excess bacteria after completion of the TMDL study.

### Project Highlights

Numerous field visits were conducted to promote the agricultural and residential BMPs offered under the TMDL implementation plan, along with postcard mailings advertising the program and personal contacts and meetings with farmers and residents about the water quality improvement programs

From July 1, 2011 through June 30, 2012, two livestock stream exclusion practices protecting 2,190 feet of stream were completed. In addition, one extension of a CREP watering system (1,210 feet), and a 17 acre of reforestation of erodible crop and pastureland practice were completed. Also, 23 septic pump outs and two septic system installations/replacements were completed during this period.

**Slate River and Rock Island Creek BMP Summary:  
July 2011-June 2012**

Control Measure*	Unit	Units Needed	# Installed	%
<b>Agricultural</b>				
Stream Exclusion Fencing	Feet	1,367,520	2,190	>1
Stream Exclusion Fencing	System	406	2	>1
Extension of CREP Watering System	Acre		48	
Reforestation of Erodeable Crop & Pastureland	Acre	30	17	57
<b>Residential</b>				
Septic System Pump Out	System	187	23	12
Septic System Repair	System	90	0	0
Septic System Installation	System	97	2	2
*NOTE: BMP counts after 7/1/2010 only include 319, WOIF and VNRCF funded projects. BMPs funded by State CS CREP or Federal EQIP are not included after this date (though they may have been included previously)				

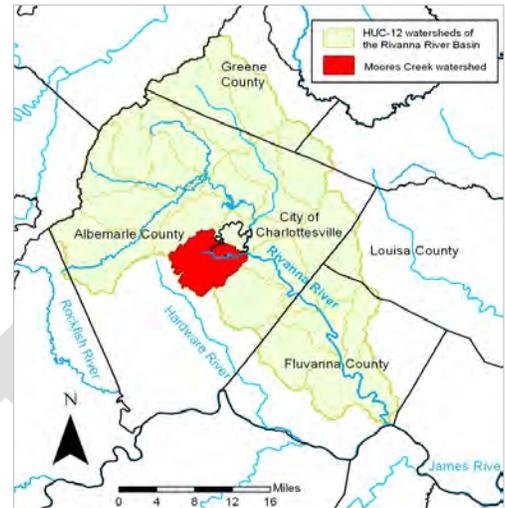
**Pollution Reductions for the Slate River and Rock Island Creek: July 2011-June 2012**

Period	Pathogens (Coliform) CFU	Nitrogen Lbs/year	Phosphorus Lbs/year	Sedimentation-Siltation tons/year
July 2011-June 2012	1.34E+11	600	69	96

## **Current 319H Project Report - Moores Creek TMDL Implementation Project: January 2012-June 2012**

### **Project Location**

Moores Creek watershed is located within the Middle James watershed and drains 31.49 square miles of Albemarle County and 3.49 square miles of the City of Charlottesville, for a total drainage area of 34.92 square miles. Moores Creek flows approximately 11 miles from its source in the Ragged Mountains to its confluence with the Rivanna River in Charlottesville. The watershed is predominantly forested, with residential areas, grasslands, and urban areas being the other major land uses. Moores Creek was first listed as impaired due to violations of the State's water quality standard for fecal coliform on Virginia's 1998 303(d) Total Maximum Daily Load Priority List and Report (DEQ, 1998). The 6.37 mile impaired segment extends from the intersection of U.S. Route 29 and County Route 1106 to the confluence of the Rivanna River.



### **Project Background**

A TMDL for the bacteria impairment on Moores Creek was completed by DEQ and approved by EPA in 2002. A TMDL implementation plan was completed by the Thomas Jefferson Planning District Commission in 2003; however, it did not meet the nine eligibility criteria to receive EPA Section 319 funding. In 2012, DCR contracted the Rivanna River Basin Commission (RRBC) to complete an update to the implementation plan in order to meet the funding criteria and provide funding to the RRBC to implement the plan. The update was completed and approved by EPA in 2012. During the revision process, the RRBC led the formation of a partnership to support implementation efforts that included Albemarle County and the City of Charlottesville, the Thomas Jefferson SWCD, the Albemarle County Health Department, the Rivanna Water and Sewer Authority, StreamWatch, The University of Virginia, The Rivanna Conservation Service, and the Thomas Jefferson Planning District Commission. This partnership has a strong history of working together on water quality projects throughout the Rivanna River Basin. The partnership collaborated on completion of the revised implementation plan as well as planning and implementation of the Moores Creek TMDL implementation project.

### **Project Goals**

EPA 319(h) funds are currently being used to support project technical staff, the implementation of a residential septic program, a pet waste education program and water quality monitoring. DCR has awarded the Thomas Jefferson SWCD with funding from the VA Natural Resources Commitment Fund for agricultural BMP cost share in the watershed. Specific implementation goals for this 2 ½ year project are summarized in the table below.

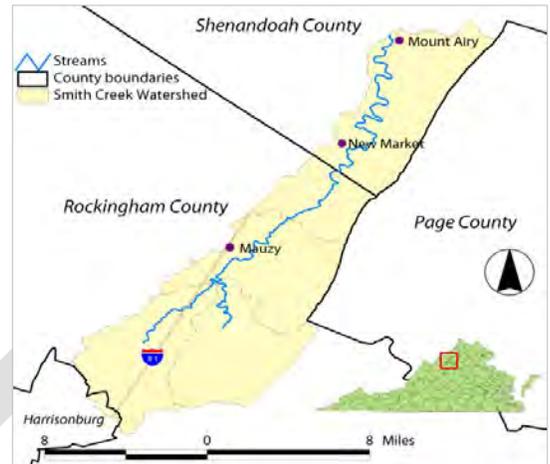
Program	Control measure	Units	Extent
Residential septic	Septic tank pumpout	Pumpout	40
	Connection to public sewer	Connection	1
	Septic system repair	Repair	4
	Septic system replacement	System	2
	Alternative waste treatment system	System	1
Pet waste	Pet waste digesters (including 1 pet waste to energy digester)	Digester	76
	Pet waste education program	Program	1
Agriculture	Livestock exclusion (including rotational grazing system)	System	5

As implementation efforts progress in Moores Creek, these grant deliverables will be tracked in conjunction with TMDL implementation plan goals to assess progress towards achieving water quality standards.

## Current 319H Project Report - Smith Creek TMDL Implementation Project: January 2012-June 2012

### Project Location

The Smith Creek watershed is located in the Potomac River Basin in Shenandoah and Rockingham counties, with a small portion of the headwaters located in the City of Harrisonburg, Virginia. The watershed is approximately 67,900 acres in size and land use is predominantly forest and agricultural. Smith Creek was listed as impaired on Virginia's *Section 303(d) Total Maximum Daily Load Priority List and Report* due to violations of the State's Water Quality Standards for fecal coliform bacteria and violations of the General Standard (benthic) (VADEQ 1998, 2002). The Smith Creek TMDLs were completed in April 2004 and approved by EPA in June 2004. A stressor analysis was performed during development of the benthic TMDL, and sediment was identified as the primary stressor causing the aquatic life use impairment in Smith Creek.



### Project Background

A TMDL implementation plan was completed for Smith Creek in February 2009. This plan was developed through a partnership between DEQ, DCR, Virginia Tech, and The University of Virginia's Institute for Environmental Negotiation. Shortly after completion of the implementation plan, Smith Creek was designated as a Showcase Watershed by NRCS (one of three in the Chesapeake Bay watershed). As a result of this designation, Smith Creek has received considerable attention from natural resources agencies over the past four years as well as targeted federal funding to support agricultural BMP implementation. The TMDL implementation plan has served as a guide for these efforts, resulting in an emphasis on livestock exclusion and improved pasture management by NRCS and SWCD staff. Efforts are currently underway by NRCS and DCR staff to coordinate tracking of agricultural BMP implementation based on specific goals included in the TMDL implementation plan. Despite the focus on Smith Creek as a Showcase Watershed, targeted funding was not available for the residential septic and urban stormwater BMPs included in the plan (only agricultural BMPs offered through state and federal cost share programs). Consequently, in 2011/2012 the Shenandoah Valley SWCD applied for and was awarded EPA 319(h) funds to implement a residential septic program in the watershed as well as a series of urban stormwater management practices. This has resulted in a highly effective, comprehensive watershed restoration project in the Smith Creek watershed. In addition, extensive monitoring is currently being conducted in the watershed by USGS, Friends of the Shenandoah River, and Friends of the North Fork of the Shenandoah River, which will aid in assessing progress.

### Project Goals

Considerable progress has already been made to date with respect to agricultural BMP goals for Smith Creek. NRCS installed nearly 27,000 feet of fence in the watershed (stream fencing and cross fencing) between FY 2010 and FY 2012 along with 11 waste storage facilities, 27 watering facilities, 3 stream crossings, and 2,516 acres of

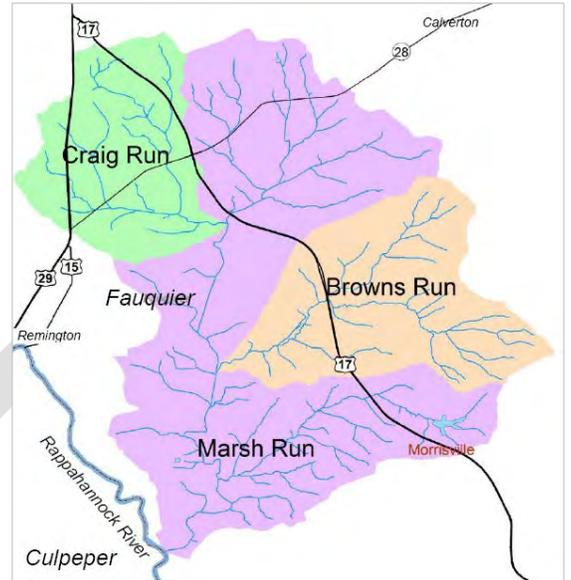
nutrient management. Once NRCS and DCR finalize plans for coordinated tracking of agricultural BMP implementation, these BMPs will be reported in conjunction with achievement of TMDL implementation plan goals. A summary of implementation goals included in the 2 ½ year septic/stormwater grant is provided in the table on the left.

Program	Control measure	Units	Extent
Residential septic	Septic tank pumpout	Pumpout	100
	Connection to public sewer	Connection	3
	Septic system repair	Repair	8
	Septic system replacement	System	11
	Alternative waste treatment system	System	4
Urban	Rain gardens and bioretention filters	Systems	7
	Pet waste education program	Program	1
	Riparian buffer	Buffer	1

## **Current 319H Project Report - Craig, Brown and Marsh Runs TMDL Implementation Project: January 2012-June 2012**

### **Project Location**

The Craig, Browns, and Marsh Run watersheds are located in Fauquier County, VA in the Rappahannock River Basin. The watersheds comprise approximately 29,400 acres, with agriculture and forest as the predominant land uses. Marsh Run, Browns Run, and Craig Run were initially placed on Virginia's *Section 303(d) Total Maximum Daily Load Priority List and Report* in 1996, 2002, and 2004 respectively for exceeding the bacteria standard. Bacteria TMDLs were completed for the creeks in April 2007 as part of the Rappahannock River Basin TMDL, which was approved by EPA in January 2008.



### **Project Background**

The TMDL implementation plan was completed for Craig, Browns and Marsh Runs in November 2010. In October 2011, the John Marshall SWCD submitted a grant proposal to implement several components of Phase I of the 10-year implementation plan. DCR awarded the SWCD 319(h) funds to administer agricultural and residential cost share programs (technical assistance funding and residential BMP cost share). The SWCD was also awarded a VA Natural Resources Commitment Fund grant from DCR, which provides \$300,000 in state funds for agricultural BMP cost share. The SWCD plans to utilize education and outreach strategies that have proven successful in other TMDL implementation project areas including working with home owner associations, community based organizations and local businesses to increase awareness of local water quality issues and the availability of the cost-share assistance. VDH will promote the residential cost-share program in conjunction with the enforcement of septic system regulations. In addition, the SWCD will partner with the Rappahannock-Rapidan Regional Commission to broaden the use and distribution of previously developed "It's Your Doodie!" pet waste management materials, and will demonstrate the use of pet waste digesters at public events.

### **Project Goals**

The Craig, Browns and Marsh Run TMDL implementation project will be implemented over a 2 ½ year period from July 1, 2012 through June 30, 2014, which approximates the time period assigned to milestones 1 and 2 of Phase I (de-listing goal) of the IP. The goals of this project are summarized in the table below.

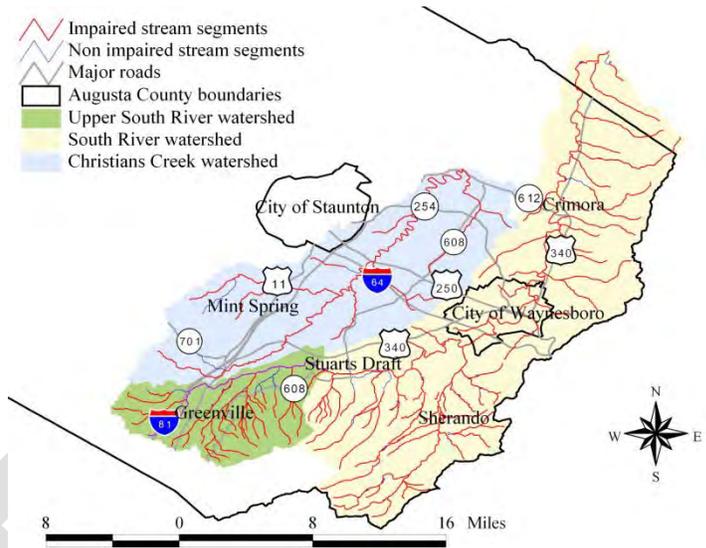
Program	Control measure	Units	Extent
Agricultural	Livestock exclusion fencing	Linear ft	38,500
	Reforestation of pasture or cropland	Acres	20
	Permanent vegetative cover on cropland	Acres	50
Residential	Septic tank pumpout	Pumpout	40
	Septic system repairs	Repair	23
	Septic system replacements	Systems	4
	Alternative waste treatment system	Systems	1
	Pet waste education program	Program	1

## State Project Report - Christians Creek and South River TMDL Implementation Project:

The Christians Creek and South River implementation project for bacteria, sediment and phosphorus impairments was initiated in 2006. DCR contracted with the Headwaters Soil and Water Conservation District and provided funding through the Water Quality Improvement Fund (WQIF) for project implementation. The project is now in its seventh year of agricultural BMP implementation. The table below lists BMPs implemented in the watershed within the period of 2006 through June 2012. These BMPs were funded with state WQIF/VNRCF targeted TMDL cost-share funds. The total cost-share payments for these BMPs were \$533,529.

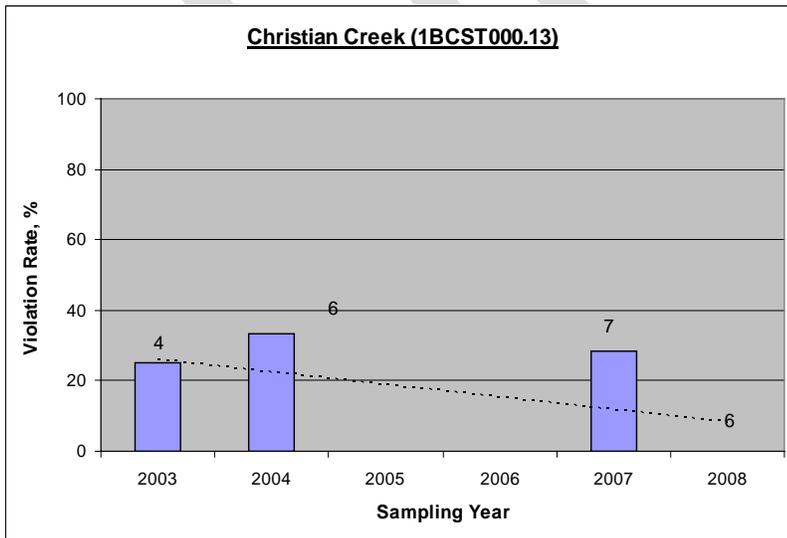
Stream fencing practices have been installed through the USDA Conservation Reserve Enhancement Program, CRSL-6 practice (46,106 linear feet), and CRWP-2 practice (1,440 linear feet) and the TMDL fencing practices: LE-1T (12,937 linear feet), LE-2T (7,151 linear feet), and SL-6 (43,248 linear feet). This totals 21 miles of livestock stream exclusion fencing installed.

The *E. coli* bacteria standard that became effective in 2003 is the standard that has to be met to remove Christians Creek and the South River from the Impaired Waters List. The bar graph shows the percent violation rates for stream samples collected annually that did not meet the water quality standard of 235 cfu/100 mL. The number of samples that were collected each year are shown above each bar within the graphs. A linear trend fitted to the Christians Creek data shows a significant decreasing trend in violation rate over the sampling period, but no samples have been collected since 2008. The decreasing trends in violation rates indicate significant improvement in water quality conditions in Christians Creek.



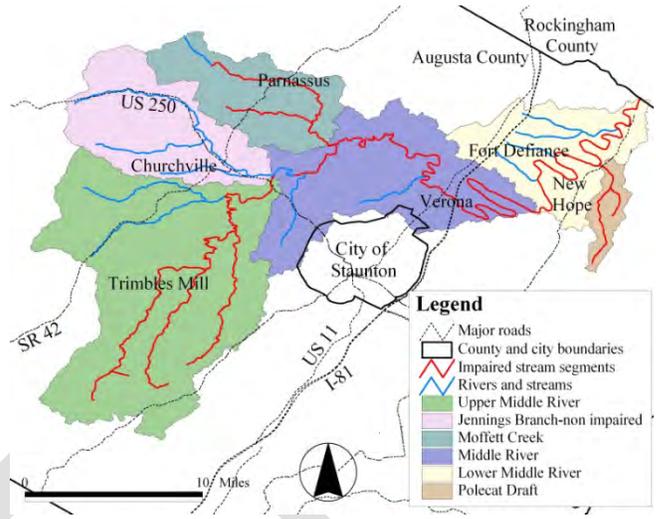
Christians Creek and South River BMP Summary: 2006-2012

Practice Code	Extent Installed	Unit
CP-22	140	Acres
CRFR-3	101	Acres
CRLF-1 (buffer)	5,800	Lin. Feet
CRSL-6	46,106	Lin. Feet
CRWP-2	1,440	Lin. Feet
FR-1	22	Acres
LE-1T	12,937	Lin. Feet
LE-2T	7,151	Lin. Feet
NM-3	311	Acres
NM-4	128	Acres
SL-1	316	Acres
SL-6	43,248	Lin. Feet
SL-7T	4	Acres
SL-8B	3,593	Acres
SL-8H	2,670	Acres
WL-1	4	Acres
WL-2	2	Acres
WP-4	4	System
WQ-4	40	Acres



## State Project Report - Moffett Creek, Middle River and Polecat Draft TMDL Implementation Project :

The Moffett Creek, Middle River and Polecat Draft implementation project for bacteria impairments in all three watersheds and sediment impairments in the Moffett Creek and the Upper Middle River was initiated in 2006. DCR contracted with the Headwaters Soil & Water Conservation District and provided Water Quality Improvement Funds (WQIF) towards the project implementation. The project is now in its seventh year of the implementation of various agricultural BMPs. The table below lists BMPs implemented in the watershed within the period of 2006 through June 2012. These BMPs were funded with state WQIF/VNRCF targeted TMDL cost-share funds. The total cost-share payments for these BMPs were \$1,306,728. The change in water quality reflects the cumulative impact of BMPs implemented.



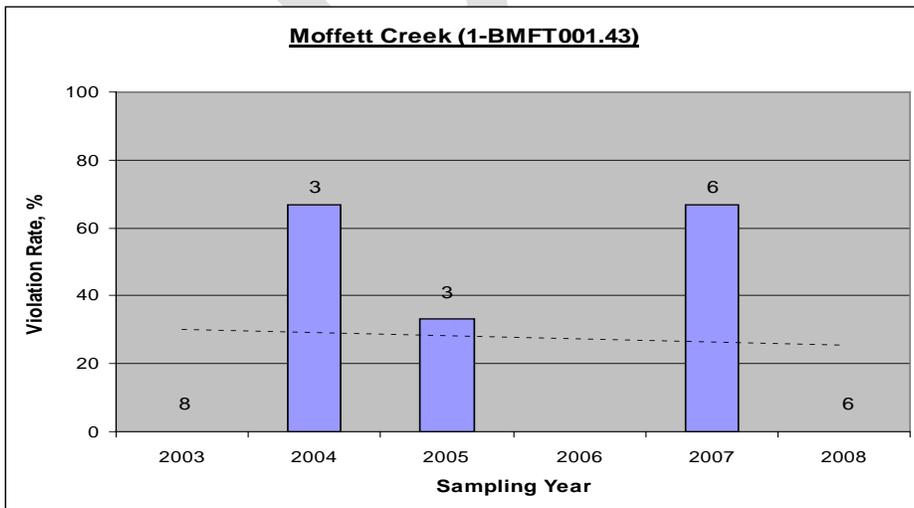
Stream fencing practices have been installed through the USDA Conservation Reserve Enhancement Program, CRSL-6 practice (72,041 linear feet), and CRWP-2 practice (2,389 linear feet), and through TMDL fencing practices: LE-1T (18,252 linear feet), LE-2T (8,580 linear feet), and SL-6 (135,769 linear feet). This totals 44 miles of livestock stream exclusion fencing installed.

The *E. coli* bacteria standard that became effective in 2003 is the standard that has to be met to remove Moffett Creek, Middle River, and Polecat Draft from the Impaired Waters List.

The bar graph shows the percent violation rate for stream samples collected annually that did not meet the water quality standard of 235 cfu/100 mL. The number of samples that were collected each year is shown above each bar within the graph. A linear trend fitted to the Moffett Creek data shows a slight decreasing trend in violation rates over the sampling period, indicating some improvement in water quality conditions in Moffett Creek.

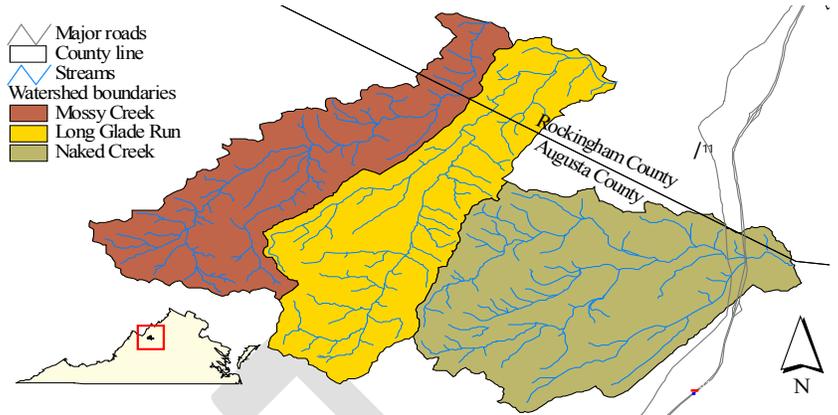
Moffett Creek, Middle River & Polecat Draft BMP Summary: 2006-2012

Practice Code	Extent Installed	Units
CP-21	11	Acres
CP-22	368	Acres
CRFR-3	331	Acres
CRLF-1 (buffer)	9,611	Lin. Feet
CRSL-6	72,041	Lin. Feet
CRWP-2	2,389	Lin. Feet
FR-1	40	Acres
LE-1T	18,252	Lin. Feet
LE-2T	8,580	Lin. Feet
NM-3	539	Acres
SL-1	728	Acres
SL-6	135,769	Lin. Feet
SL-7T	4	Acres
SL-8B	5,278	Acres
SL-8H	6,933	Acres
SL-11	1	Acres
WL-1	24	Acres
WL-2	30	Acres
WL-3	2	Acres
WP-2	22,045	Lin. Feet
WP-4	6	System
WP-4B	1	System
WP-4C	2	Facility
WQ-1	11	Acres
WQ-4	413	Acres



## State Project Report - Mossy Creek, Naked Creek & Long Glade Run TMDL Implementation Project

The Mossy and Naked Creeks and Long Glade Run implementation project for bacteria impairments in all three watersheds and aquatic life impairment attributed to sediment in Mossy Creek was initiated in 2006. DCR contracted with the Headwaters Soil & Water Conservation District and provided funding from the Water Quality Improvement Fund (WQIF) for project implementation. The project is now in its sixth year of the implementation of various agricultural BMPs. The table below lists BMPs implemented in the watershed within the period of 2006 through June 2011. These BMPs were funded with state WQIF/VNRCF targeted TMDL cost-share funds. The total cost-share payments for these BMPs were \$567,481. The change in water quality reflects the cumulative impact of BMPs implemented in the watershed.



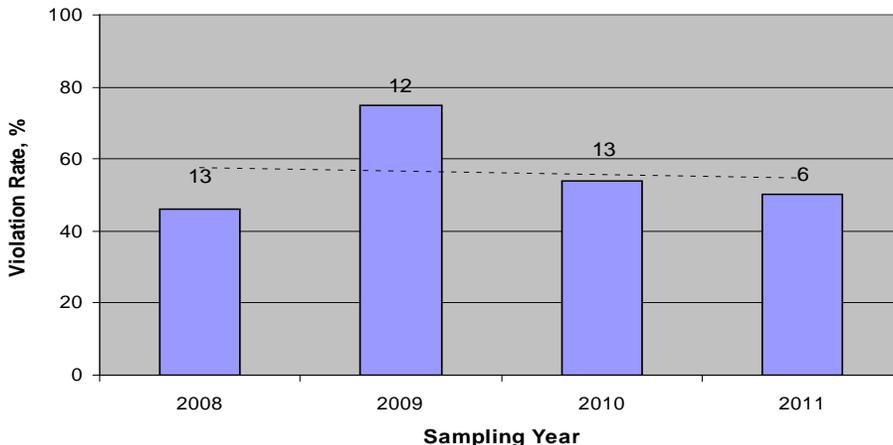
Stream fencing practices have been installed through the USDA Conservation Reserve Enhancement Program, CRSL-6 practice (4,150 linear feet), and CRWP-2 practice (3,800 linear feet) and the TMDL fencing practices: LE-1T (8,425 linear feet), LE-2T (3,225 linear feet), and SL-6 (29,895 linear feet). This totals 9 miles of livestock stream exclusion fencing installed.

The *E. coli* bacteria standard that became effective in 2003 is the standard that has to be met to remove Mossy and Naked Creeks and Long Glade Run from the Impaired Waters List. The bar graph shows the percent violation rate for stream samples collected annually that did not meet the water quality standard of 235 cfu/100 mL. The number of samples that were collected each year are shown above each bar within the graph. Data for Naked Creek shows a slight decreasing trend in violation rates over the sampling period. The decreasing trend in violation rates indicates some improvement in Naked Creek.

Mossy & Naked Creeks & Long Glade Run BMP Summary: 06-11

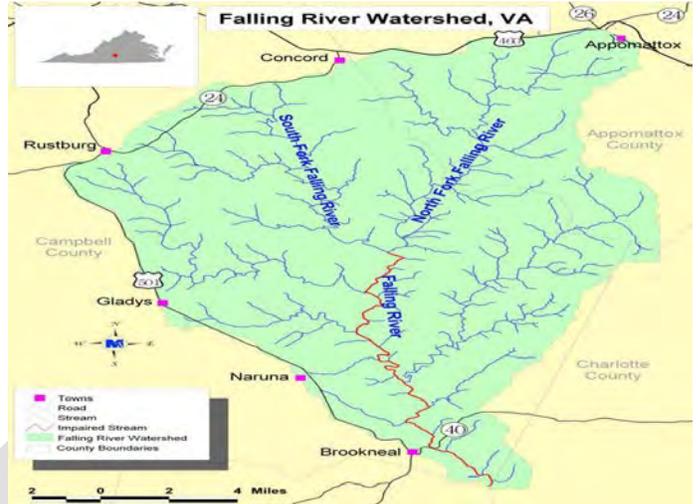
Practice Code	Extent Installed	Unit
CP-22	90	Acres
CRFR-3	78	Acres
CRLF-1 (buffer)	15,311	Lin. Feet
CRSL-6	4,150	Lin. Feet
CRWP-2	3,800	Lin. Feet
LE-1T	8,425	Lin. Feet
LE-2T	3,225	Lin. Feet
SL-1	65	Acres
SL-6	29,895	Lin. Feet
SL-8B	3,217	Acres
SL-8H	2,132	Acres
WL-1	2	Acres
WL-2	33	Acres
WL-3	35	Acres
WP-4	4	System
WQ-4	197	Acres

**Naked Creek (1BNKD000.80)**



## State Project Report - Falling River TMDL Implementation Project

The Falling River implementation project for bacteria impairment was initiated in 2006. DCR contracted with the Robert E. Lee Soil and Water Conservation District and provided Water Quality Improvement Funds (WQIF) towards the project implementation. The project is now in its sixth year of the implementation of various agricultural BMPs. The table below lists BMPs implemented in the watershed within the period of 2006 through June 2012. From July 1, 2011 through June 30, 2012 five livestock exclusion practices were installed. These BMPs were funded with state WQIF/VNRCF targeted TMDL cost-share funds. The total cost-share payments for these BMPs were \$1,312,722. The change in water quality reflects the cumulative impact of BMPs implemented in the watershed.



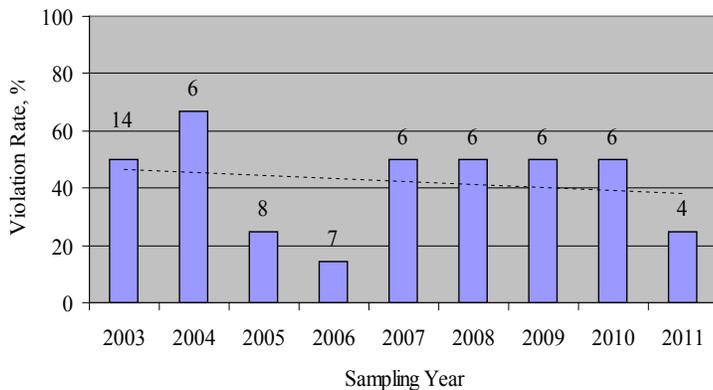
A considerable amount of stream fencing has been installed through the USDA Conservation Reserve Enhancement Program, CRSL-6 practice (29,480 linear feet), and the TMDL fencing practices: LE-1T (88,729 linear feet), LE-2T (3,750 linear feet), SL-6 (91,926 linear feet), and WP-2T (14,700 linear feet). This totals 43 miles of livestock stream exclusion fencing installed.

The *E. coli* bacteria standard that became effective in 2003 is the standard that has to be met to remove Falling Creek from the Impaired Waters List. The bar graph shows the percent violation rate for stream samples collected annually that did not meet the water quality standard of 235 cfu/100 mL. The number of samples that were collected each year is shown above each bar within the graph. A linear trend fitted to the data shows a slight decreasing trend in violation rates over the sampling period. The decreasing trend in violation rates indicates some improvement in water quality condition in the Falling River.

Falling River BMP Summary: 2006-2011

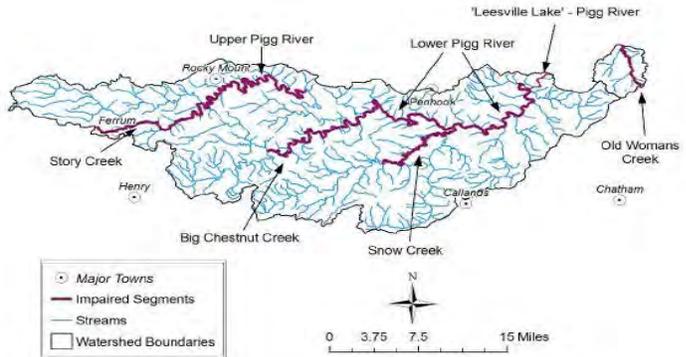
Practice Code	Extent Installed	Unit
CP-22	67	Acres
CP-29	19	Acres
CRFR-3	53	Acres
CRSL-6	29,480	Lin. Feet
CRWQ-1	6	Acres
FR-1	196	Acres
LE-1T	88,729	Lin. Feet
LE-2T	3,750	Lin. Feet
NM-1	1,020	Acres
NM-2	697	Acres
SL-6	91,926	Lin. Feet
SL-6B	6,664	Acres
SL-7T	19	Acres
SL-8B	1,711	Acres
SL-8H	1,070	Acres
SL-11	2	Acres
WP-2A	255	Lin. Feet
WP-2T	14,700	Lin. Feet
WP-3	3	Acres

Falling River (4AFRV010.99)



## State Project Report - Pigg River TMDL Implementation Project (Blue Ridge SWCD)

The Pigg River implementation project for bacteria impairments was initiated in 2006. DCR contracted with the Blue Ridge and Pittsylvania Soil and Water Conservation Districts and provided funding from the Water Quality Improvement Fund (WQIF) for implementation. This project summary includes project progress made by the Blue Ridge SWCD in the Upper Pigg River, Story Creek, Chestnut Creek, and Snow Creek watersheds. The project is now in its seventh year of the implementation of various agricultural BMPs. The table below lists BMPs implemented in the watersheds within the period of 2006 through June 2012. These BMPs were funded with state WQIF/VNRCF targeted TMDL cost-share funds. The total cost-share payments for these BMPs were \$1,350,400. The change in water quality reflects the cumulative impact of BMPs implemented in the watershed.

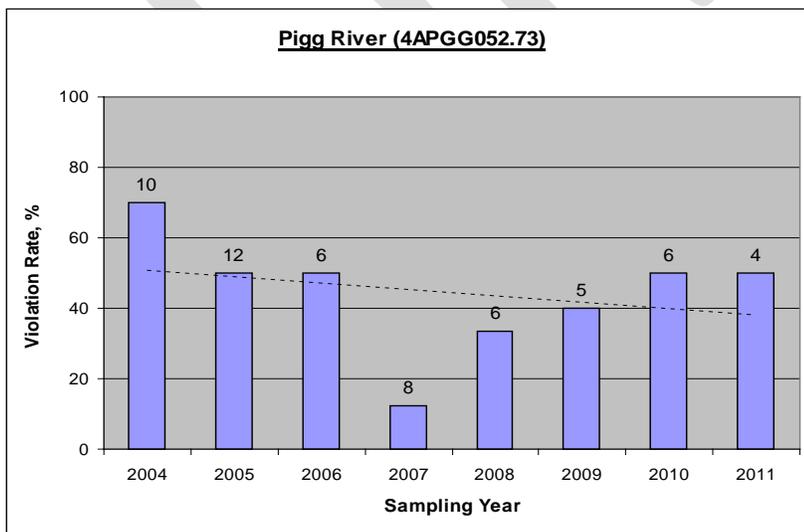


The stream fencing has been installed through the TMDL fencing practices: LE-1T (107,560 linear feet), LE-2T (1,784 linear feet), and SL-6 (56,692 linear feet). This totals 31 miles of livestock stream exclusion fencing installed which is 55 percent of the fencing goal quantified in the TMDL implementation plan.

Pigg River BMP Summary (Blue Ridge SWCD): 2006-2012

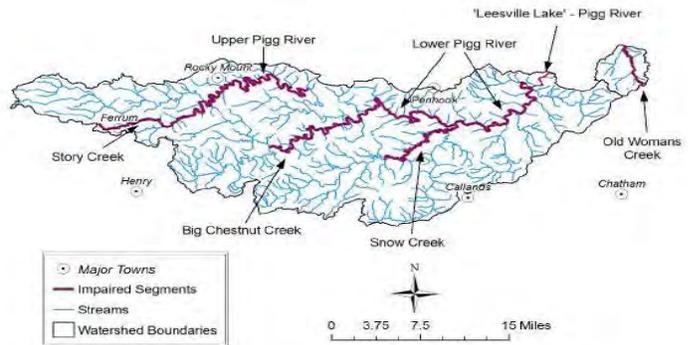
Practice	Extent	Unit
FR-1	68	Acres
LE-1T	107,560	Lin. Feet
LE-2T	1,784	Lin. Feet
SL-6	56,692	Lin. Feet
SL-8B	3,192	Acres
SL-8H	2,953	Acres
SL-11	10	Acres
WP-4	2	System
WP-4B	7	System

The *E coli* bacteria standard that became effective in 2003 is the standard that has to be met to remove the impaired stream segments from the Impaired Waters List. The bar graph shows the percent violation rate for stream samples collected annually that did not meet the water quality standard of 235 cfu/100 mL. The number of samples that were collected each year is shown above each bar within the graph. A trend fitted to the data at river mile 52.73 shows a significant decreasing trend in violation rates over the sampling period. The decreasing trend in violation rates indicates improvement in water quality conditions in the Pigg River.



## State Project Report - Pigg River TMDL Implementation Project (Pittsylvania SWCD)

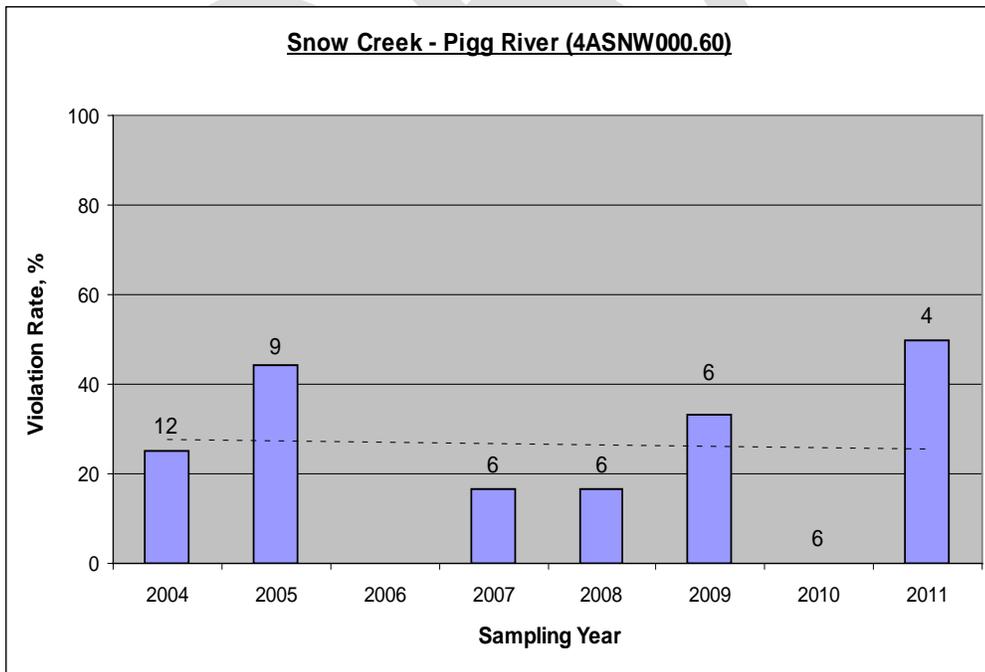
The Pigg River implementation project including Story, Snow, Chestnut Creeks and the Pigg River mainstem for bacteria impairments was initiated in 2006. DCR contracted with the Blue Ridge and Pittsylvania Soil & Water Conservation Districts and provided Water Quality Improvement Funds (WQIF) towards the project implementation. This summary includes project progress made by year in Pittsylvania SWCD in the Lower Pigg River and Snow Creek watersheds. The project is now in its seventh year of the implementation of various agricultural BMPs. The table below lists all BMPs implemented in the watershed within the period of 2006 through June 2012. These BMPs were funded with state WQIF/VNRCF targeted TMDL cost-share funds. The total cost-share payments for these BMPs were \$635,110. The change in water quality reflects the cumulative impact of BMPs implemented in the watershed. Stream fencing has been installed through the TMDL fencing practices: LE-1T (19,144 linear feet), SL-6 (20,348 linear feet) and WP-2T (14,179 linear feet). This totals 10.5 miles of livestock stream exclusion fencing installed.



The *E. coli* bacteria standard that became effective in 2003 is the standard that has to be met to remove Pigg River (Pittsylvania SWCD) from the Impaired Waters List. The bar graph shows the percent violation rate for stream samples collected annually that did not meet the water quality standard of 235 cfu/100 mL. The number of samples that were collected each year are shown above each bar within the graph. The linear trend fitted to Snow Creek shows a slightly decreasing trend in the violation rates, indicating only a slight improvement in water quality.

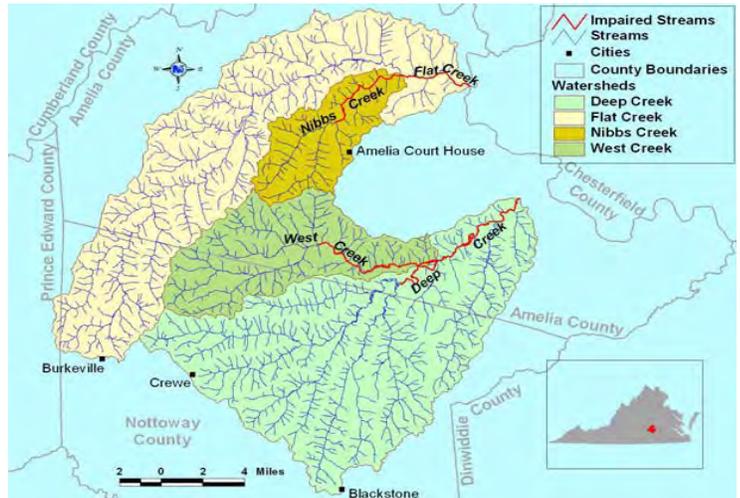
Pigg River (Pittsylvania SWCD)  
BMP Summary: 2006-2012

Practice Code	Extent Installed	Unit
FR-1	34	Acres
LE-1T	19,144	Lin. Feet
SL-1	145	Acres
SL-5	1,461	Lin. Feet
SL-6	20,348	Lin. Feet
SL-8	65	Acres
SL-8B	485	Acres
SL-8H	228	Acres
WP-2T	14,179	Lin. Feet
WP-4	4	System



## State Project Report - Flat, Nibbs, Deep and West Creeks TMDL Implementation Project

The Flat, Nibbs, Deep, and West Creeks implementation project for bacteria impairments was initiated in 2006. DCR contracted with the Piedmont Soil and Water Conservation District and provided Water Quality Improvement Funds (WQIF) towards the project implementation. The project is now in its seventh year of the implementation of various agricultural BMPs. The table below lists BMPs implemented in the watershed within the period of 2006 through June 2012. These BMPs were funded with state WQIF/VNRCF targeted TMDL cost-share funds. The total cost-share payments for these BMPs were \$709,596. The change in water quality reflects the cumulative impact of all BMPs implemented in the watershed.

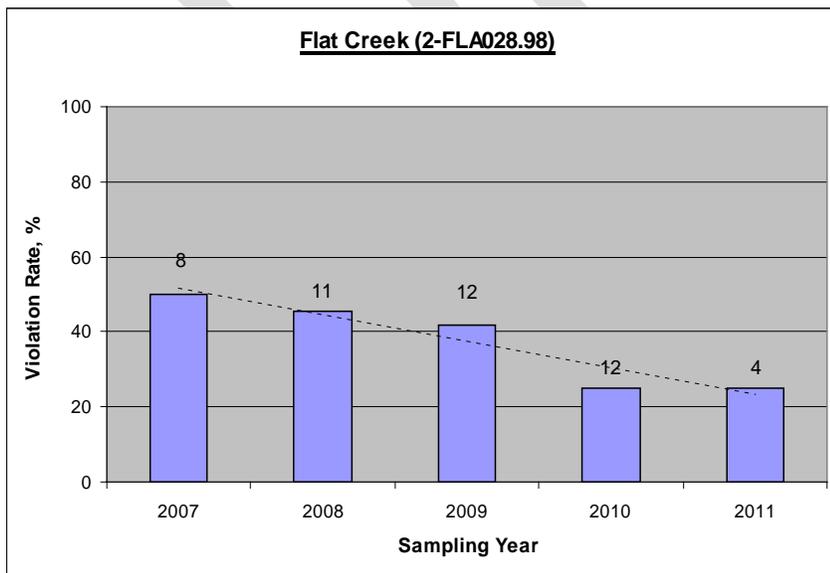


Stream fencing practices have been installed through the USDA Conservation Reserve Enhancement Program, CRSL-6 practice (11,995 linear feet) and the state fencing practices: LE-1T (17,397 linear feet), LE-2T (1,800), SL-6 (45,489 linear feet), SL-6T (4,410 linear feet), and WP-2T (20,809 linear feet). This totals 19 miles of livestock stream exclusion fencing installed. A total of 76 acres have been enrolled under a new pasture management BMP.

The *E. coli* bacteria standard that became effective in 2003 is the standard that has to be met to remove the impaired creeks from the Impaired Waters List. The bar graph shows the percent violation rate for stream samples collected annually that did not meet the water quality standard of 235 cfu/100 mL. The number of samples that were collected each year are shown above each bar within the graph. The trend fitted to the data at river mile 28.98 shows a significant decreasing trend in the violation rates over the sampling period. The decreasing trend indicates significant improvement in water quality conditions in Flat Creek.

Flat, Nibbs, Deep & West Creeks  
BMP Summary: 2006-2012

Practice Code	Extent Installed	Unit
CP-CNT	111	Acres
CP-22	42	Acres
CRFR-3	42	Acres
CRSL-6	11,995	Lin. Feet
FR-1	124	Acres
LE-1T	17,397	Lin. Feet
LE-2T	1,600	Lon. Feet
NM-3B	55	Acres
SL-1	174	Acres
SL-6	45,489	Lin. Feet
SL-6T	4,410	Lin. Feet
SL-8B	2,590	Acres
SL-8	38	Acres
SL-8H	3,973	Acres
SL-10T	76	Acres
SL-11	1	Acres
SL-15A	146	Acres
SL-15B	176	Acres
WP-2T	20,809	Lin. Feet
WP-3	1,477	Acres
WP-4	3	Systems
WQ-4	1,471	Acres



## State Project Report - Spring, Briery & Saylers Creeks, Little Sandy & Bush Rivers TMDL Implementation Project

The Spring Creek, Little Sandy River, Bush River, Briery and Saylers Creeks implementation project for bacteria impairments was initiated in 2006. DCR contracted with the Piedmont Soil & Water Conservation District and provided Water Quality Improvement Funds (WQIF) for BMP implementation. The project is now in its seventh year of the implementation of various agricultural BMPs. The table below lists BMPs implemented in the watershed within the period of 2006 through June 2012. These BMPs were funded with state WQIF/VNRCF targeted TMDL cost-share funds. The total cost-share payments for these BMPs were \$854,095. The change in water quality reflects the cumulative impact of all BMPs implemented in the watershed.

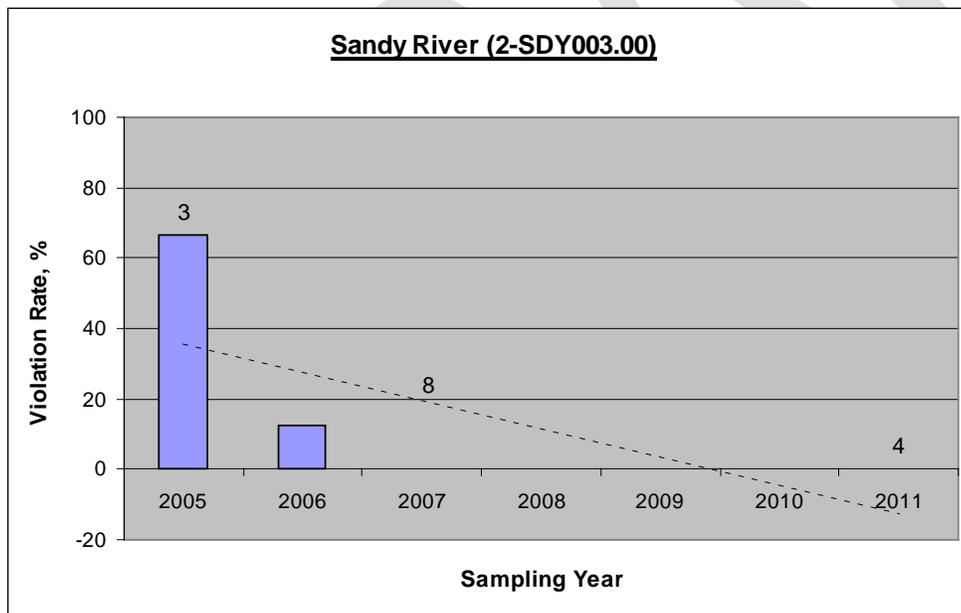
A considerable amount of stream fencing has been installed through the USDA Conservation Reserve Enhancement Program, CRSL-6 practice (32,124 linear feet), and the TMDL fencing practices: LE-1T (68,697 linear feet), LE-2T (1,700 linear feet), SL-6 (65,841 linear feet), SL-6T (8,982 linear feet), WP-2 (2,993 linear feet) and WP-2T (10,769 linear feet). This totals 36 miles of livestock stream exclusion fencing installed. Water source has been extended to 23 acres for grazing management and 47 acres have been enrolled under a new pasture management BMP.

The *E. coli* bacteria standard that became effective in 2003 is the standard that has to be met to remove Spring Creek, Little Sandy River, Bush River, and Briery and Saylers Creeks from the Impaired Waters List.

The bar graph shows the percent violation rate for stream samples collected annually that did not meet the water quality standard of 235 cfu/100 mL. The number of samples that were collected each year is shown above each bar within the graph. A linear trend fitted to the data of Little Sandy River shows significant decreasing trend in the violation rate over the sampling period.

Spring, Briery, Saylers Creeks & Bush and Little Sandy Rivers BMP Summary: 2006-2012

Practice Code	Extent Installed	Unit
CP-22	351	Acres
CRFR-3	147	Acres
CRSL-6	32,124	Lin. Feet
FR-1	335	Acres
LE-1T	68,697	Lin. Feet
LE-2T	1,700	Lin. Feet
SL-1	218	Acres
SL-6	65,841	Lin. Feet
SL-6T	8,982	Lin. Feet
SL-7T	23	Acres
SL-8B	1,202	Acres
SL-8H	1,030	Acres
SL-10T	47	Acres
SL-11	4	Acres
WP-1	1	Count
WP-2	2,993	Lin. Feet
WP-2T	10,769	Lin. Feet
WP-4C	1	System



## State Project Report - Bluestone River TMDL Implementation Project

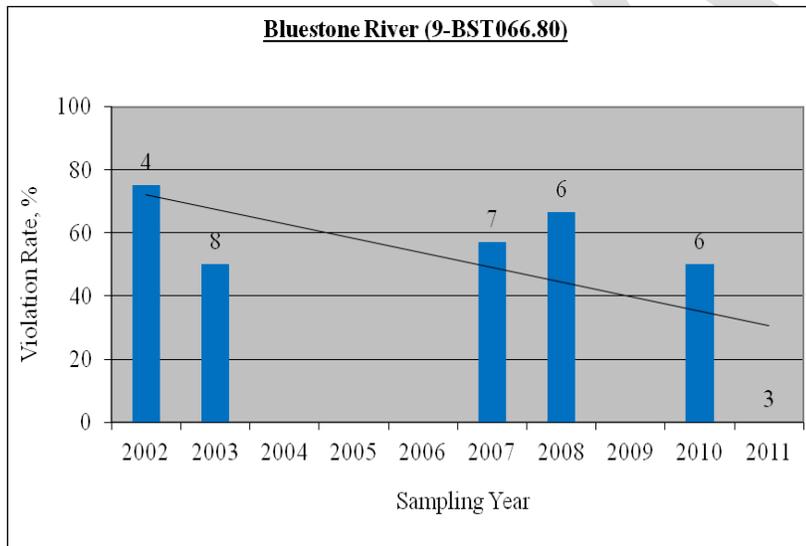
The Bluestone River implementation project for bacteria and sediment impairments was initiated in 2006. DCR contracted with the Tazewell Soil and Water Conservation District and provided funding through the Water Quality Improvement Fund (WQIF) for project implementation. The project is now in its sixth year of the implementation of various agricultural BMPs. The table below lists BMPs implemented in the watershed within the period of 2006 through June 2012. This project is not being awarded additional funding as of July 1, 2012. These BMPs were funded with state WQIF/VNRCF targeted TMDL cost-share funds. The total cost-share payments for these BMPs was \$291,714. The change in water quality reflects the cumulative impact of BMPs implemented in the watershed.

The stream fencing practices have been installed through the USDA Conservation Reserve Enhancement Program, CRSL-6 practice (791 linear feet) and the TMDL fencing practices: LE-1T (6,034 linear feet), and SL-6 (4,690 linear feet). This totals about 2 miles of livestock stream exclusion fencing installed.

Bluestone River BMP Summary:  
2006-2012

Practice Code	Extent Installed	Unit
CP-22	2.3	Acres
CRFR-3	2.3	Acres
CRSL-6	791	Lin. Feet
LE-1T	6,034	Lin. Feet
SL-6	4,690	Lin. Feet

The *E. coli* bacteria standard that became effective in 2003 is the standard that has to be met to remove Bluestone River from the Impaired Waters List. The bar graph shows the percent violation rate for stream samples collected annually that did not meet the water quality standard of 235 cfu/100 mL. The number of samples that were collected each year are shown above each bar within the graph. A linear trend fitted to the Bluestone River data shows a decreasing trend in violation rate over the sampling period. The decreasing trend in violation rates indicates some improvement in water quality conditions in Bluestone River. Moreover, the data collected in 2011 did not show any violation of the water quality standard.



## State Project Report - Upper Clinch River TMDL Implementation Project

---

The Upper Clinch River implementation project for an aquatic life impairment attributed to sediment was initiated in 2006. DCR contracted with the Tazewell Soil & Water Conservation District and provided Water Quality Improvement Funds (WQIF) towards project implementation. The project is now in its sixth year of the implementation of various agricultural BMPs. The table below lists all BMPs implemented in the watershed within the period of 2006 through June 2012. This project is not being awarded additional funding as of July 1, 2012. These BMPs were funded with state WQIF/VNRFCF targeted TMDL cost-share funds. The total cost-share payments for these BMPs were \$524,498.

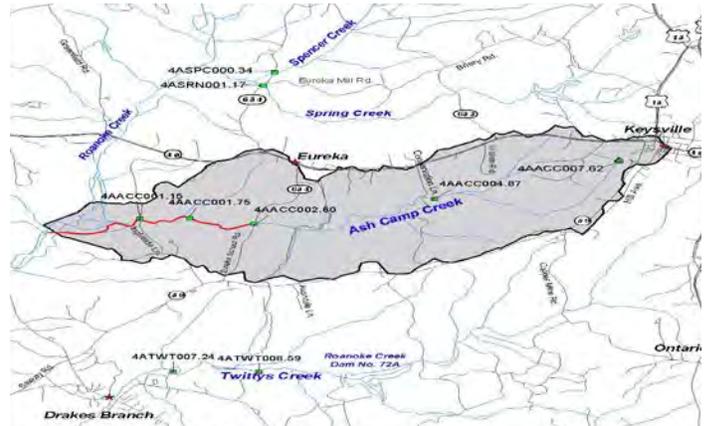
The stream fencing practices have been installed through the USDA Conservation Reserve Enhancement Program, CRSL-6 practice (10,403 linear feet), and the TMDL fencing practices: LE-1T (9,048 linear feet) and SL-6 (44,262 linear feet). This totals 12 miles of livestock stream exclusion fencing installed. Only 10 acres of cropping practices (SL-8H, cover crops) have been implemented, and cropland is a significant source of sediment.

Upper Clinch River BMP Summary:  
2006-2012

Practice Code	Extent Installed	Unit
CP-22	26.5	Acres
CRFR-3	28	Acres
CRLF-1 (buffer)	900	Lin. Feet
CRSL-6	10,403	Lin. Feet
LE-1T	9,048	Lin. Feet
SL-6	44,262	Lin. Feet
SL-8H	10	Acres

## State Project Report - Ash Camp and Twittys Creeks TMDL Implementation Project

The Ash Camp and Twittys Creeks implementation project for benthic impairments was initiated in 2006. DCR contracted with the Southside Soil & Water Conservation District and provided Water Quality Improvement Funds (WQIF) towards the project implementation. The project is now in its sixth year of the implementation of various agricultural BMPs. The table below lists BMPs implemented in these watersheds within the period of 2006 through June 2012. This project is not being awarded additional funding as of July 1, 2012. These BMPs were funded with state WQIF/VNRCF targeted TMDL cost-share funds. The total cost-share payments for these BMPs were \$78,048 (\$55,920 for Ash Camp Creek and \$22,128 for Twittys Creek watersheds). The change in water quality reflects the cumulative impact of BMPs implemented in the watershed.



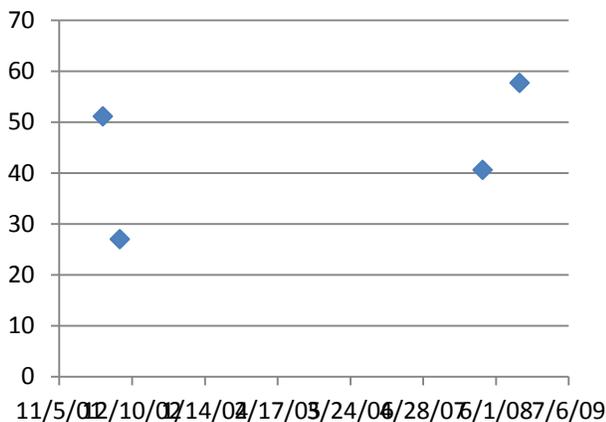
The stream fencing installed in Ash Camp Creek and Twittys Creek watersheds through the TMDL program includes: LE-1T (6,685 linear feet) and SL-6 (4,800 linear feet). This totals about 2 miles of livestock stream exclusion fencing installed.

Ash Camp and Twittys Creeks  
BMP Summary: 2006-2012

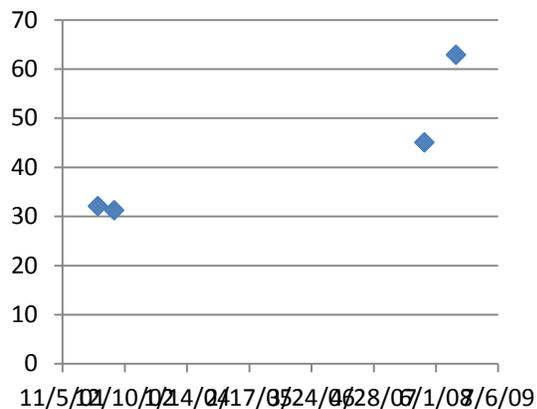
Practice Code	Extent Installed	Unit
FR-1	19	Acres
LE-1T	6,685	Lin. Feet
SL-6	4,800	Lin. Feet
SL-8B	22	Acres
SL-11	1	Acres

The aquatic life standard is the standard that has to be met to remove Ash Camp and Twittys Creeks from the Impaired Waters List. A Stream Condition Index (SCI) is used in Virginia to assess biological integrity of streams. Streams that score greater than 60 are considered to be non-impaired, whereas streams that score less than 60 are considered impaired.

**IBI Score (4ATWT003.36)**

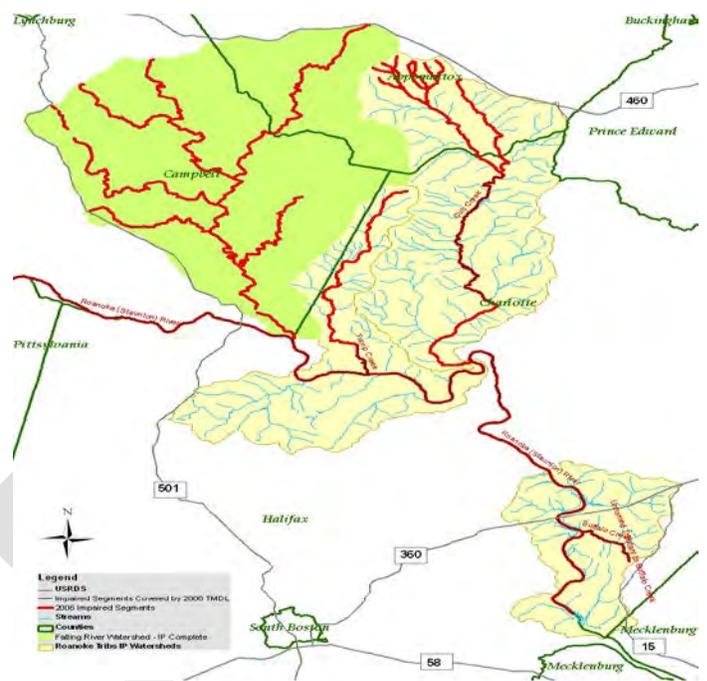


**IBI Score (4ATWT006.40)**



## State Project Report - State Project Report - Cub, Turnip and Buffalo Creeks TMDL Implementation Project

The Cub, Turnip and Buffalo Creeks implementation project for bacteria impairments was initiated in 2006. DCR contracted with the Robert E. Lee and Southside Soil and Water Conservation Districts (SWCD) and provided funding from the Water Quality Improvement Fund (WQIF) towards project implementation. The BMPs implemented and cost-share amounts paid by each district are noted separately. The project is now in its sixth year of the implementation of various agricultural BMPs. The tables below list all BMPs implemented within the period of 2006 through June 2012. This project is not being awarded additional funding as of July 1, 2012. These BMPs were funded with state WQIF/VNRCF targeted TMDL cost-share funds. The total cost-share payments for these BMPs were \$627,039 (\$513,870 through Southside SWCD and \$113,169 through Robert E. Lee SWCD). The change in water quality reflects the cumulative impact of all BMPs implemented in the watersheds.



Cub, Turnip, and Buffalo Creeks Southside SWCD BMP Summary: 2006-2012

SWCD	Practice	Extent	Extent
Southside	CCI-CNT	25	Acres
	CCI-SE1	1,620	Lin. Feet
	FR-1	105	Acres
	LE-1T	20,115	Lin. Feet
	SL-1	70	Acres
	SL-6	64,536	Lin. Feet
	SL-15A	53	Acres
	SL-3	12	Acres
	SL-8B	63	Acres
	WP-4B	1	System
	WP-4F	1	Facility
R.E. Lee	CRSL-6	4,100	Lin. Feet
	FR-1	27	Acres
	LE-1T	6,300	Lin. Feet
	SL-6	5,600	Lin. Feet
	SL-8B	47	Acres

The stream fencing by Southside SWCD has been installed through the TMDL fencing practices LE-1T (20,115 linear feet) and SL-6 (64,536), and CCI-SE1 voluntary practice (1,620 linear feet). Robert E. Lee stream fencing has been installed through the USDA Conservation Reserve Enhancement Program, CRSL-6 (4,100 linear feet), and the TMDL fencing practices: LE-1T (6,300 linear feet) and SL-6 (5,600 linear feet). This totals 20 miles of livestock stream exclusion fencing installed.

The *E. coli* bacteria standard that became effective in 2003 is the standard that has to be met to remove Cub, Turnip and Buffalo Creeks from the Impaired Waters List.

## Glossary of Acronyms

BMP – Best Management Practice  
CB – Chesapeake Bay  
CD – Consent Decree  
CFU – Colony Forming Units  
CREP – Conservation Reserve Enhancement Program  
DCR – Department of Conservation and Recreation  
DEQ – Department of Environmental Quality  
DMME – Department of Mines, Minerals and Energy  
DOT – Department of Transportation  
EPA – U.S. Environmental Protection Agency  
FY – Virginia Fiscal Year  
FFY – Federal Fiscal Year  
GA – General Assembly  
NPS – Nonpoint Source  
NRCS – USDA Natural Resources Conservation Service  
SR – Southern Rivers  
SWCD – Soil and Water Conservation District  
TMDL – Total Maximum Daily Load  
TMDL IP – Total Maximum Daily Load Implementation Plan  
USDA – United States Department of Agriculture  
VSMP – Virginia Stormwater Management Program  
VNRFCF – Virginia Natural Resources Commitment Fund  
WIP – Watershed Implementation Plan  
WQIF – Water Quality Improvement Fund

DRAFT

