

Virginia Nonpoint Source Pollution Management Program

2017 Annual Nonpoint Source Report
July 1, 2016 through June 30, 2017



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2017 Virginia Nonpoint Source Annual Report

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Acknowledgements

Virginia Department of Environmental Quality (DEQ) staff extends their appreciation for the cooperation and assistance of local and state agencies to communicate the Commonwealth’s efforts to effectively manage nonpoint source pollution.

2017 Virginia Nonpoint Source Annual Report

Executive Summary

This report fulfills the Virginia Department of Environmental Quality's (DEQ) legislative requirement under § 319(h)(8) and (11) of the Federal Clean Water Act (33 USC 1329). It describes Nonpoint (NPS) Source Pollution Management Program activities undertaken by DEQ and cooperating agencies during Virginia fiscal year 2017 (FY2017) which covers a period from July 1, 2016 through June 30, 2017. In addition, it communicates the success of Virginia's NPS pollution management programs to the citizens of the Commonwealth and elected officials.

TMDL DEVELOPMENT AND IMPLEMENTATION

Over the past fiscal year, 35 TMDL equations (31 new, four revised), each representing a watershed area draining to impaired surface waters, have been approved by EPA. Another 23 (10 new, 13 revised) are complete, have been approved by the State Water Control Board, and were submitted to EPA for final approval. To maintain a robust pace of TMDL development with level funding, Virginia continues to explore tools and options for restoring and protecting water quality including:

- developing TMDLs using a watershed approach to address multiple impairments in watersheds with similar characteristics
- developing TMDLs in-house
- identifying non-TMDL solutions, such as straight-to-implementation, to address impairments
- developing TMDLs that are more easily implemented

Further, DEQ recently employed a statewide strategy to prioritize watersheds for TMDL development, TMDL alternative, stressor analysis, or natural condition analysis during the 2016-2022 timeframe. Watersheds are prioritized based on risk to public health, public interest, available monitoring data, factors associated with the impaired uses of the watershed, regional input, and available funding.

During this program year, Virginia developed four (4) implementation plans (IPs) that addressed 31 impairments; in addition, six (6) IPs addressing 126 impairments were under development but were not completed or approved by the end of the fiscal year. As of 2017, Virginia has developed 88 implementation plans addressing 460 impairments, thereby exceeding the goal for number of impairments addressed in IPs by 23%; in fact, as of June 2017, Virginia has already exceeded its 2019 goal by 18%.

DEQ and its partners also jointly funded implementation in 72 implementation plan areas comprising 204 watersheds, resulting in the installation of 2,759 agricultural and residential septic BMPS that excluded livestock from 218 miles of stream and addressed straight pipes and failing septic systems from 651 homes. Expenditures for these projects totaled \$17,150,875, including \$13,316,377 of federal and state funds and \$3,834,498 in landowner contributions. Collectively, these efforts achieved pollutant reductions of 742,201 lbs of nitrogen, 78,529 lbs of phosphorus, 462,520 tons of sediment, and 4.83E+16 cfu of bacteria.

These efforts have significant measurable water quality benefits, as can be seen through the development of [Virginia's Nonpoint Source Pollution Success Stories](#). Through these Success Stories, EPA and DEQ document progress in partial or full restoration of watershed segments associated with NPS implementation actions. The VA nonpoint program has met its FY2017 goal for total number of Success Stories and has exceeded by 10% its FY2017 goal for number of segments discussed in those reports; three (3) Success Stories were submitted for six (6) impaired watershed segments with water quality improvements attributable to TMDL implementation actions. The three Success Stories developed in Virginia in 2017 were

[Water Quality Improved after Implementing Best Management Practices in the Upper Robinson River Watershed](#), Improving Aquatic Health by Implementing Best Management Practices in Mountain Run Watershed, Virginia, and Reclaiming Acid Mine Drainage Areas and Implementing Control Measures Improve Biological Health of Stone Creek, Virginia. In addition to developing these Success Stories, DEQ has maintained its [Virginia's Nonpoint Source Pollution Program Success Stories](#) website and developed a story map exhibiting the Commonwealth's Success Stories.

AGRICULTURE AND NUTRIENT MANAGEMENT PROGRAMS

Priority funding for implementation of livestock exclusion is an important agricultural program milestone. Applications for 100% state-funded livestock stream exclusion were accepted from January 2013 through June 2015. As of that time, there were \$73 million in pending applications received and \$48 million expended or obligated for a total statewide initiative of \$121 million. Through June 2017, a total of \$93 million has been expended or obligated by SWCDs to complete 2,161 practices, and \$6.2 million in applications have cancelled, leaving \$28.2 in pending applications for 554 practices awaiting funding. Once completed, the 2,741 practices will protect 10 million linear feet of streambank from livestock access.

Virginia continued to advance implementation of the [Virginia Resource Management Planning \(RMP\) Program](#) as a voluntary way to promote the use of conservation practices that improve farming operations and water quality. As of September 30, 2017, there were 388 plans covering 92,016 acres statewide. Of those, 62 RMPs covering just over 23,869 acres were developed in 2017.

As part of DCR's [nutrient management program](#), staff prepared nutrient management plans on 192,882 acres. Private nutrient management planners have developed or revised nutrient management plans statewide for 672,617 acres.

The [Agricultural Stewardship Act \(ASA\) Program](#) administered by the [Virginia Department of Agriculture and Consumer Services](#) (VDACS) is a complaint-based program intended to address alleged water pollution from agricultural activities. During the program year April 1, 2016 through March 31, 2017, VDACS-ASA program staff responded to 67 official water quality complaints. In 22 of the 67 complaints (33%), there was sufficient evidence that the agricultural activities were causing or would cause water pollution; Agricultural Stewardship Plans were required for those cases. Two corrective orders were issued during this program year; however, it was not necessary to assess any civil penalties.

The VDACS-ASA program also provides support to the DEQ agricultural program staff on a [Small Animal Feeding Operation \(AFO\) Evaluation and Assessment Strategy](#). This strategy is a voluntary effort to address water quality concerns associated with animal confinement on a site-specific basis without the need for additional regulations or permitting. Approximately 95 small AFOs remain to be evaluated out of the 800 identified in the Chesapeake Bay Watershed Implementation Plan (WIP). This number is down from 426 in the previous year.

FORESTRY PROGRAMS

The [Virginia Department of Forestry's](#) (VDOF) harvest inspection program provides VDOF one-on-one contact with harvest operators and a welcomed opportunity to educate them on BMPs and the latest water quality protection techniques. In FY2017, VDOF field personnel inspected 5,010 timber harvest sites across Virginia on 220,105 acres – a slight decrease in the number of acres harvested in FY2016.

Another focus of the VDOF water quality program is training harvesting contractors in water quality protection techniques. For FY2017, there were 16 training programs offered with a total of 430 attendees present.

The VDOF has had a statewide audit system in place since 1993 to track trends in forestry BMP implementation and effectiveness. In 2016 (most recent year of data available), 94.7 percent of the timber harvest acres in Virginia conducted within the boundaries of the Bay Watershed were under BMPs. The audit also showed that 98.32 percent of the sites visited had no active sedimentation present after the close-out of a harvesting operation. The goal for implementation under WIP II is 90 percent of timber harvest acres under BMPs by 2017 and 95 percent by 2025.

Virginia Silvicultural Water Quality Law, §10-1-1181.1 through §10.1-1181.7 grants the authority to the State Forester to assess civil penalties to those owners and operators who fail to protect water quality on their forestry operations. In FY2017, the VDOF was involved with 186 water quality actions initiated under the Silvicultural Law. This represents a decrease of 29 percent from FY2016 and is due to drier weather and better “due diligence” by logging contractors. Of these actions, one (1) resulted in Special Orders being issued for violations of the law. None of these actions proceeded to the issuance of a civil penalty to the owners and operator.

VDOF supports a number of other programs that contribute to the control of NPS pollution:

- VDOF administers a conservation easement program to maintain large, unfragmented blocks of forestland, ensuring the land is available for forest management in perpetuity. In FY2017, VDOF permanently protected 6,371 acres of open space and more than 34 miles of water courses through 23 conservation easements and another 33 acres in one amendment.
- VDOF reviewed over 275 project proposals in calendar year 2016 as part of the environmental impact review process. In numerous cases, these reviews have resulted in the modification of project footprints to avoid forest loss and to commitments by project sponsors to follow VDOF Forestry BMPs for Water Quality.
- Through its “Virginia Trees for Clean Water” initiative, VDOF has assisted to-date 123 projects resulting in more than 40,846 trees being planted in Virginia communities.
- VDOF co-lead the Healthy Watershed Forest/TMDL project, which has successfully quantified the value of retaining more forestland to meet Chesapeake Bay TMDL requirements, produced a “toolbox” of incentives that can be used to stimulate forestland retention in land-use planning decision-making, and identified some of the key challenges that thwart enhanced forestland retention planning.
- VDOF is encouraging communities to complete Urban Tree Canopy assessments using sub-meter resolution infrared-enhanced imagery to develop urban tree canopy goals and implementation plans specifically tied to their communities’ urban forests.

In previous years, VDOF offered cost-share assistance of forestry BMPs; however, funds were not available in FY2017 to support this program, despite a waiting list of interested timber harvest operators.

RESOURCE MANAGEMENT AND LAND CONSERVATION PROGRAMS

The Healthy Waters Program (HWP) at Virginia’s DCR, Division of Natural Heritage (DNH), in collaboration with Virginia Commonwealth University (VCU), seeks to characterize and conserve ecological integrity of aquatic communities. Virginia has more than 400 ecologically healthy streams, creeks, and rivers, and there are more to be identified. Healthy streams have been identified and ranked as “outstanding”, “healthy”, or “restoration candidate” through a stream ecological integrity assessment known as the [Interactive Stream Assessment Resource \(INSTAR\)](#).

The Virginia HWP has continued to represent the Commonwealth in the Chesapeake Bay Program Goal Implementation Team Four (GIT4; Healthy Watersheds) to improve communication materials illustrating

the location of identified healthy waterbodies and to develop strategies to advance resource protection in the Chesapeake Bay.

The HWP *Watershed Integrity Model* has been updated and streamlined to improve the utility and integrate new data from the latest sampling. The new model, referred to as the ConservationVision Watershed Model includes four primary components: Watershed Integrity, Landscape Position, Soil Sensitivity, and Land Cover. DNH continues to identify vulnerable areas and prioritize areas in need of conservation and protection actions.

VIRGINIA LAND CONSERVATION PROGRAMS

Under the guidance of the McAuliffe Administration, land conservation in Virginia has continued to grow. In December 2016, Governor Terry McAuliffe announced that the Commonwealth reached its goal of protecting 1,000 Virginia Treasures, which include ecologically significant lands protected with conservation or open-space easements, historic properties designated by the Virginia Department of Historic Resources, and new projects that enhanced access to the great outdoors.

Two main tools for land conservation in Virginia are the Virginia Land Conservation Foundation (VLCF) grant program and the Virginia Land Preservation Tax Credit (LPTC). From 1999 through 2017, VLCF has awarded more than \$50.9 million to land conservation projects and helped protect more than 63,800 acres. As of August 31, 2017, the LPTC has provided landowners tax credits for permanently protecting 819,962 acres.

However, achieving the Bay-wide goal of an additional two million acres of land from the 2010 baseline will require a concerted multi-state effort. To achieve the new Bay goal in 2025, Virginia should conserve about 50,368 acres per year in the Bay watershed. The average annual acreage preserved within the Bay watershed in Virginia from 2001 to 2017 was 44,375 acres per year, which means that achieving the new goal is possible, though it will take a robust and collaborative effort.

ONSITE SEWAGE DISPOSAL PROGRAMS

The [Virginia Department of Health](#) (VDH) [Division of Onsite Sewage and Water Services](#) implements wastewater treatment systems to protect public health and water quality. From July 1, 2016 through June 30, 2017, VDH issued 9,929 new construction permits; 1,370 were for installation of alternative onsite sewage systems (AOSS). During the same period, VDH issued 3,896 repair permits statewide; 251 required the installation of an AOSS. Repair permits include component replacements or complete system replacements.

DEQ continues to work with VDH as well as organizations and localities across Virginia to fund projects that correct failing septic systems or straight-pipes. A majority of these projects are part of larger watershed restoration and implementation efforts in TMDL implementation areas. During FY2017, DEQ provided funding to pump out septic systems, repair or replace failing septic systems, or remove straight pipes from at least 651 homes using \$833,144 from grant funding sources and landowner contributions, a 47% increase in expenditures from FY2016. Grant funds active in FY2017 were distributed throughout 9 river basins.

To encourage the timely repair of failing onsite sewage systems, VDH created a goal to repair all onsite sewage systems within 60 days of when the failure is reported to VDH. By 2018, VDH aims to repair 43% of failing onsite sewage systems statewide within 60 days of becoming aware of the failure with increases in that repair percentage over time. Current estimates suggest an average of 51% of septic systems statewide are repaired within 60 days, with individual health districts ranging from 0% to 100%.

One major hurdle to timely repairs is the cost of installation and on-going operation and maintenance. Recent amendments to AOSS regulations (12VAC5-613), effective July 17, 2017, will allow homeowners to repair failing systems discharging directly to groundwater at a lower cost. Furthermore, VDH continues to look for funding sources that will assist homeowners on repairing failing septic systems and installing nitrogen-reducing AOSS.

VDH's strategic vision is to shift evaluation and design services for onsite sewage systems and private wells to the private sector in an orderly manner, so that limited VDH resources can be focused on improving public health and groundwater supplies. House Bill 2477 (2017 General Assembly session) directs VDH to take eight steps associated with the HB558 (2016 General Assembly session) plan to transition direct design and soil evaluation services to the private sector.

RESOURCE EXTRACTION PROGRAMS

Virginia [Department of Mines Minerals and Energy \(DMME\)](#), [Division of Mined Land Reclamation](#)'s (DMLR) federally funded [Abandoned Mined Land](#) (AML) program continues to eliminate sources of nonpoint source pollution through the reclamation of abandoned coal mined lands. During calendar year 2017, DMLR's AML program eliminated over 812 acres of abandoned coal mined lands.

In addition, DMLR encourages the reduction and elimination of nonpoint source pollution through its BMPs and offset approach to TMDL implementation in its joint mining and discharge permitting processes. In 2017, TMDL offset projects were calculated to reduce total suspended solids loads to coalfield streams from nonpoint source pollution by 341 tons and total dissolved solids loads by 10,058 tons, the first time that pollution reduction efforts exceeded 10,000 tons.

DMME's [Division of Mineral Mining](#) administers its [Orphaned Mine Land Program \(OML\)](#). It receives Section 319(h) federal funding from DEQ to conduct inventories of orphaned mine lands, which assist in prioritizing sites for reclamation. As of November 20, 2017, a total of 3,127 sites have been inventoried, in 571 of Virginia's 1,247 watersheds, or 45.8% the state's total watersheds. With \$3,752,076 from the interest on the Minerals Reclamation Fund, mines identified as environmental and safety hazards have been eliminated in 133 sites representing 11.8% of the inventoried orphan mineral mines.

URBAN PROGRAMS

Under DEQ's Stormwater Management Program, from July 2016 through June 2017, no local governments received approval of their local stormwater management programs. A total of 94 local governments continued to implement their previously approved local stormwater management programs with the assistance of DEQ staff. In the same time period, DEQ issued new (i.e., first-time) coverage under the 2014 Construction General Permit to 324 land-disturbing activities. A total of 1,293 Construction General Permits were issued statewide. DEQ staff continued to visit small and large construction activities to perform site inspections for compliance with the 2014 Construction General Permit.

With regard to nutrient management, more than 69,170 acres of urban areas now have nutrient management practices in place. This total includes approximately 25,116 acres on 264 golf courses with nutrient management plans that DCR contracts to private planners.

CHESAPEAKE BAY INITIATIVES AND POLLUTION REDUCTIONS

Virginia has made progress toward pollution reduction within the Chesapeake Bay Watershed. A review of Chesapeake Bay TMDL implementation progress through 2015 shows that Virginia met its 2015 milestone targets for nitrogen and phosphorus reductions but was slightly behind for sediment. Model forecasts of the 2016–2017 milestones suggest that Virginia is on track to meet the 2017 target for achieving 60% of the required reductions for nitrogen and phosphorus pollutants and very close to achieving required reductions for sediment.

Chesapeake Bay Act implementation continued during FY2017. From September 2016 to September 2017, Chesapeake Bay Preservation Act compliance reviews were initiated for 31 localities. Twelve of those reviews have been completed; three localities were deemed to be fully compliant. For nine of the localities, DEQ staff identified deficiencies in their programs, assessed conditions, and established a deadline to meet those conditions. A total of 40 of the 84 Bay Act localities have now gone through a second-round of compliance review. As part of the compliance review process, localities are required to submit annual reports on their continued implementation of the Bay Act. Based on the 2016 annual report cycle, a total of 580 soil and water quality conservation assessments were conducted and 23,030 septic systems were pumped out.

VIRGINIA COASTAL ZONE MANAGEMENT

As part of the ensuing five-year Section 309 Strategies for 2016–2020, the Virginia Coastal Zone Management Program will focus on Cumulative and Secondary Impacts of Development, Coastal Hazards, and Ocean Resources. The final year of PDC water quality projects (2011–2015) was completed September 30, 2016. Grantees completed FY16 projects in the following focal areas: Ocean Resources (ocean planning, marine debris) and Cumulative and Secondary Impacts of Growth and Development (water quality, shoreline management, working waterfronts and special area management planning.)

Key activities included:

- Hampton Roads Regional Planning District Commission worked with the local governments of Norfolk and Suffolk to develop implementable policies to assist local government in addressing the requirements of the new Virginia Stormwater Management Regulations and the Chesapeake Bay Total Maximum Daily Load. One focus was on specific modifications to local ordinances. A second focus provides an example of how local governments can use Geographic Information Systems (GIS) to model the physical and environmental impacts of some of the proposed changes
- Middle Peninsula Planning District Commission addressed rural water quality issues (roadside ditch management).
- Northern Virginia Regional Commission is working with Northern Virginia master gardeners and master naturalists training them as volunteer community liaisons to promote creation of native landscapes in both residential and commercial spaces. NVRC has also worked with DEQ remediation to promote restoration of residential landscapes with native plants.

Looking ahead, a key program challenge is limited funding available for a competitive process to address issues among eight coastal planning regions. However, PDCs which received grant awards have leveraged funds and established new partnerships that may help them moving forward.

VIRGINIA LAND COVER DATABASE PROJECT

The 2014 General Assembly authorized funding from the WQIF to update the Commonwealth's statewide digital orthography to improve land coverage data necessary to assist local governments in planning and implementing their stormwater management programs. The selected contractor, WorldView Solutions,

began work in July 2015 and completed the development of the Chesapeake Bay portion of the state by the scheduled deadline of June 2016; the final products are now available on the [VGIN website](#). The completion of the final land cover dataset for the remainder of Virginia (non-Bay watersheds) was released in December 2016.

Chapter 1 – Introduction and Background

WHAT IS NONPOINT SOURCE (NPS) POLLUTION?

Nonpoint source (NPS) pollution originates from multiple, diffuse sources over a relatively large area. Nonpoint sources can be divided into source activities related to either land or water use including failing septic tanks, improper animal waste, mining, and forestry practices, and urban and rural runoff. Pollutants from these sources including nutrients, sediment, and bacteria, are typically accumulated in and carried into waterbodies by rainfall and snowmelt. However, in some cases, a precipitation event is not required to deliver NPS pollution to surface water (e.g., direct deposition of fecal matter in waterbody by wildlife or livestock or contamination from leaking sewer lines or straight pipes).

In contrast, point source (PS) pollution comes from a discrete, identifiable source. Point sources can include pipes, outfalls, and conveyance channels from municipal wastewater treatment plants, industrial waste treatment facilities, industrial stormwater discharges, or municipal storm sewer systems (MS4s).

WHAT IS VIRGINIA’S NONPOINT SOURCE (NPS) POLLUTION MANAGEMENT PROGRAM?

[Virginia’s Nonpoint Source \(NPS\) Pollution Management Program](#) is a diverse network of state and local government programs that collectively promotes and funds local watershed planning efforts, stream and wetland restoration and protection, education and outreach, and other measures.

The Program’s goal is to reduce NPS pollution and prevent it from impacting the Commonwealth’s lakes, rivers, and streams to help restore their health and prevent further water quality degradation.

WHAT IS THE LEGISLATIVE BACKDROP TO VIRGINIA’S NPS MANAGEMENT PROGRAM?

There are several state and federal laws that result in comprehensive programs, which address the management of NPS pollution in the Commonwealth of Virginia. Section 319(h) of the Federal Clean Water Act requires that states develop and implement NPS pollution management programs. In addition, § 10.1-104.1 of the Code of Virginia, Cooperative Nonpoint Source Pollution Program, states that management programs to control nonpoint source pollution are required, and that the state shall assist local governments, soil and water conservation districts and individuals in restoring, protecting, and improving water quality through grants provided from the Virginia Water Quality Improvement Fund. As of July 1, 2013, the Virginia Department of Environmental Quality (DEQ) is the lead agency for the Commonwealth’s nonpoint source pollution management programs and thereby oversees the Section 319(h) grant program in the Commonwealth. DEQ also distributes assigned funds and leads the identification and establishment of priorities of NPS-related water quality problems in coordination with numerous partner agencies, as discussed in this document.

WHAT IS THE VIRGINIA NPS POLLUTION MANAGEMENT PLAN?

This plan, developed by DEQ in cooperation with other state, federal, regional, and local agencies and other organizations, summarizes the Commonwealth’s strategy and programs to prevent and control NPS pollution. The updated five-year plan approved by EPA on September 30, 2014 identifies programs and initiatives to achieve long-term statewide NPS goals. Coordination and cooperation are vital to effective NPS pollution management. Therefore, the Program utilizes partnerships to advance goals through financial, technical, and outreach assistance and local capacity building to achieve specific NPS pollution control targets. The EPA-approved version of the Plan can be found on the [DEQ website](#).

WHAT IS THE PURPOSE OF THE 2017 VIRGINIA NPS MANAGEMENT PROGRAM ANNUAL REPORT?

This report summarizes the key actions taken throughout the Commonwealth of Virginia to implement the 2014 Virginia Nonpoint Source Pollution Management Plan and improve the quality of the Commonwealth's waters.

Chapter 2 – Accomplishments in TMDL Development and Implementation, Watershed Restoration, and Pollution Reductions

TMDL DEVELOPMENT AND IMPLEMENTATION PROCESS

To address nonpoint source pollutant loads, impaired waterbodies in Virginia are identified and restored through an approach involving five ongoing, interrelated processes (Figure 2-1): water quality monitoring, assessment of monitoring data, TMDL development, TMDL Implementation Plan (IP) development, and implementation of practices to reduce pollutants and restore impaired waters. These same processes, monitoring, assessment and TMDL implementation are applied regardless of pollutant source. All of the processes revolve around the water quality standards in a cycle called, “The Continuing Planning Process”. More on water quality standards and a graphic representation of the CPP are provided at the [DEQ Water Quality Standards webpage](#).

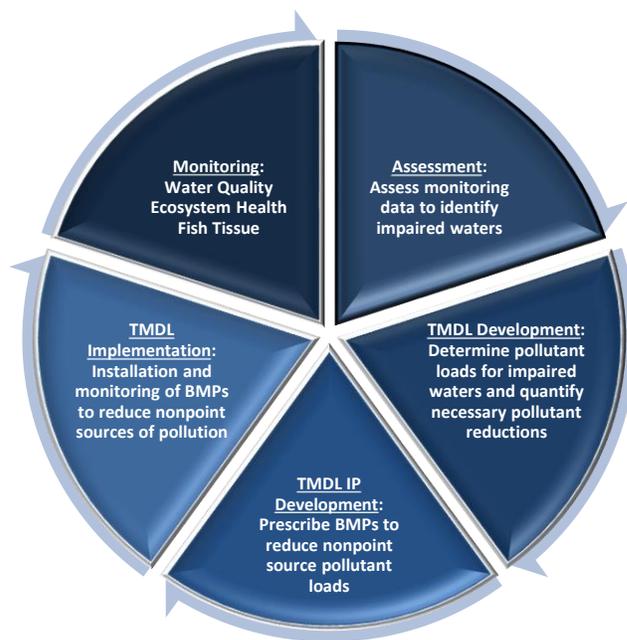


Figure 2-1: Planning process to identify and restore waters impaired by nonpoint source pollution

The [impaired waters list](#), developed annually by DEQ, individually describes stream segments, lakes, and estuaries that exhibit violations of water quality standards. These lists are contained in the [305\(b\)/303\(d\) Water Quality Assessment Integrated Report](#) (IR), which details the pollutant(s) responsible for the violations and the suspected cause(s) and source(s) of the pollutant(s).

Since 1998, DEQ has conducted studies, with public input, to restore and maintain the water quality for impaired waters (waterbodies failing to meet water quality standards). These studies produce “*Total Maximum Daily Loads*,” or [TMDLs](#), which are required by Section 303(d) of the Clean Water Act and the EPA’s Water Quality Planning and Management Regulation (40 CFR Part 130). Virginia’s Water Monitoring, Information, and Restoration Act (62.1-44.19:7), or WQMIRA, also requires TMDLs to be developed and

Total Maximum Daily Load (TMDL):
the total pollutant a waterbody can assimilate and still meet water quality standards

implemented expeditiously for such waters. Once a TMDL has been developed in Virginia, a TMDL report is prepared and distributed for public comment and then submitted to EPA for approval.

Section 319 and Virginia's 1997 Water Quality Monitoring, Information, and Restoration Act (§62.1-44.19:4 through 19:8 of the Code of Virginia) allow for the development of watershed-based plans (WBPs) or *TMDL implementation plans (IPs)*, which describe practical actions (i.e., *best management practices (BMPs)*) necessary to reduce pollutants entering a waterbody and achieve the TMDL. Point sources of pollution – those that can be traced back to a single direct source (e.g., industrial stormwater) – are alternatively addressed through permit conditions established by the Virginia Pollutant Discharge Elimination System (VPDES) Program administered by DEQ.

Best Management Practices (BMP): methods, measures, or practices determined to be reasonable and cost-effective means for a landowner to meet certain, generally nonpoint source, pollution control needs

TMDL Implementation Plan (IP): describes how pollution will be reduced to achieve a TMDL; includes types and number of BMPs to be installed, sources of funding for and stakeholders involved in implementation

An IP is developed with involved agencies, organizations, and local stakeholders as a practical guide for funding and implementing targeted, on-the-ground activities (i.e., BMPs), which will result in water quality improvements, attainment of water quality standards, and the subsequent delisting of impaired waterbodies. The IP includes a schedule of actions, costs, and monitoring. Virginia uses a staged approach to implementation that provides opportunities for periodic evaluation of implementation action effectiveness and adjustment of efforts to achieve water quality objectives in a timely

and cost-effective manner. To gauge progress, DEQ tracks BMP installations and continues to monitor water quality in the impaired watersheds.

TMDL DEVELOPMENT AND IMPLEMENTATION GOALS

Figure 2-2 summarizes the Virginia fiscal year 2017 (FY2017) goals for each step in the process to identify and restore impaired waters in Virginia.

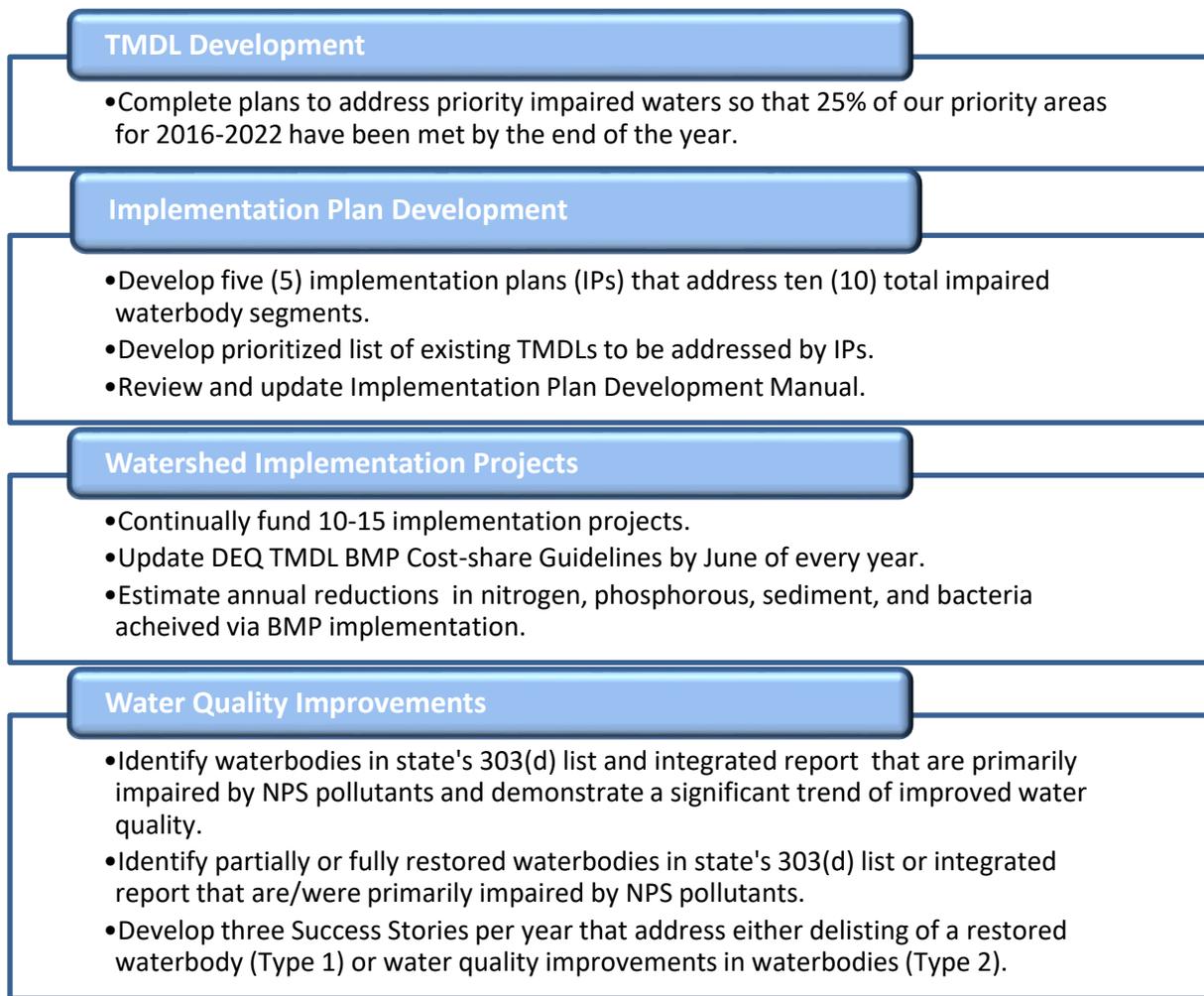


Figure 2-2: General goals of the TMDL development, planning, and implementation program for FY2017

TMDL DEVELOPMENT AND IMPLEMENTATION PROGRESS

TMDL Development Progress

Figure 2-3 shows the number of TMDL equations by pollutant set across Virginia since the inception of the TMDL program in 2001. As of June 2017, 35 TMDL equations (31 new, 4 revised), each representing a watershed area draining to impaired surface waters, have been approved by EPA since July 2016 (VAFY17). In USFY17, 25 equations were approved; however, had the September State Water Control Board meeting not been postponed until November, 40 equations would have been approved in the federal fiscal year. Therefore, 18% of priority area TMDLs were developed and actually approved in VAFY17, so the goal of addressing 25% of priority areas was not achieved. However, the total submitted represented 23% of priority areas, falling just short of that goal.

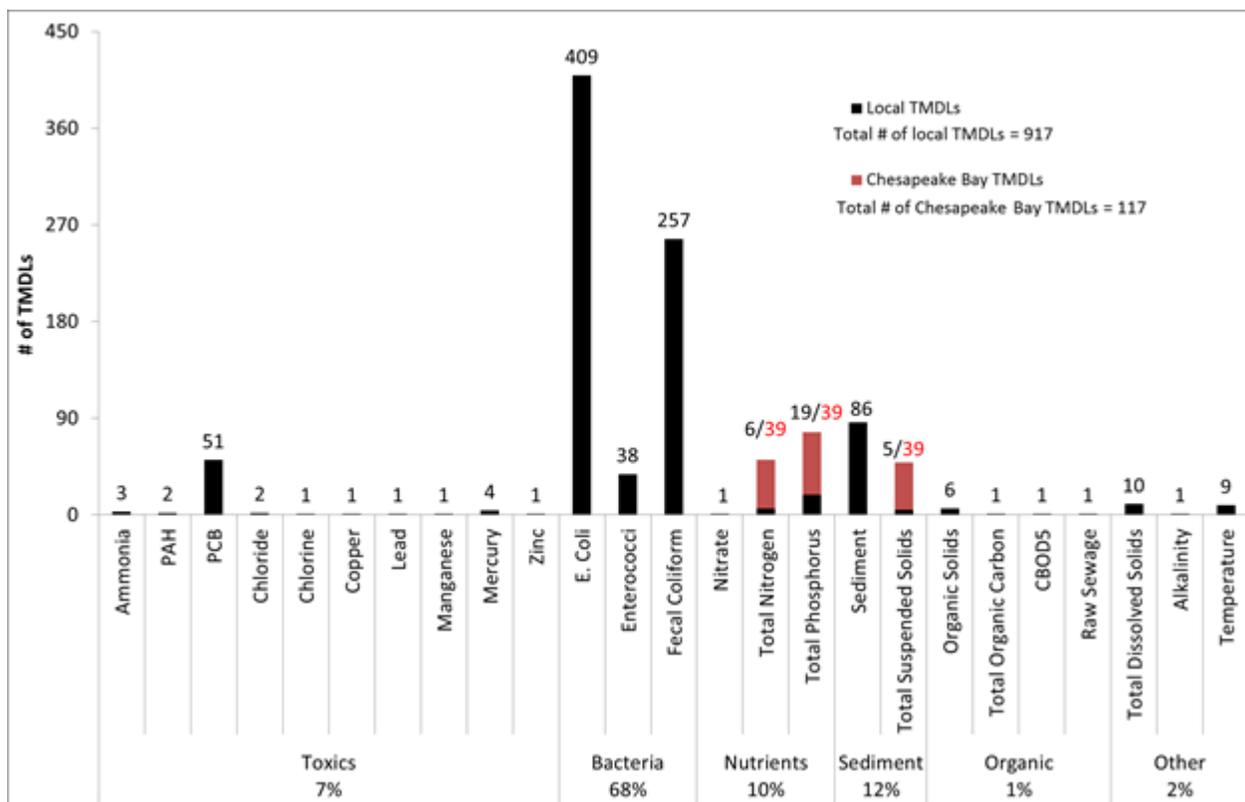


Figure 2-3: TMDL equations developed since 2001, classified by pollutant

Based on the 2014 Integrated Report, Virginia estimates that over 8,000 miles of rivers, 79,929 acres of lake, and 2,053 square miles of estuary will require TMDL development in the coming years. Virginia continues to explore tools and options for restoring and protecting water quality, both for environmental benefit and efficient program management. To maintain a robust pace of TMDL development with level funding, Virginia has developed several strategies including:

- developing TMDLs using a watershed approach to address multiple impairments in watersheds with similar characteristics
- developing TMDLs in-house
- identifying non-TMDL solutions, such as straight-to-implementation, to address impairments
- developing TMDLs that are more easily implemented

In the winter of 2014, DEQ began prioritizing watersheds for TMDL development, TMDL alternative, stressor analysis, or natural condition analysis during the 2016-2022 timeframe. Watersheds are prioritized based on risk to public health, public interest, available monitoring data, factors associated with the impaired uses of the watershed, regional input, and available funding.

A list of watersheds prioritized for TMDL or TMDL alternative development during 2016-2022 was developed and finalized on May 4, 2016; the priority watersheds through 2022 include 1,969 river and stream miles, 4,304 acres for lakes and reservoirs, and 267 square miles for estuaries. With priority watersheds finalized, DEQ began immediately tracking progress toward those priorities. A description of the prioritization process and the six-year priorities can be found on Virginia’s [TMDL Program Priorities website](#). Two-year TMDL development schedules are also posted on Virginia’s [TMDL development website](#).

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IP Development Progress

In FY2017, DEQ and other partners developed four (4) IPs addressing 31 impairments. In addition, six (6) IPs addressing 126 impairments were under development at the end of the fiscal year. Table 2-1 summarizes TMDL implementation plans completed or under development during FY2017.

Table 2-1: TMDL implementation plans completed or under development during FY2017

Watershed (# of impairments / # of impaired segments)	Location (county or city)	Impairment	Status
Roanoke River Watersheds- Part 2 – North Fork Roanoke River, South Fork Roanoke River, Bradshaw Creek, Wilson Creek (8/4)	Floyd, Montgomery, Roanoke	Bc, Be (sed)	C
Crooked Run, Stephens Run, West Run, Willow Run (4/4)	Frederick, Warren	Bc	C
Upper Clinch River and Tributaries (8/8)	Tazewell	Bc	C
Blackwater Creek, Clinch River, N.F. Clinch River, Stock Creek, Moll Creek (11/11)	Scott, Russell, Wise	Bc	C*
Cromwells Run, Little River, Upper Goose Creek (3/3)	Fauquier, Loudoun	Bc	UD
Yeocomico River (13/13)	Northumberland, Westmoreland	Bc	UD
Dan River- Birch Creek, Byrds Branch, Doubles Creek, Fall Creek, Sandy Creek (94/94)	Pittsylvania, Halifax	Bc	UD
Little Calfpasture River (1/1)	Augusta, Rockbridge	Be (sed)	UD
Powell River, North Fork Powell, South Fork Powell, Butcher Creek, Wallen Creek (12/10)	Lee, Wise	Bc, Be (sed)	UD
Accotink Creek (3/3)	Fairfax, Fairfax County	Chloride	UD

Impairment types: Bc = bacteria, Be = Benthic, Sed = sediment

Status “C” = IP complete in 2017; Status “UD” =IP under development

** IP has been completed and submitted to USEPA, but not yet approved.*

Since 2001, Virginia has completed 87 IPs that address 460 impairments; these IPs are listed in Appendix 1 of this report. Figure 2-4 below shows the location by watershed of the Commonwealth’s TMDL implementation planning and activities since the program’s inception. Each watershed has an IP in various stages of implementation, from planning underway to implementation of the plan underway.

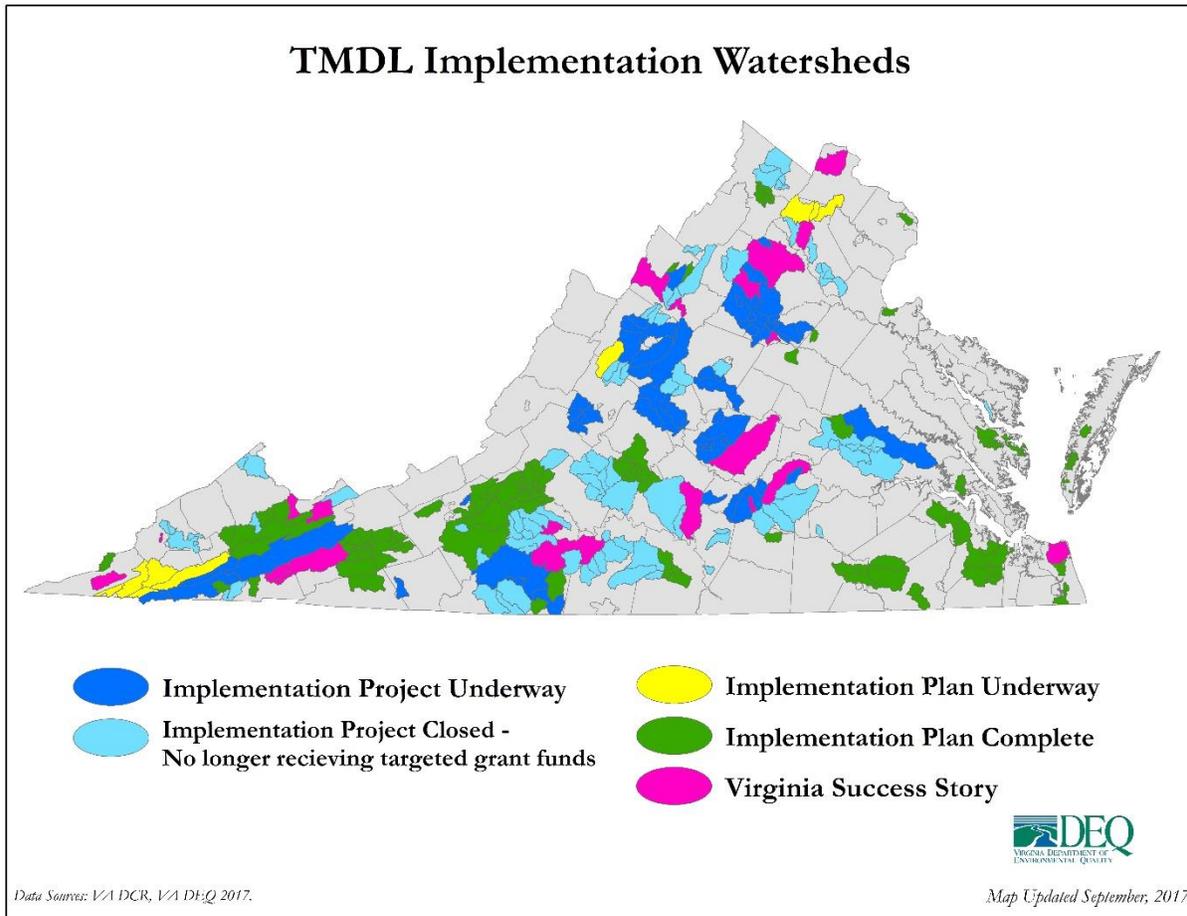


Figure 2-4: Status of planning and implementation of IPs by watershed through September 2017

As Virginia has expanded the overall geographic coverage of IPs, the number of impairments addressed by each IP has increased, on average. This reduces watershed modeling costs and resources needed for public engagement. As of 2017, the ratio of plans to impairments was five to one. Figure 2-5 below demonstrates the overall trend in numbers of IPs and impairments addressed.

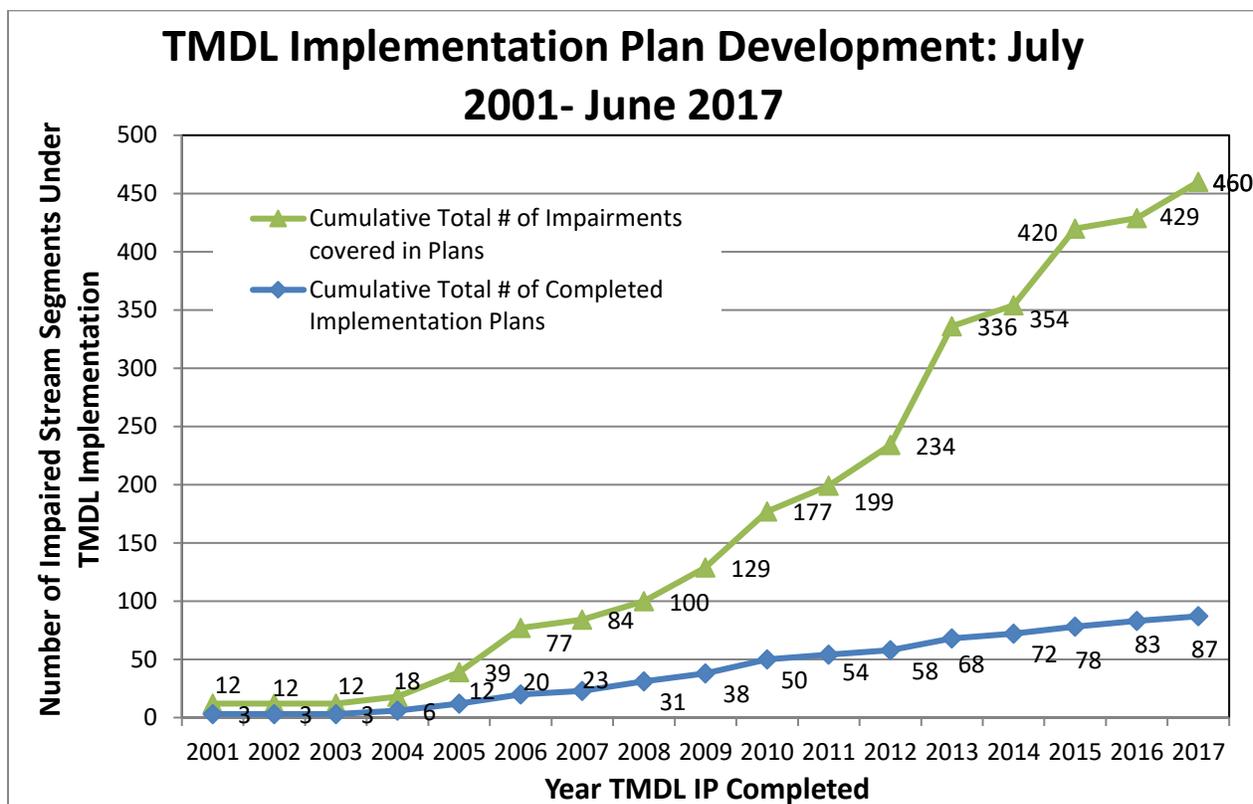


Figure 2-5: Cumulative summary of TMDL IP development and number of impairments addressed by each IP

The rate of TMDL IP development exceeds the current goals stated in the 2014 Nonpoint Source Program Management Plan. As of 2017, Virginia has exceeded the goal for number of impairments addressed in IPs by 23%; in fact, as of June 2017, Virginia has already exceeded its 2019 goal by 18%.

Table 2-2: Progress of implementation planning based on 2014 NPS goals and milestones

Goal	2014 Baseline	2017 Goal	2019 Goal	2017 Actual	% Progress of 2017 Goal	% Progress of 2019 Goal
# of Implementation and Watershed Plans Completed	72	89	102	88	99%	86%
# of Impairments addressed by Implementation Plans	354	375	390	460	123% (exceeds)	118% (exceeds)

Watershed Restoration and TMDL Implementation Progress

Historically, Virginia’s TMDL Implementation Program has provided federal and state resources to watersheds with TMDL IPs. On average, implementation projects receive funding for three years, but funding duration has ranged from two to 10 years.

DEQ staff, supported by both federal 319(h) and Chesapeake Bay Implementation Grant (CBIG) funds, provide project management and technical support to watershed stakeholders implementing TMDLs. Section 319(h) funds are also provided to project partners (e.g., Soil and Water Conservation Districts) to provide technical assistance to landowners during implementation projects. In addition, Virginia administers a comprehensive cost-share program for BMP implementation utilizing both federal (319(h) and CBIG) grants and state resources (i.e., Water Quality Improvement Fund (WQIF), Virginia Natural Resources Commitment Fund (VNRCF), Virginia Agricultural Cost-Share Program (VACS)).

From July 1, 2016 through June 30, 2017, DEQ managed 20 implementation projects funded partially or fully with Federal Section 319(h) funds. Of these 20 projects, 18 of them collectively spent \$1,850,918 in state, federal, and private funds on 377 BMPs installed in 46 TMDL watersheds. Table 2-3 summarizes implementation for the projects active in FY2017.

Table 2-3: 319(h)-funded TMDL Implementation Projects Active in Virginia, Fiscal Year 2017

Watershed Area	TMDL Watershed Code	Years of Implementation and Funding
Thumb, Great, Carter and Deep Runs	VAN-E01R, E02R & E10R	§319(h): 2006-2016, VNRCF: 2011-2015
Upper Hazel River	VAN-E03- 05R	§319(h): 2009-2017, VNRCF: 2011-2015, WQIF RFP: 2007-2009
Slate River and Rock Island Creek	VAC-H17R, H21R, H22R	§319(h): 2010-2017
Upper York River (Orange County)	VAN-F06R, F07R	§319(h): 2012-2017, VNRCF: 2012-2015:
Spout Run	VAV-B57R	§319(h): 2014-2017
Lower Banister River	VAC-L67R, L70R, L71R	§319(h): 2014-2017, VNRCF: 2012-2015
Middle Clinch River	VAS-P03R - P09R	§319(h): 2017
Middle Fork Holston River	VAS-O03R	§319(h): 2014-2017
Middle River	VAV-B10R, B13R & B15R	§319(h): 2015-2017 (agriculture); VNRCF: 2006-2015 (agriculture)
Stroubles Creek	VAW-N22R	§319(h): 2014-2017, WQIF RFP: 2006-2008
Greenvale, Payne and Beach Creeks	VAN-E25R	§319(h): 2014-2016
Flat, Nibbs, Deep and West Creeks	VAP-J08-09R, J11R	§319(h): 2015-2017 (septic); WQIF/VNRCF: 2007-2015 (agriculture)
Linville Creek	VAV-B46R	§319(h): 2015-2017
Little Dark Run and Robinson River	VAN-E14R & E15R	§319(h): 2015-2017
Tye River	VAV-H09R, H10R & H13R	§319(h): 2015-2017
Hardware River	VAV-H18R & H19R	§319(h): 2015-2017
Briery, Little Sandy, Spring, Saylers Creeks and Bush River	VAC-J02- J06R	§319(h): 2016-2017; WQIF/VNRCF: 2007-2015– Agriculture only
Upper Rapidan River	VAN-E11R, E12R & E13R	§319(h): 2016-2017
Chestnut Creek	VAS-N06R	§319(h): 2016-2017
Upper Clinch River	VAS-P01R	§319(h): 2016-2017

319(h) = Federal EPA Nonpoint Source Implementation Grant; WQIF RFP = Watershed Improvement Fund Request for Proposals; VNRCF = State Virginia Natural Resources Commitment Fund

Aside from the 20 TMDL implementation projects that received targeted TMDL funding in FY2017, there were additional TMDL implementation watershed areas that received funding to implement agricultural BMPs funded through DCR's administration of Virginia Agricultural Cost-share Program and the federal Chesapeake Bay Implementation Grant; collectively, these programs funded the installation of 2,382 additional BMPs in 71 watersheds with TMDL IPs.

From July 1, 2016 through June 30, 2017, a total of 2,759 BMPs were installed across 72 implementation plans (up from 58 in FY16) and 215 TMDL implementation watersheds, resulting in total expenditures of \$17,150,875 including \$13,316,377 of federal and state funds and \$3,834,498 in landowner contributions (see Table 2-4).

Table 2-4: Summary of BMP implementation in TMDL watersheds by funding sources, FY2017

Type of Funding	Funding Source	# of IPs *	# of IP Watersheds*	# of BMPs Installed	\$ of Cost-share Paid	\$ of Landowner Contribution or Match	TOTAL BMP Cost
DEQ-Managed TMDL Work	Targeted TMDL (319(h)) with any other funding source	18	46	377	\$1,525,273	\$325,645	\$1,850,918
DEQ-Managed Subtotal		18	46	377	\$1,525,273	\$325,645	\$1,850,918
DCR-Managed TMDL Work	Federal Chesapeake Bay Funding (with or without State funding)	9	10	14	\$691,017	\$92,901	\$783,919
	Federal RCPP Grant Program	7	7	7	\$62,546	\$156,893	\$219,438
	No State or Federal Funds	16	28	87	\$0	\$298,798	\$298,798
	CREP (with or without other state cost-share funding)	23	38	92	\$570,281	\$685,784	\$1,256,065
	State VACS or WQIF	70	182	2,182	\$10,467,261	\$2,274,476	\$12,741,737
DCR-Managed Subtotal		71	190	2,382	\$11,791,104	\$3,508,853	\$15,299,957
TOTAL Unique Number		72	215	2,759	\$13,316,377	\$3,834,498	\$17,150,875
Chesapeake Bay Watershed		39	125	1,568	\$5,718,956	\$2,520,783	\$8,239,739
Waters Outside the Chesapeake Bay Watershed		33	90	1,191	\$7,597,421	\$1,313,715	\$8,911,136
TOTAL		72	215	2,759	\$13,316,377	\$3,834,498	\$17,150,875

RCPP = Resource Conservation Performance Partnership Grant (by USDA's Natural Resource Conservation Service); CREP = Conservation Reserve Enhancement Program (state share); VACS = Virginia Agricultural Cost-Share Program; WQIF = Water Quality Improvement Fund

*Some IPs are funded by multiple funding sources and may appear in the individual funding source tallies more than once. The Subtotals reflect the total number of unique instances of IPs and IP Watersheds with funding managed by DEQ and DCR, respectively; the total reflects the total number of IPs and IP watersheds funded statewide.

Each watershed presents unique opportunities and challenges that affect the success of BMP implementation. Table 2-5 itemizes BMP installations and related costs in the 72 TMDL implementation plans and 215 implementation watersheds that received cost-share funds in FY2017.

Table 2-5: Cost-share funds spent on implementation in FY2017, classified by TMDL watershed

TMDL Implementation Plan & TMDL Implementation Watershed	# BMPs	Cost-Share Paid	Landowner Contribution	Total Cost
Ash Camp and Twitty's Creeks	2	\$60,959	\$5,359	66,318
Back Bay Watershed	14	\$29,172	0	29,172
Back Creek	2	\$109,211	0	109,211
Banister River, Winn Creek, and Terrible Creek	2	\$729	\$761	1,490
Beaver Creek and Little Creek	12	\$15,926	\$10,029	25,955
Big Otter River Watershed	17	\$1,277,742	\$81,124	1,358,866
Blackwater River (Upper, Middle, North Fork, and South Fork)	5	\$102,580	\$16,568	119,148
Bluestone River	1	\$31,080	0	31,080
Buffalo Creek, Colliers Creek, and Cedar Creek	8	\$15,861	\$20,159	36,020
Carter Run, Great Run, Deep Run, and Thumb Run	10	\$187,090	\$275	187,365
Catoctin Creek	18	\$81,046	\$6,049	87,095
Cedar Creek, Hall Creek, Byers Creek and Hutton Creek; Middle Fork Holston River, and Wolf Creek	25	\$97,571	0	97,571
Chestnut Creek Watershed	4	\$25,799	\$24,770	50,569
Chickahominy River and Tributaries	55	\$80,480	0	80,480
Chowan River Watershed	269	\$373,433	\$89,038	462,470
Chuckatuck and Brewers Creek	50	\$60,150	0	60,150
Clinch River and Cove Creek	23	\$905,296	\$64,092	969,388
Cooks Creek and Blacks Run	8	\$4,040	\$6,649	10,689
Crab Creek	4	\$88,702	\$5,931	94,633
Craig Run, Browns Run, and Marsh Run	6	\$81,782	\$3,893	85,675
Cripple Creek and Elk Creek	19	\$337,224	\$55,219	392,443
Cub Creek, Turnip Creek, Buffalo Creek, and UT to Buffalo Creek	8	\$303,483	\$7,774	311,257
Falling River	6	\$56,370	\$21,789	78,159
Flat, Nibbs, Deep, and West Creeks	35	\$136,063	\$262,787	398,850
Greenvale, Paynes, and Beach Creeks	52	\$13,992	\$3,510	17,502
Guest River	2	\$67,156	\$22,075	89,231
Hardware and North Fork Hardware River	26	\$209,949	\$31,352	241,301
Hawksbill Creek and Mill Creek	11	\$52,214	\$56,385	108,599
Hays, Moffatts, Walker, and Otts Creeks	19	\$39,779	\$23,822	63,601
James River and Tributaries-City of Richmond	64	\$279,297	\$14,009	293,305
James River-Lynchburg	6	\$354,786	\$8,933	363,720
Linville Creek Watershed	56	\$67,606	\$73,694	141,300

TMDL Implementation Plan & TMDL Implementation Watershed	# BMPs	Cost-Share Paid	Landowner Contribution	Total Cost
Little Dark Run and Robinson River	80	\$425,623	\$139,591	\$565,215
Little River Watershed	10	\$195,158	\$34,410	\$229,568
Little River Watershed; Mill Creek - Montgomery County	3	\$73,470	\$1,352	\$74,822
Long Meadow Run and Turley Creek	9	\$6,288	\$134,386	\$140,674
Looney Creek	4	\$139,793	\$29,796	\$169,590
Lower Banister River	14	\$107,087	\$25,937	\$133,024
Lower Blackwater River, Maggodee and Gills Creek	17	\$389,289	\$54,098	\$443,388
Middle Clinch River	6	\$255,710	0	\$255,710
Middle Fork Holston River and Wolf Creek	99	\$286,375	\$84,226	\$370,601
Middle River Watershed	75	\$534,576	\$188,212	\$722,788
Mill Creek - Northampton County	4	\$3,679	0	\$3,679
Mill Creek and Powhatan Creek Watersheds	3	\$3,156	0	\$3,156
Mossy Creek, Long Glade Run, and Naked Creek	51	\$241,353	\$82,273	\$323,626
North Fork Holston River Watershed	55	\$766,216	\$93,512	\$859,729
North Landing Watershed (including Milldam, Middle, West Neck, and Nanney Creeks)	27	\$57,850	0	\$57,850
North River	43	\$64,795	\$177,378	\$242,173
Ocohanock Creek	15	\$48,692	\$3,893	\$52,585
Opequon Creek Watershed	4	\$78,033	\$66,915	\$144,948
Piankatank River, Gwynns Island, Milford Haven	121	\$83,254	0	\$83,254
Pigg River and Old Womans Creek Watersheds	18	\$434,335	\$75,046	\$509,382
Reed Creek Watershed	35	\$400,317	\$170,828	\$571,145
Rockfish River Watershed	7	\$5,564	\$8,084	\$13,648
Shenandoah Tributaries	3	\$33,143	\$44,644	\$77,787
Slate River and Rock Island Creek	35	\$135,124	\$43,881	\$179,005
Smith Creek Watershed	43	\$97,662	\$529,552	\$627,214
Smith River and Mayo River Watersheds	17	\$264,398	\$52,933	\$317,331
South River Watershed and Christians Creek	91	\$279,085	\$80,480	\$359,564
Spout Run	5	\$166,394	\$26,038	\$192,432
Spring Creek, Briery Creek, Bush River, Little Sandy River, and Saylers Creek	46	\$187,141	\$178,278	\$365,419
Stroubles Creek	0	0	0	0
The Gulf, Barlow, Mattawoman, Jacobus, and Hungars Creeks	13	\$14,646	\$7,787	\$22,433
Three Creek, Mill Swamp, Darden Mill Run	448	\$349,860	\$137,692	\$487,552
Tye River, Hat Creek, Rucker Run, and Piney River	20	\$82,741	\$30,541	\$113,283
Upper Banister River and Tributaries	21	\$127,777	\$174,577	\$302,353

TMDL Implementation Plan & TMDL Implementation Watershed	# BMPs	Cost-Share Paid	Landowner Contribution	Total Cost
Upper Hazel River, Hughes River, Rush River, and Thornton River	75	\$215,289	\$48,371	\$263,661
Upper Nansemond River	249	\$356,562	\$3,834	\$360,396
Upper Rapidan River	92	\$473,950	\$31,993	\$505,943
Upper Roanoke River -Part 2	2	\$3,467	\$4,576	\$8,043
Upper York River Watershed	50	\$260,515	\$39,842	\$300,357
Willis River Watershed	10	\$121,442	\$113,496	\$234,938
Grand Total	2,759	\$13,316,377	\$3,834,498	17,150,875

BMP Implementation Progress and Pollutant Reductions

Tracking both BMP implementation and water quality improvements in TMDL watersheds is critical to properly assess progress and needs in watershed restoration and thereby measure TMDL Implementation Program success.

TMDL BMP installations in FY2017 resulted in the reduction of 742,201 pounds of nitrogen, 78,529 pounds of phosphorous, 462,520 tons of sediment, and 4.83E+16 colony forming units (CFU) of fecal coliform bacteria. Tables 2-6 and 2-7 below provide a summary of the estimated BMP pollutant reductions achieved, classified by associated BMP funding source and the extent of each BMP installed.

Colony Forming Unit (cfu):
a unit used to estimate the number of bacteria in a sample

Table 2-6: Summary of pollutants reduced through TMDL implementation in FY2017

BMPs Installed/Pollutant Reductions	Targeted TMDL 319(h) and Any Other Source	Non-319(h) funded projects (State, other federal or other funding)	Total
Number of BMPS Installed	377	2,382	2759
Total Pounds Nitrogen Reduced	9,888	732,313	742,201
Total Pounds Phosphorus Reduced	2,490	76,040	78,529
Total Tons Sediment Reduced	971	461,549	462,520
Total of Bacteria Reduced (cfu)	6.35E+15	4.20E+16	4.83E+16

Table 2-7: Summary of BMP implementation for TMDL projects in FY2017

Practice	Practice Description	# of BMPs	Extent of BMP Installed	Riparian Buffer (Acres)	Units
CCI-CNT	Long-Term Continuous No-Till Planting System	36	1,209	--	acres
CCI-SE-1	Stream Exclusion - Maintenance Practice	16	75,350	--	lin. feet
CRFR-3	CREP Riparian Forest Buffer Planting	45	141	141	acres
CRSL-6	CREP Grazing Land Protection	55	145,929	145	lin. feet
CRWP-2	CREP Streambank Protection	1	900	1	lin. feet
CRWQ-1	CREP Grass Filter Strips	1	1	1	acres
FR-1	Aforestation of Erodeable Crop and Pastureland	8	40	--	acres
FR-3	Woodland Buffer Filter Area	4	14	14	acres
LE-1T	Livestock Exclusion with Riparian Buffers for TMDL Imp.	18	71,022	60	lin. feet
LE-2	Livestock Exclusion with Reduced Setback	2	2,400	--	lin. feet
LE-2T	Livestock Exclusion with Reduced Setback for TMDL Imp.	1	1,660	--	lin. feet
RB-1	Septic Tank Pump-out	360	360	--	count
RB-2	Connection to Public Sewer	4	4	--	count
RB-3	Septic Tank System Repair	38	38	--	count
RB-4	Septic Tank System Replacement	30	30	--	count
RB-4P	Septic Tank System Installation/Replacement with Pump	14	14	--	count
RB-5	Installation of Alternative Waste Treatment System	2	2	--	count
SL-1	Long Term Vegetative Cover on Cropland	37	749	--	acres
SL-11	Permanent Vegetative Cover on Critical Areas	6	9	--	acres
SL-15A	Continuous High Residue Minimal Soil Disturbance Tillage System	63	2,387	--	acres
SL-6	Stream Exclusion with Grazing Land Management	202	748,458	735	lin. feet
SL-6B	Alternative Water System	3	100	--	acres
SL-6T	Stream Exclusion with Grazing Land Management for TMDL Imp.	14	84,551	73	lin. feet
SL-7	Extension of CREP Watering Systems	11	589	--	acres
SL-8	Protective Cover for Specialty Crops	12	705	--	acres
SL-8B	Small Grain and Mixed Cover Crop for Nutrient Management and Residue Management	1395	49,393	--	acres
SL-8H	Harvestable Cover Crop	334	15,680	--	acres
SL-9	Grazing Land Management	7	168	--	acres
WP-1	Sediment Retention, Erosion or Water Control Structures	2	2	--	Count
WP-2	Streambank Protection (Fencing)	5	25,020	20	lin. feet
WP-3	Sod Waterway	2	6	--	acres
WP-4	Animal Waste Control Facilities	10	10	--	Count
WP-4C	Composter Facilities	4	4	--	Count
WQ-12	Roof Runoff Management System	2	4,074	--	sq. feet
WQ-4	Legume Based Cover Crop	15	914	--	acres

BMP installation efforts in FY17 resulted in the implementation of:
2,759 BMPs,
1,190 acres of riparian buffer, and
218 miles (1,155,290 linear feet) of stream fenced from livestock access,
which excluded 27,591 animals from stream access

VIRGINIA TMDL WATER QUALITY IMPROVEMENTS AND SUCCESS STORIES

The water quality programs at DEQ aim to identify, restore, and ultimately protect impaired waters. This is accomplished through [water quality monitoring](#), [assessments of the water quality data](#) to identify impaired waters as part of the 305(b)/303(d) Integrated Report, and a number of regulatory and non-regulatory, incentive-based approaches to restore water quality. These approaches to restoring water quality include [TMDLs](#), [TMDL alternatives](#), [TMDL implementation plans](#), [permitting](#) and [grants/cost-share programs](#) that help fund pollution controls and best management practices (BMPs) across the state.

In cases where impaired waters have been restored or exhibit great improvements in water quality due to the implementation of pollution controls, we call those success stories. Generally, waters are degraded over long periods of time, and therefore, the restoration of those impaired waters takes both time and properly implemented pollution controls. Due to the unique characteristics of each impaired stretch of water, the methods for restoring impaired waters are varied. In some cases, installing BMPs throughout the watershed as prescribed in TMDL Implementation Plans or TMDL alternatives may lead to water quality restoration. In other cases, working closely with regulated entities on the implementation of TMDL wasteload allocations and other permit conditions through the permitting process can restore impaired waters. While these two scenarios outline restoration attained through nonpoint source reductions or point source reductions, impaired waters may also be restored through a combination of both. Given the complex and often large-scale nature of water quality impairments, the success stories highlighted here were successful because of extensive collaboration between DEQ, one or more other agencies, regulated entities, and multiple other stakeholders.

The examples of water quality success stories in Virginia are presented on two different webpages:

- [Virginia's Nonpoint Source Pollution Success Stories](#)
- [Other Virginia Water Quality Success Stories](#)

As described in the "[Virginia's Nonpoint Source Pollution Success Stories](#)" page; the successes of Virginia's NPS Management Program and TMDL Implementation Program are documented by describing improved water quality conditions in [Section 319 Nonpoint Source Success Stories](#). Through these Success Stories, EPA and DEQ document progress in partial or full restoration of watershed segments associated with NPS implementation actions. The VA nonpoint program has met its FY2017 goal for number of Success Stories but has exceeded by 10% its FY2017 goal for number of segments discussed in those reports (see Table 2-8); three (3) Success Stories were submitted for six (6) impaired watershed segments with water quality improvements attributable to TMDL implementation actions. Table 2-9 lists all 33 Success Stories published since 2001 about Virginia watershed segments that have been partially or fully restored (Type 1 Stories – 23 published) or have shown progress toward achieving water quality goals (Type 2 stories – 10 published). Links to those Stories are provided where available.

Table 2-8: Summary of Success Story goal attainment, FY2017

Type of Success Story	Number	2014 Baseline	2017 Goal	2017 Actual	2019 Goal	% Progress of 2017 Goal	% Progress of 2019 Goal
Partial or Full Restoration (Type 1)	# Stories	6	10	13	12	130%	108%
Partial or Full Restoration (Type 1)	# Segments	11	15	23	17	153%	135%
Significant Water Quality Improvement (Type 2)	# Stories	9	14	9	18	64%	50%
Significant Water Quality Improvement (Type 2)	# Segments	10	15	10	19	67%	N/A
Major Goal: Total Stories	# Stories	15	24	22	30	92%	73%
Major Goal: Total Stories	# Segments	21	30	33	36	110%	92%

Table 2-9: Published Success Stories through FY2017

Number of Segments with Type 1 or 2 Success Story	Number of Segments with Partial or Full Restoration (Type 1)	Number of Segments with Water Quality Improvement (Type 2)	Name of Success Story	Year	Topic
1	0	1	Cabin Branch Mine Orphaned Land Project	2001	Mining
1	0	1	Tonrae Mine Orphaned Land Project	2002	Mining
1	0	1	Middle Fork Holston River (Three Creeks)	2005	TMDL Implementation
2	0	2	Muddy Creek and Lower Dry River	2007	TMDL Implementation
1	1	0	Batie Creek	2008	Karst Program
3	3	0	Lynnhaven, Broad and Linkhorn Bays	2009	Shellfish
1	0	1	Valzinco Mine Orphaned Land Project	2008	Mining
3	3	0	Willis River	2010	TMDL Implementation
1	1	0	Middle Creek	2012	Mining
1	0	1	Black Creek	2012	Mining
1	0	1	Muddy Creek	2012	TMDL Implementation
1	0	1	Carter Run	2013	TMDL Implementation
1	0	1	Flat Creek	2013	TMDL Implementation
1	1	0	Clinch River	2014	TMDL Implementation
2	2	0	Cub Creek	2014	TMDL Implementation
2	2	0	Hall/Byers and Hutton Creeks	2015	TMDL Implementation
1	1	0	Little Sandy Creek	2015	TMDL Implementation
2	2	0	Blackwater River	2016	TMDL Implementation
1	1	0	Big Chestnut Creek	2016	TMDL Implementation
3	3	0	Upper Robinson River	2017	TMDL Implementation
2	2	0	Mountain Run	2017	TMDL Implementation
1	1	0	Stone Creek	2017	TMDL Implementation

DEQ completed three Success Stories in 2017:

1. *Upper Robinson River*

Bacteria loads from livestock, failing septic systems, pet waste, and wildlife contributed to violations of Virginia's water quality standard for bacteria in the Upper Robinson River. Three segments of the river totaling 7.15 miles were added to Virginia's 2002 303(d) Total Maximum Daily Load Priority List and Report for failing to attain the primary contact designated use. Improved water quality coincided with the installation of agricultural and residential BMPs in the watershed, allowing for the removal of two segments from the impaired waters list in 2012 and the third segment in 2014.

2. *Mountain Run*

Excess sediment primarily from forest and agricultural lands impaired water quality in Mountain Run causing violations of the state's General Standard for aquatic life. Consequently, two segments (5.69 miles and 0.95 miles) of Mountain Run were listed as impaired on Virginia's 2002 Section 303(d) Total Maximum Daily Load Priority List and Report. Installing agricultural BMPs in the watershed helped improve benthic macroinvertebrate communities, allowing Virginia to remove both segments from the state's impaired waters list in 2014.

3. *Stone Creek*

Increased sediment and total dissolved solids from acid mine drainage areas and abandoned mine lands adversely impacted the biological health of Stone Creek. As a result, a 3.33-mile segment was added to the 1996 Total Maximum Daily Load Priority List and Report for violating the General Standard for aquatic life. Reclamation of more than 215 acres of mined land (primarily to forest) as well as the installation of various acid mine drainage treatment projects ranging from simple limestone channels to complex multi-cell treatment systems helped reduce sedimentation in the creek. The resulting water quality improvements prompted the impaired segments' removal from Virginia's impaired waters list in 2014.

Please refer to the NPS Implementation closeout and progress reports included in Appendix 1 at the end of this report for examples of watersheds where water quality conditions could be improving as a result of implementation efforts. Figure 2-5 shows the geographic location of Virginia watersheds with Success Stories published since 2002.

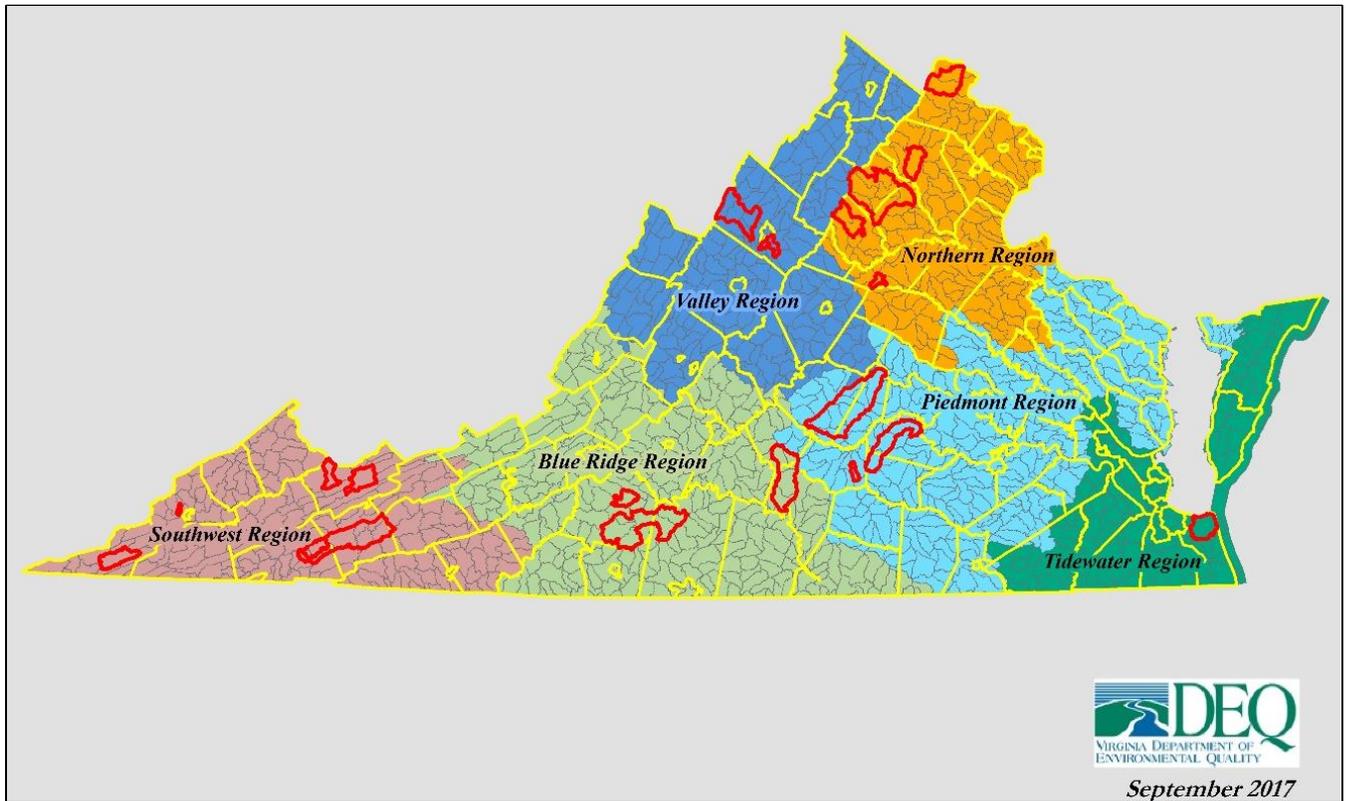


Figure 2-5: Geographic Location of Virginia watersheds with Success Stories (outlined in red), 2002-2017

KEY ACCOMPLISHMENTS, CHALLENGES AND OPPORTUNITIES FOR THE TMDL NONPOINT SOURCE IMPLEMENTATION PROGRAM

The TMDL NPS Implementation Program within the Commonwealth of VA experienced significant success and improvements in 2017 within many program areas in comparison to progress made in 2016. During this report period, the TMDL Development Program experienced a 29% increase in the total number of TMDL equations completed and either submitted to or approved by EPA and over a 100% increase in the number of impairments addressed by an IP completed or under development in 2017 (see table 2-10). The latter can be attributed to the fact that several very large IPs were under development, including some that addressed multiple pollutants. The TMDL IP Development program continues to exceed annual goals for the number of impairments that should be addressed by IPs or watershed-based plans. The program continues the trend established in 2016 of exceeding its annual and 5-year goals and has already exceeded the 2019 goal for the number of impairments covered by an IP.

Table 2-10: Comparative summary of TMDL and TMDL IP development accomplishments in 2016 vs. 2017

Program Area	Metric of Progress	Status: VAFY16	Status: VAFY17	Comparison: FY16-FY17
TMDL Development	Total # of TMDL equations completed and submitted to or approved by EPA	45	58	29%
TMDL IP Development	Total # of impairments included in IPs (completed or under development)	75	157	109%
TMDL IP Development	% of annual goal for impairments addressed by a completed IP	116%	123%	6%
TMDL IP Development	% of 2019 goal for impairments addressed by a completed IP	110%	118%	7%

In 2017, the TMDL Implementation Program saw over a 200% increase in BMP installation within completed Implementation Plan Areas compared to 2016 (see Table 2-11 below). This is an outstanding accomplishment resulting in over 218 miles of stream excluded from livestock access, a 23% increase in comparison to 2016. A majority of this increase can be attributed to increases in BMP installation and implementation efforts on the part of the Department of Conservation and Recreation and its agricultural partners. It is also partly due to the implementation of targeted initiatives funded with VA’s state Water Quality Improvement Fund (WQIF).

Implementation activity partially or fully funded by the EPA Section 319(h) program likewise had a number of successes, but also presents a few areas for improvement. One major accomplishment that will assist staff in better promoting the 319(h) program in the future was the selection of this program to be reviewed for a “lean” exercise.

- As part of a leadership training program for DEQ staff, the 319(h) program was selected to be reviewed for a “lean” exercise. This process systematically evaluates procedures, programs, policies and other elements of a business area, program, or project in order to identify process improvements, savings in time or funding, and improve overall efficiency. After reviewing the broad scope of the 319(h) program, the group decided to apply the lean principles to the process DEQ uses to solicit, evaluate, and award implementation project to grantees. As part of this process, DEQ staff evaluated a number of business practices and policies and has identified a number of improvements that can be made. Some improvements are already in place, with additional improvements yet to come. DEQ also hopes to apply the lessons learned during this process to other areas of the 319(h) program and other programs as well.

Other challenges have been identified, which can assist DEQ in finding ways to overcome these challenges moving forward:

- The 319(h)-funded program continues to experience challenges related to partner capacity and ability to recruit landowners willing and able to install BMPs on their property and pay for their portion of the BMP costs.
 - DEQ continued to work with DCR in 2017 to help implement the 100% funding of stream exclusion practices as one way to address landowner barriers to program participation. Section 319(h) funds were used in partnership with state resources to help fund additional stream exclusion. This resulted in higher participation in stream exclusion adoption;

however, it may have had a negative impact on participation in the installation of other types of BMPs.

- Project partners sometimes struggle to effectively manage and administer their implementation projects. It requires a unique skill set to be able to navigate the administrative details of a nonpoint source subrecipient award while simultaneously marketing and implementing cost-share opportunities. The capacity-building training program that DEQ staff worked to develop and implement in 2015 positively impacted partners by providing additional tools for project implementation. Staff continue to develop tools and resources that will increase implementation projects' success.
- The continued development of opportunities and tools for enabling landowners and property owners to install BMPs that address water quality concerns must be a priority going forward.

Table 2-11: Comparative summary of NPS implementation program accomplishments in 2016 vs. 2017

Program Area	Metric of Progress	Status: VAFY16	Status: VAFY17	Comparison: FY16-FY17
NPS Implementation	# of IPs with BMP installation	58	72	24%
NPS Implementation	# of BMPS installed in IP areas	881	2,759	213%
NPS Implementation	# of BMPS in IP areas funded with 319(h)	391	377	-4%
NPS Implementation	Total state/federal \$ for BMPS in IP areas	\$8,105,583	\$ 13,316,377	64%
NPS Implementation	Total 319(h) \$ for BMPS in IP areas	\$ 1,747,959	\$ 1,525,273	-13%
NPS Implementation	Miles of streams excluded from livestock access	177	218	23%
Success Stories	# of impaired segments addressed by a Success Story	27	33	22%
Success Stories	% annual goal of # of segments addressed by Success Stories	100%	110%	10%

The Virginia Nonpoint Source Pollution Management Program was transferred to DEQ in 2013. Previously, BMP design and approval were provided under the Virginia Agricultural Cost-Share Program administered by DCR. However, the administrative change resulted in a disassociation between the 319(h)-funded BMP cost-share program and DCR's Agricultural Cost-Share Program.

- DEQ continues to explore ways to ensure efficient design and approval of BMPs. This includes promoting greater stakeholder involvement to help inform the development of annual BMP specifications and cost-share resources. DEQ held several iterations of a stakeholder advisory committee addressing residential septic issues. As a result, the entire residential septic program was overhauled in 2017 to become a more effective and efficient tool to address, document, and remediate residential septic issues.

The Virginia Nonpoint Source Pollution Management Program continues to develop ways to monitor progress in implementation watersheds, despite limited resources.

- While highly effective BMP tracking programs are in place to account for BMPs installed using state or federal cost-share funds, tracking non-agricultural BMPs installed voluntarily (without government assistance) has proven challenging.
- DEQ staff work statewide to ensure the monitoring needs of implementation projects are addressed in the annual Implementation Monitoring Plan.
- Encouraging the development of citizen water quality monitoring programs has been one approach that has augmented state-sponsored monitoring of impaired waters and BMP installation. Citizen monitoring data can be a useful resource in the evaluation of implementation progress; see DEQ's [Citizen Monitoring Guidance](#).

Chapter 3 – Statewide NPS Program Initiatives

This report highlights state and local agency initiatives and implementation of goals set forth in *Virginia’s Nonpoint Source Pollution Management Program Plan*. It reflects and benefits from Virginia’s ongoing efforts to coordinate Chesapeake Bay and Nonpoint Source Pollution Management Program implementation. The layout of this chapter reflects the structure of the NPS Management Program Plan.

AGRICULTURAL AND NUTRIENT MANAGEMENT PROGRAMS

Virginia’s agricultural programs provide outstanding water quality and agronomic benefits and have the advantages of strong public support and funding from the Virginia General Assembly. An annual Agricultural Needs Assessment completed by the Department of Conservation and Recreation (DCR) guides funding and program allocation decisions and helps the Commonwealth meet water quality goals established in the *Chesapeake Bay Watershed Implementation Plan*, the *Virginia Nonpoint Source Pollution Management Plan*, and the *Chesapeake Bay and Virginia Waters Clean-up Plan*.

DCR administers funds for conservation programs that Soil and Water Conservation Districts (SWCD) deliver to the agricultural community. These programs include the [Virginia Agricultural Best Management Practices Cost-Share, BMP Tax Credit, and Conservation Reserve Enhancement Programs \(CREP\)](#). Hydrologic units with the highest potential to contribute agricultural NPS pollution to surface and ground waters receive the most cost-share funds. SWCDs then rank cost-share applications and fund those applications that will provide the greatest local water quality benefit.

Agricultural BMP Implementation

During 2017, DCR oversaw the completion and installation of over \$19.6 million in agricultural BMPs, including over \$14 million of state funds (Table 3-1). Nutrient and sediment reductions resulting from state-funded Agricultural BMP implementation are provided in Table 3-2

Table 3-1: Cost data for agricultural BMPs completed in FY2017*

Costs and Funding Category	Amount
Actual BMP Cost	\$19,679,500
Total Cost-Share Paid	\$14,439,487
State Cost-Share Paid	\$14,078,877
Non-State Cost-Share Paid	\$360,610
Other Funding Amount	\$720,327
Farmer Cost Before Tax Credit	\$4,519,686
Tax Credit Amount Issued	\$387,122

*Figures do not include approved BMPs carried forward into FY2018 that are awaiting completion.

Table 3-2: Edge of field nutrient and sediment reductions resulting from state-funded agricultural BMP implementation in FY2017*

Total Nitrogen Reduction (lbs/year) **	Total Phosphorus Reduction (lbs/year)**	Total Sediment Loss Reduction (tons/year)
10,491,282	3,662,450	854,544

*Figures do not include approved BMPs carried forward into FY2018 that are awaiting completion.

**Total N and P Reduction numbers now include estimates for nutrient management BMPs.

Priority funding for implementation of livestock exclusion is an important agricultural program milestone. Applications for 100% state-funded livestock stream exclusion were accepted from January 2013 through June 2015. As of that time, there were \$73 million in pending applications received and \$48 million expended or obligated for a total statewide initiative of \$121 million. Through June 2017, a total of \$93 million has been expended or obligated by SWCDs to complete 2,161 practices, and \$6.2 million in applications have cancelled, leaving \$28.2 in pending applications for 554 practices waiting funding. Once completed the 2,715 practices will protect 10 million linear feet of stream bank from livestock access.

DCR worked cooperatively with United States Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS) state office staff to develop guidance and scoring criteria for a USDA NRCS Regional Conservation Partnership Program (RCPP) livestock stream exclusion grant. DCR also worked with NRCS districts to complement each agency’s engineering assistance to SWCDs and farmers in many areas of the state. DCR continued to utilize DCR Conservation District Coordinators (CDCs) to effectively communicate with SWCDs for a more efficient implementation of the state cost-share program and other NPS efforts. In addition, DCR shared BMP implementation data with DEQ, so that TMDL IP development can incorporate the most recent practice implementation data.

Agricultural BMP Tracking

With funding provided by the General Assembly, Virginia developed and is working to expand a computerized BMP tracking program to record implementation and financial data associated with all implemented practices. VDACS and DEQ utilize modules of the BMP tracking program to Agricultural Stewardship Act (ASA) and Total Maximum Daily Load (TMDL) programs, respectively. During last fiscal year, DCR continued to upgrade this application to include functionality for the development of Resource Management Plans and Conservation Plans (see below). These two modules are integrated with the original BMP tracking portion of the application to allow for the collection of BMP data associated with plans. This program continues to be maintained by DCR.

Resource Management Planning

The [Virginia Resource Management Planning](#) program provides a voluntary way to help farm owners and operators take advantage of all the conservation measures at their disposal to improve farming operations and water quality. The plans are designed to encourage farmers to implement BMPs that reduce runoff pollution to local waters and, in many cases, improve the farmer’s financial bottom line. In return for full implementation, the plan holder can be assured that he or she is in compliance with any new state nutrient, sediment, and water quality standards and, in particular, with regulations related to the Chesapeake Bay and all local stream segment TMDLs. As of September 30, 2017, there were 388 plans covering 92,016 acres statewide. Of those, 62 RMPs covering just over 23,869 acres have been developed in the 2017. Further, the 2017 calendar-year goal of 10,000 acres covered by RMPs in the Chesapeake Bay watershed was surpassed with 42 plans covering more than 16,000 acres (Table 3-3).

Table 3-3: FY2017 Resource Management Plan (RMP) goal and progress

Goal	2017 Goal	2017 Actual	% Progress of 2017 Goal
Acres of RMPs developed in the Chesapeake Bay Watershed	10,000	16,000	160% (exceeds)

Nutrient Management

DCR administers a comprehensive [nutrient management program](#). In FY2017, DCR staff prepared *nutrient management plans* on 192,882 acres. Private nutrient management planners have developed or revised nutrient management plans statewide for 672,617 acres. With regard to cumulative nutrient management acreage goals, the 786,000-acre goal for cropland and hay land nutrient management plans has been exceeded. Cumulatively, there are a total of 605,764 acres in the Chesapeake Bay watershed and 865,498 acres under nutrient management plans statewide.

Nutrient Management Plan:
accounts for nutrient resources available on a property and calculates the nutrient application necessary to maximize yield while minimizing potential for nutrient pollution of nearby waterways.

The Commonwealth has set an ambitious milestone target for increasing the number of nutrient management plans on unpermitted dairies: 75% of facilities will have a nutrient management plans by the end of calendar year 2025. As a result of a competitive Request for Applications (RFA) that DCR issued in 2015 for private plan writing on unpermitted dairy operations, three private certified nutrient management planners were awarded a total of \$118,000 in combined Chesapeake Bay Implementation Grant and Nonpoint Source §319 funding to develop plans on a targeted acreage of 27,650 acres. The result was a total of 24 nutrient management plans written on unpermitted operations covering 2,779 acres. Another RFP was issued in February 2016, resulting in contracts totaling \$265,000 for the development of nutrient management plans on both permitted and unpermitted animal operations. An additional 23,788 acres on unpermitted operations and 22,844 acres on permitted operations, are expected to result from the latest contract. These contracts are still in effect and substantial progress has been made. There are 542 unpermitted dairies in Virginia, of which 155 (47%) have nutrient management plans as of the date of this report. There are 82 permitted dairies remaining in Virginia; 55 of these permitted operations have current plans with 16 having updated plans near completion. DCR is also working with Virginia Tech Cooperative Extension to assess the number of unpermitted confined beef operations in the Commonwealth. At the current time, there are five permitted beef operations with nutrient management plans. Of a total \$265,000 made available in FY2016 for private sector plan writers, \$120,000 was used for plans on unpermitted animal operations. Approximately \$150,000 per year in funding is needed on an ongoing basis to expand existing contracting with the private sector plan writers for these unpermitted animal operations.

DCR re-established a joint program with the Virginia Poultry Federation in February 2016, and poultry litter shipments out of the Chesapeake Bay watershed resumed in August 2016. As of June 30, 2017, 5,700 tons of litter had been shipped outside of Virginia's Chesapeake Bay watershed. DCR is working with the Virginia Poultry Federation and turkey integrators to incorporate actual turkey production data into the Phase 6 Chesapeake Bay Model. Once complete, this dataset will help more accurately reflect turkey litter volume produced, turkey population, and nutrients generated via turkey litter in the Bay watershed.

Virginia Department of Agriculture and Consumer Services (VDACS)

The [Virginia Department of Agriculture and Consumer Services](#) (VDACS) administers the [Agricultural Stewardship Act \(ASA\) Program](#). Through this complaint-based program, the Commissioner of Agriculture and Consumer Services receives information alleging water pollution from agricultural activities. The ASA program objective is to work with farmers and local SWCDs to resolve, in a timely and commonsense manner, water quality problems reported to VDACS concerning nutrients, sediment, and toxins from agricultural activities. Other partners involved in the process include the USDA NRCS, Virginia Department of Forestry (VDOF), DCR, DEQ, and local governments.

During the program year April 1, 2016 through March 31, 2017, VDACS-ASA program staff responded to 67 official water quality complaints. In 22 of the 67 complaints (33%), there was sufficient evidence that the agricultural activities were causing or would cause water pollution; Agricultural Stewardship Plans were required for those cases. Under the ASA, the Commissioner issues a corrective order when an owner or operator fails to submit and complete implementation of the Agricultural Stewardship Plan based on the findings of a conference held to gather facts on a case. Farmers involved in the complaint and correction process were generally cooperative in meeting the deadlines set by the ASA. Two corrective orders were issued during this program year; however, it was not necessary to assess any civil penalties.

The VDACS-ASA program also provides support to the DEQ agricultural program staff on a [Small Animal Feeding Operation \(AFO\) Evaluation and Assessment Strategy](#). This strategy is a voluntary effort to address water quality concerns associated with animal confinement on a site-specific basis without the need for additional regulations or permitting. Approximately 95 small AFOs remain to be evaluated out of the 800 identified in the Chesapeake Bay Watershed Implementation Plan (WIP). This number is down from 426 in the previous year.

Success is typically measured by compliance with ASA plans. The largest challenge of the ASA program is managing an ever-increasing workload with limited resources and staffing. Staff are tasked with processing and investigating new complaints, ensuring plans are implemented, and periodically following up on past complaints to document compliance. With an increasing number of plans required to address water pollution issues, prioritization is crucial to remain effective and efficient.

FORESTRY PROGRAMS

The [Virginia Department of Forestry](#) (VDOF) has been involved with the protection of forested watersheds since the early 1970s with the development of their first set of Forestry Best Management Practices (BMPs) to protect water quality in streams near forest harvesting operations. VDOF also improves and protects watersheds through project management and land conservation. The focus is on practices that will most greatly improve water quality, specifically conserving land permanently, establishing and maintaining riparian buffer zones, planting trees on non-forested open land, and increasing urban forest canopy by planting trees. All of these activities are closely related to meeting water quality goals associated with restoration of the Chesapeake Bay and Virginia's southern rivers watersheds.

Harvest Inspection Program

The backbone for the Department’s water quality effort is the harvest inspection program, which began in the mid-’80s. This program provides VDOF one-on-one contact with harvest operators and a welcomed opportunity to educate them on BMPs and the latest water quality protection techniques. In FY2017, VDOF field personnel inspected 5,010 timber harvest sites across Virginia on 220,105 acres – a slight decrease from the number of acres harvested in FY2016 (Figure 3-1).

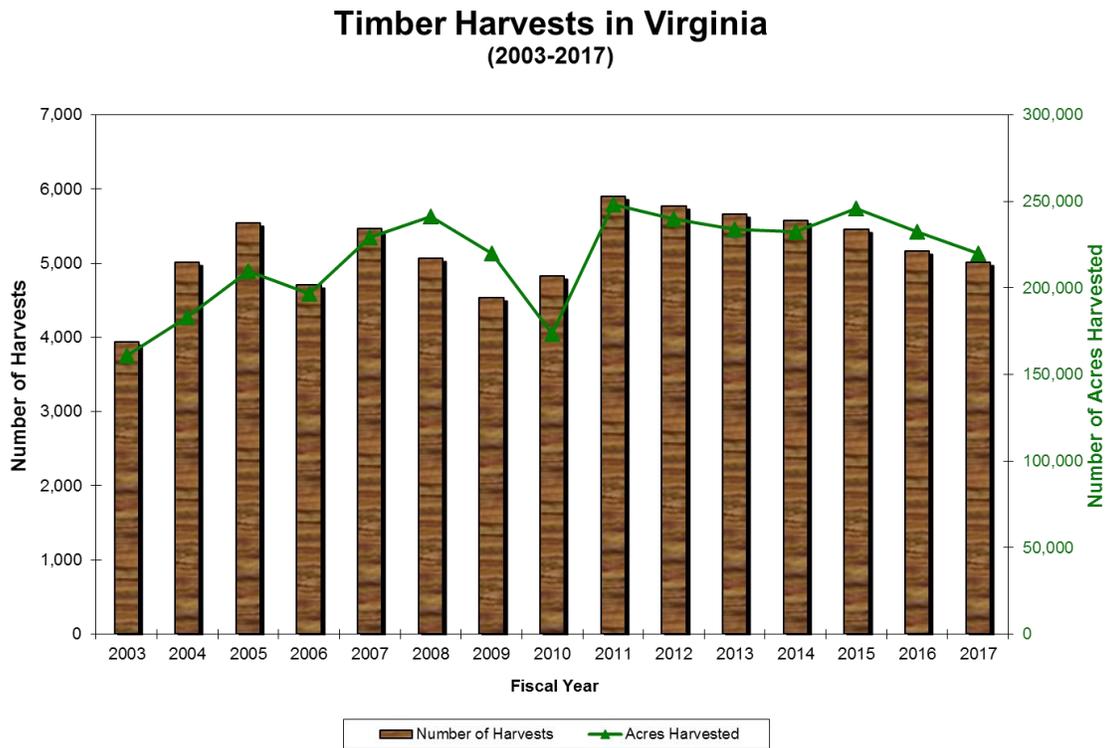


Figure 3-1: Number of harvests inspected and total number of acres harvested: 2003 through 2017

Logger Education

Another main focus of the VDOF water quality program is logger education. Since the development of its first BMP Manual, VDOF has been involved in training harvesting contractors in water quality protection techniques including harvest planning, map reading, and the use of GPS units in BMP implementation. In FY2017, there were 16 training programs offered educating 430 timber harvesting professionals through the Virginia SHARP Logger Program in cooperation with Virginia Tech and the Sustainable Forestry Initiative (SFI®) State Implementation Committee. This program has enabled VDOF to assist in training 8,666 harvesting professionals in 284 programs relating to water quality protection since its inception. Figure 3-2 exhibits historical levels of participation in VDOF logger education programs since 2003.

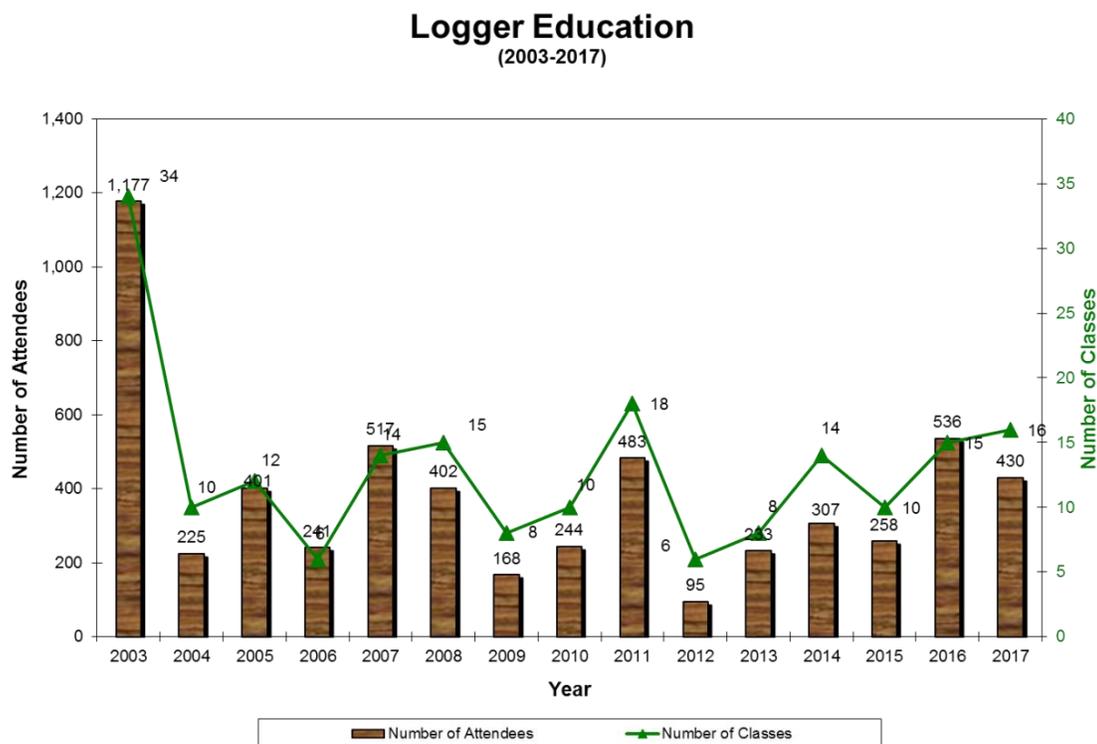


Figure 3-2: VDOF logger education: 2003 through 2017

Riparian Forest Buffers Technical Assistance

While other state and federal conservation agencies, including DCR, the USDA Farm Service Agency (FSA), and the Natural Resources Conservation Service (NRCS) provide funding for landowners to establish riparian forest buffers, the VDOF provides technical forestry expertise in the planning and creation of those buffers. In FY2017, 143 riparian buffer establishment projects were reported by the VDOF for 567.9 acres within the Chesapeake Bay watershed. These are projects where the VDOF was directly involved by providing planning, oversight, and certification of project completion.

Riparian Forest Buffer Tax Credits

One of the most valuable BMPs for water quality is the uncut or partially-cut streamside management zone. This voluntary measure assures an unbroken forest groundcover near the stream, providing shade for aquatic organisms and wildlife corridors. Landowners can elect to receive a state tax credit for a portion of the value of the uncut trees in the buffer. By doing so, they agree to leave the buffer undisturbed for 15 years. Seventy landowners took advantage of this option in Tax Year 2016 (most recent year of available data); this was a slight increase in number of applications from the previous year. This watershed protection option provided property owners a total tax credit of \$443,085.38 on 1,288.7 acres of retained streamside

timber valued at \$2,101,493.85. This was an increase from tax year 2015 in both tax credit issued and value of buffer retained.

Easement Program

VDOF administers a conservation easement program to maintain large, unfragmented blocks of forestland, ensuring the land is available for forest management in perpetuity. Today, the Department holds 154 conservation easements in 52 counties and the City of Suffolk that permanently protect nearly 43,000 acres of vital forestland, making VDOF the second-largest holder of conservation easements in Virginia. In FY2017, VDOF permanently protected 6,371 acres of open space and more than 34 miles of water courses through 23 conservation easements and another 33 acres in one amendment.

Forest Stewardship Program

Virginia's Forest Stewardship Program is a cooperative effort of the VDOF, the US Forest Service, and Private Forestry, to assist non-industrial private landowners in improving the management of private non-industrial forestlands for multiple resources, including wildlife, water, recreation, and forest products. Owned by VDOF, Virginia's state forests serve as demonstration sites for "best practices" in forestry including activities from tree planting to harvesting and environmental considerations for water quality, aesthetics, and wildlife. Management of vital streamside habitat focuses on a continuous source of clean water, travel corridors for wildlife, and diversity of plant and animal species.

Urban Tree Canopy Program

VDOF is encouraging communities to complete Urban Tree Canopy assessments using sub-meter resolution infrared-enhanced imagery to develop urban tree canopy goals and implementation plans specifically tied to their communities' urban forests. Such urban tree canopy assessments can be an integral component to green infrastructure planning on a city, county, or regional basis, which is vital for identifying and conserving urban/suburban forest lands. Using sub-meter resolution imagery now will also make it easier for reporting TMDL progress for 2017 and beyond.

Forestry BMP Implementation Monitoring

A statewide audit system has been in place since 1993 to track trends in BMP implementation and effectiveness. The entire BMP Implementation Monitoring effort has also been automated to be compatible with VDOF's IFRIS (Integrated Forest Resource Information System) enterprise database system. The information compiled serves as the basis for VDOF reporting under Virginia's WIP. In 2016 (most recent year of available data), 94.7 percent of the timber harvest acres in Virginia conducted within the boundaries of the Bay Watershed were under BMPs. The audit also showed that 98.32 percent of the sites visited had no active sedimentation present after the close-out of a harvesting operation. The goal for implementation under WIP II is 90 percent of timber harvest acres under BMPs by 2017 and 95 percent by 2025.

Environmental Impact Reviews

As a reviewing agency for DEQ's and Virginia Department of Transportation's (VDOT) environmental impact review processes, VDOF offers planning, design, and project footprint site recommendations to sponsors proposing to develop large public infrastructures projects. These recommendations incorporate BMPs and stewardship planning to conserve forests and mitigate unavoidable disturbances or impacts to Virginia's forests. VDOF reviewed over 275 project proposals in calendar year 2016. In numerous cases, these reviews have resulted in the modification of project footprints to avoid forest loss and to commitments by project sponsors to follow VDOF Forestry BMPs for Water Quality. DEQ has also provided project sponsors with special forestland mitigation guidance that was developed by VDOF in its environmental impact review instructions.

Cost-Share Assistance

VDOF offers timber harvest operators cost-share assistance on forestry BMPs through a unique program funded by the Commonwealth's Water Quality Improvement Fund (WQIF). In FY2015-16, these funds supported 30 stream protection projects that incorporated the use of portable bridges as stream crossing protection. The bridges' mobility allows for their continued use at multiple sites for years to come. Additional funds were not available in FY17 to continue this program even though there is a waiting list for this program.

Virginia Trees for Clean Water

Through its "Virginia Trees for Clean Water" initiative, VDOF is improving water quality by promoting on-the-ground tree planting efforts. To date, VDOF has assisted 123 projects resulting in more than 40,846 trees being planted in Virginia communities including special projects such as riparian buffer tree planting, a Turf to Trees program, and community and neighborhood and street tree plantings.

Healthy Watershed Forest/TMDL Project

In 2017, VDOF and the Rappahannock River Basin Commission continued to lead a project in partnership with DEQ, the Chesapeake Bay Commission, the George Washington Regional Commission, The Nature Conservancy, the Virginia Tech Land Use Education Program, and the Water Resource Research Center at Virginia Tech, which is intended to demonstrate the value of retaining forestland in the Chesapeake Bay watershed. A joint effort between Virginia and Pennsylvania, the project has focused first on quantifying the value of retaining forestland for meeting water quality objectives. Secondly, Virginia engaged in more than 60 discussion and discovery sessions in the field to determine what is needed from the perspective of local leaders to prioritize forestland retention as a land-use planning option to meet Chesapeake Bay Watershed goals.

In a methodology peer-reviewed and validated by Pennsylvania, Virginia successfully quantified that the value of retaining more forestland to meet Chesapeake Bay TMDL requirements could offset TMDL management investments and, thereby, save up to \$125 million in the pilot study area alone. Consequently, such savings extrapolated across all the jurisdictions within the Chesapeake Bay Watershed could be enormous. Secondly, it produced through extensive discussions with localities and numerous other stakeholder groups a "toolbox" of policy and other incentives that can be used to stimulate forestland retention in land-use planning decision-making. Lastly, it identified and focused discussions on some of the key challenges that thwart enhanced forestland retention planning, so possible solutions can be explored. The final report on the project's findings and recommendations was submitted June 30, 2017 to the Federal, Virginia, and Pennsylvania governments and numerous other parties. Follow-on efforts are now underway to act on the project's recommendations.

Assessments of Forestland Change

VDOF is compiling and incorporating assessments of forestland change from other agencies, states, universities, and conservation groups to better inform urban forestry policies, including state forest resources assessments, wildlife action plans, and eco-regional assessments.

Vital Habitat

VDOF diminished species work was highlighted with two poster presentations at the Biennial Longleaf Conference in Savannah, GA. One described VDOF's planting date study (which has led to the recommendation that longleaf be planted in October – December in Virginia), and the other summarized the 10-year data from the VDOF provenance test, which proved the value of preserving the native Virginia longleaf genotype. This was followed up with two new reports:

- Comparison of planting months for maximizing survival and early growth of restored longleaf pine,

and

- Relative performance of native Virginia longleaf pine compared to other geographic sources from North Carolina to Mississippi.

Significant efforts have been made in recent years to both restore longleaf pine and to increase the capacity and use of prescribed burning. These efforts are bearing fruit with 759 acres of longleaf pine planted in the past year and 4,285 acres of prescribed burning in the Southeast Virginia focal area. This has truly been a multi-faceted effort among landowners, contractors, agencies and organizations involved.

VDOF has established a six-acre longleaf pine orchard at its New Kent Forestry Center near Providence Forge, Virginia. With improved grafting techniques, cone-bearing trees are expected by 2020, and seed production is planned to eventually provide an annual crop of 250,000 seedlings. A longleaf pine time-of-planting study at Suffolk's Lone Star Lakes Park has been evaluated, and current survival rates are 87 percent to 100 percent. One-year-old containerized seedlings were planted each month from October 2014 until May 2015. The study will continue to be evaluated and has been duplicated for the 2016-17 planting season.

Project Learning Tree

The VDOF Project Learning Tree coordinator participated in the creation of a new Meaningful Watershed Educational Experience (MWEE) guide for educators. VDOF staff was invited by the National Oceanic and Atmospheric Administration (NOAA) to be on the team that wrote and produced the 36-page guide intended to help teachers deliver high-quality educational experiences for all students.

Virginia Silvicultural Water Quality Law

In July 1993, the General Assembly of Virginia – with the support of the forest industry – enacted the Virginia Silvicultural Water Quality Law, §10.1-1181.1 through §10.1-1181.7. The law grants authority to the State Forester to assess civil penalties to those owners and operators who fail to protect water quality on their forestry operations. Virginia continues to be the only state in the southeastern United States that grants enforcement authority to the state's forestry agency under such a law. In FY2017, the VDOF was involved with 186 water quality actions initiated under the Silvicultural Law. This represents a decrease of 29 percent from FY2016 and is due to drier weather and better “due diligence” by logging contractors. Of these actions, one (1) resulted in Special Orders being issued for violations of the law. None of these actions proceeded to the issuance of a civil penalty to the owners and operator.

RESOURCE MANAGEMENT AND LAND CONSERVATION PROGRAMS

Healthy Waters Program

The Healthy Waters Program (HWP) at Virginia's Department of Conservation and Recreation, Division of Natural Heritage (DNH), in collaboration with Virginia Commonwealth University (VCU), seeks to characterize and conserve ecological integrity of aquatic communities. While watershed restoration is critical to promoting healthy ecosystems in the Commonwealth, it is economically and ecologically preferable to conserve and protect healthy ecosystems than to restore them after they have been damaged. The HWP continues to partner with the DEQ, VCU, EPA, the Albemarle-Pamlico National Estuary Program, the Nature Conservancy, and the North Carolina Department of Natural Resources to advance the identification and conservation of natural resources.

Virginia has more than 400 ecologically healthy streams, creeks, and rivers, and there are more to be identified. Healthy streams have been identified and ranked as “outstanding”, “healthy”, or “restoration candidate” through a stream ecological integrity assessment known as the Interactive Stream Assessment

Resource ([INSTAR](#)). INSTAR was originally designed to assist individuals with planning and land use decisions by identifying healthy streams in their communities and encouraging their protection.

The Virginia HWP has continued to represent the Commonwealth in the Chesapeake Bay Program Goal Implementation Team Four (GIT4; Healthy Watersheds). This working group has brought together the various state Healthy Waters programs in the Chesapeake Bay watershed and led discussions to improve communication materials illustrating the location of identified healthy waterbodies and to develop strategies to advance resource protection in the Chesapeake Bay. Additionally, the GIT4 provided guidance on the Goals for the Chesapeake Bay Agreement to meet the protection of Healthy Waters.

The *Watershed Integrity Model* has been updated and streamlined to improve the utility and integrate new data from the latest sampling. The new model is referred to as the ConservationVision Watershed Model. This new tool includes four primary components: Watershed Integrity, Landscape Position, Soil Sensitivity, and Land Cover. A survey was distributed to stakeholders and potential users of the new model to obtain feedback on the changes and proposed weighting of various parameters. Additionally, a continual update of the existing INSTAR point data is underway to identify Healthy Catchments. A clarification is being made to improve the identification of Healthy Watersheds, and the DCR DNH Biotics database reflects new Stream Conservation Units and Ecological Occurrences based on those data.

Watershed Integrity Model: a GIS model that highlights terrestrial features that should be prioritized for conservation because of their contributions to water quality integrity.

DNH has completed a statewide resource vulnerability assessment that can identify areas most likely to be lost due to changes in land use or land cover. This vulnerability assessment has focused on all resources identified under the DNH, and a specific vulnerability assessment of those ecologically healthy sites in the Chesapeake Bay watershed is being conducted. Through the HWP, priorities to protect these special places will be established to best appropriate resources (voluntary agreements, easements, acquisitions, buffers, etc.) to protect Virginia's Healthy Waters for the future. Additionally, the DNH is conducting a prioritization of those Stream Conservation Units (SCUs) to identify those aquatic resources most need of conservation. This will be used to guide conservation and protection actions in Virginia by NHP staff, VDEQ, Conservation Districts, land trusts and nongovernmental organizations such as the Virginia Chapter of the Nature Conservancy. An intended application of the prioritization would be the selection of a watershed in the upper James, upper Rappahannock, or upper Potomac rivers where the HWP *Criteria for Ecologically Healthy Watershed Conservation* would be applied.

The goals and actions for Virginia's HWP are presented below:

- Advance HWP geo-referenced data sets. Continue to update 10-year old (or older) data in Bay Watershed and develop an ongoing maintenance and continuous monitoring and assessment plan.
- Complete detailed INSTAR assessments in the Southern River Basins including the Clinch, Powell, New, Big Sandy, Yadkin, and Roanoke basins.
- Improve HWP capacity by developing consistent funding to support the acquisition of new data and support a full time HWP Manager at DNH and additional staff, as necessary.
- Work toward the identification and development of strategies to achieve the 2025 goal of: *100% of state-identified currently healthy waters and watersheds remain healthy* (2014 Chesapeake Bay Watershed Agreement Goal).

Water quality monitoring of potentially healthy waters is carried out at random sites through Virginia each year. DEQ performs probabilistic monitoring, a sampling of randomly selected stations, to provide accurate

statewide and regional assessments of the chemical, physical, and biological conditions of Virginia's freshwater resources. These monitoring stations are generated by a computer program that randomly chooses monitoring sites on rivers and streams throughout the Commonwealth. DEQ has also undertaken an investigation of stream concentrations of total and dissolved trace metals, major anions and cations, and suspended and dissolved solids in the mainstem Clinch River between Norris Lake, Tennessee and Nash Ford, Virginia. The Clinch and Powell rivers in this area are a high priority for protection through the HWP, as they contain remarkably high biodiversity of both fish and mussels, including some rare species. This is one effort in the larger [Clinch-Powell Clean Rivers Initiative](#).

Virginia Land Conservation Programs

Under the guidance of the McAuliffe Administration, land conservation in Virginia has continued to grow. In December 2016, Governor Terry McAuliffe announced that the Commonwealth reached its goal of protecting 1,000 Virginia Treasures. The milestone highlights important ecological, historic, scenic and recreational lands across the state. Treasures include ecologically significant lands protected with conservation or open-space easements, historic properties designated by the Virginia Department of Historic Resources, or new projects that enhanced access to the great outdoors. To qualify, Virginia Treasures must have been protected, preserved, or opened to the public since January 2014.

Two main tools for land conservation in Virginia are the Virginia Land Conservation Foundation grant program and the Virginia Land Preservation Tax Credit. Total funds appropriated to the Virginia Land Conservation Foundation (VLCF) exceed \$62.0 million since FY2000. Approximately \$48.0 million has been allocated to VLCF's matching grant program, with \$14.0 million allocated to the Virginia Outdoors Foundation (VOF) for the Open-Space Lands Preservation Trust Fund in accordance with Virginia Code § [10.1-1020\(C\)\(1\)](#). Moneys from this Fund are used to aid localities acquiring open-space easements or landowners conveying open-space easements with the costs of easement conveyance. Since first receiving funding in FY2000, the Foundation has held twelve grant rounds. During those twelve grant rounds, VLCF received 337 applications requesting almost \$123 million in state funding, which was almost two-and-a-half times the available amount. From 1999 to 2017, VLCF has awarded funding to 203 of the 337 grant applications, awarded more than \$50.9 million to land conservation projects, and helped protect more than 63,800 acres.

The Virginia Land Preservation Tax Credit (LPTC) Program has proven to be a valuable incentive for landowners interested in voluntarily conserving their property through perpetual conservation easements or fee-simple donations. The transferability feature of Virginia's tax credit program is especially valuable to landowners with little or no state income tax liability, enabling them to sell their tax credits for income. Virginia's LPTC Program began in January 2000 and continues to advance the preservation of important lands across the Commonwealth. Virginia Department of Taxation's records indicate that as of August 31, 2017, landowners have received tax credits for permanently protecting 819,962 acres across the Commonwealth through 3,774 land donations since program inception.

Looking forward, Virginia's land conservation programs will continue to build upon prior achievements. State agencies and private land trusts will continue to reach out to landowners and encourage efforts to conserve priority lands such as farms, forests, natural areas, historic resources, and public access to waterways. Many of these conserved lands provide water quality benefits in perpetuity by requiring riparian buffers and agricultural and forest management plans. Other benefits include educational opportunities, continued wildlife habitat, and preservation of scenic landscapes.

Achieving the Bay-wide goal of an additional two million acres of land from the 2010 baseline throughout the Bay watershed will require a concerted multi-state effort. Although there are no state specific goals set out in the agreement, a rough estimate of how Virginia could achieve its share of this new target requires

some back-of-the-envelope calculations. From FY2010 through FY2017, the progress made in land conservation is 427,154 acres statewide. Virginia makes up about 34% of the Bay watershed, so its portion of the goal will be 34% of two million acres, which is 680,000 acres. Virginia's progress within the Bay watershed is 277,059 of the 427,154 acres statewide. Subtracting this acreage from the Bay goal, Virginia's acreage to reach its Bay goal by 2025 is 402,941 acres (680,000 acres – 277,059 acres = 402,941 acres). To achieve the new Bay goal in 2025, Virginia will have to conserve about 50,368 acres per year in the Bay watershed.

Looking at Table 3-4 below, the average annual acreage preserved within the Bay watershed in Virginia from 2001 to 2017 was 44,375 acres per year, which means that achieving the new challenge is possible, though it will take a robust and concerted effort. Virginia will need consistent long-term funding and a commitment by all partners. Virginia's LPTC and the current federal tax benefits have been large contributing factors in achieving our progress thus far. Also, the VLCF grant programs all leverage at least a one-to-one match, so that money is often doubled. It is important that existing programs remain in place with adequate funding to help encourage landowners to preserve their land.

Table 3-4: Current annual land protection trends in the Bay watershed, as of June 30, 2017

Fiscal Year	Statewide (acreage)	Bay (acreage)	Non-Bay (acreage)
2001	43,463.72	29,855.67	13,608.05
2002	50,536.81	36,567.11	13,969.70
2003	48,369.96	39,714.31	8,655.65
2004	39,680.24	30,790.04	8,890.20
2005	69,559.79	44,184.72	25,375.07
2006	70,798.22	55,622.16	15,176.06
2007	97,984.66	73,312.31	24,672.35
2008	94,252.32	60,675.43	33,576.89
2009	90,388.85	62,222.70	28,166.15
2010	107,017.18	80,122.57	26,894.61
2011	34,289.15	21,881.23	12,407.92
2012	56,029.98	36,421.54	19,608.44
2013	44,916.63	24,914.48	20,002.15
2014	75,371.18	44,873.68	30,497.50
2015	36,573.38	22,319.07	14,254.31
2016	33,388.77	23,063.90	10,324.87
2017	39,567.97	23,463.45	16,104.52
Total conserved 2001-2017	1,032,188.81	710,004.37	322,184.44
Average annual acreage conserved 2001-2017	64,511.80	44,375.27	20,136.53

ONSITE SEWAGE DISPOSAL PROGRAMS

The [Virginia Department of Health](#) (VDH) [Division of Onsite Sewage and Water Services](#) implements wastewater treatment systems to protect public health and water quality. The correction of failing or malfunctioning onsite sewage systems keeps raw, untreated sewage from contributing bacterial pollution and excess nitrogen to groundwater and surface waters. From July 1, 2016 through June 30, 2017, VDH issued 9,929 new construction permits; 1,370 were for installation of *alternative onsite sewage systems* (AOSS). During the same period, VDH issued 3,896 repair permits statewide; 251 required the installation of an AOSS. Repair permits include component replacements or complete system replacements. AOSS reduce nitrogen entering groundwater by as much as 69% compared to conventional onsite sewage systems, always disperse secondary or better effluent, and sometimes includes disinfection or pressure distribution.

Alternative Onsite Sewage System (AOSS): any system for treatment of residential wastewater for return to the environment, other than a standard onsite sewage system.

Virginia Environmental Information System (VENIS)

The Virginia Environmental Information System (VENIS) is the main recordkeeping tool for the agency's environmental health programs. VDH revised VENIS and reporting policies to capture additional information about AOSS. VDH can now identify BMPs for onsite sewage systems recognized by the Chesapeake Bay Model. On December 7, 2013, VDH required all new and repaired AOSS to reduce nitrogen by 50% as compared to conventional sewage systems. Previously, VDH could only report those AOSS that reduced nitrogen by 50%. However, VENIS can now report all nitrogen removal from all AOSS (20%, 38%, 50%, 69%), septic tank pump-outs (5% nitrogen reduction), and onsite sewage systems connected to municipal wastewater collection systems (100% nitrogen reduction). Virginia participated in the multi-state workgroup that recommended new waste treatment BMPs in the onsite sector for 20%, 38%, and 69% nitrogen reduction. As new BMPs are adopted, VENIS will be updated accordingly to facilitate and improve reporting.

Timely Repair of Onsite Sewage Systems

To encourage the timely repair of failing onsite sewage systems, VDH created a goal to repair all onsite sewage systems within 60 days of when the failure is reported to VDH. This goal is one of five metrics reported to the governor from the Secretary of Health and Human Resources as an indicator of Virginians' health, and it is monitored monthly. It has also been incorporated into the 2016-2017 Milestones of the Phase 2 Watershed Implementation Plan (WIP) for the Chesapeake Bay TMDL. By 2018, VDH aims to repair 43% of failing onsite sewage systems statewide within 60 days of becoming aware of the failure with increases in that repair percentage over time. Current estimates suggest an average of 51% of septic systems statewide are repaired within 60 days with individual health districts ranging from 0% to 100%.

One major hurdle to timely repairs is the cost of installation and ongoing operation and maintenance. Repairs to failing systems can sometimes require the installation of a new system and can cost homeowners more than \$30,000, especially in the coastal plain physiographic province (e.g., those areas east of I-95). The Code of Virginia § 32.1-164.1:1 allows a property owner to waive the requirements of additional treatment and/or pressure dispersal in the AOSS regulations (12VAC5-613) due to financial burden. Since January 1, 2012, VDH has issued 640 waivers to homeowners statewide. These waivers can be a disincentive for homeowners to upgrade a failing septic system with additional treatment. Recent amendments to AOSS regulations (12VAC5-613), effective July 17, 2017, will allow homeowners to repair failing systems discharging directly to groundwater at a lower cost. One goal of the recent amendment was to encourage compliance with the AOSS Regulations so that owners will elect to receive fewer waivers. This regulatory change would reduce cost, protect groundwater quality, and encourage property owners to install

additional treatment instead of requesting a waiver. Furthermore, VDH continues to look for funding sources that will assist homeowners with repairing failing septic systems and installing nitrogen-reducing AOSS. VDH is also exploring options with DEQ and other stakeholders to determine how a repair fund could be created to help homeowners with costs to repair or upgrade a septic system in the Chesapeake Bay Watershed.

VDH’s strategic vision is to shift evaluation and design services for onsite sewage systems and private wells to the private sector in an orderly manner, so that limited VDH resources can be focused on improving public health and groundwater supplies. VDH determined that it should not provide evaluation and design services when and where a sufficient number of licensed private sector professionals are available to perform them. VDH concluded it should focus its limited resources on population health and strengthen its efforts in health monitoring, data collection and dissemination, community health assessments, creating a complete inventory of wells and sewage systems throughout the Commonwealth, understanding viral and nutrient impacts to drinking water and recreational water, providing quality assurance inspections of private sector work, educating the public on operation and maintenance needs and drinking water quality, developing necessary policies to improve health, and providing reasonable enforcement and programmatic oversight. VDH cannot currently perform these higher priority needs to the extent necessary because the law requires VDH to perform soil evaluations and designs. House Bill 2477 (2017 General Assembly session) directs VDH to take eight steps associated with the HB558 (2016 General Assembly session) plan to transition direct design and soil evaluation services to the private sector.

DEQ Grant Funding for Repairing/Replacing Failing Onsite Septic Systems and Straight Pipes

DEQ continues to work with organizations and localities across Virginia to fund projects that correct failing septic systems or straight-pipes. A majority of these projects are part of larger watershed restoration and implementation efforts in TMDL implementation areas. During FY2017, DEQ provided funding to pump out septic systems, repair or replace failing septic systems, or remove straight pipes from at least 651 homes using \$833,144 from grant funding sources and landowner contributions (Table 3-5), a 47% increase in expenditures from FY2016. Grant funds active in FY2017 were distributed throughout 9 river basins. DEQ generally disbursed funds through SWCDs; however, in a few cases nonprofits, planning district commissions, and localities assisted with these TMDL implementation projects.

Table 3-5: Residential septic program –grant-funded BMPs, FY2017

Name of BMP	BMP Practice Code	Number of BMPs Installed	Pounds of Nitrogen Reduced	CFU* of Bacteria Reduced	Total Amount of Cost-share Provided	Landowner Contributions or Other Match	Total Cost of Practice
Septic Tank Pump-out	RB-1	528	1479	2.63E+12	\$73,749	\$87,702	\$161,451
Connection to Public Sewer	RB-2	6	185	2.99E+11	\$24,135	\$38,018	\$62,153
Septic Tank Repair	RB-3	59	1363	2.20E+12	\$75,222	\$68,552	\$143,773
Septic Tank Replacement/Installation	RB-4	38	878	1.417E+12	\$122,181	\$109,749	\$231,929
Septic Tank Replacement or Installation with Pump	RB-4P	16	370	5.97E+11	\$70,225	\$82,406	\$152,631
Alternative Septic System	RB-5	4	92	1.49E+11	\$48,025	33,182	\$81,207
Total	--	651	4,368	7.29E+12	\$413,536	\$419,608	\$833,144

*CFU = colony forming units

During FY2017, DEQ also provided financial assistance through the Chesapeake Bay Implementation Grant to low-to-moderate income homeowners within Chesapeake Bay preservation areas to address the

requirements of a local government's septic tank pump-out program, pursuant to the Chesapeake Bay Preservation Act.

RESOURCE EXTRACTION PROGRAMS

Abandoned Mined Land (AML) Program

Virginia [Department of Mines Minerals and Energy, Division of Mined Land Reclamation](#)'s (DMLR) federally funded [Abandoned Mined Land](#) (AML) program continues to eliminate sources of nonpoint source pollution through the reclamation of abandoned coal mined lands in Virginia. DMLR inventories the coalfield counties of Virginia for abandoned mined land features, prioritizes those features based on public health, safety, and environmental impact, selects features for reclamation, and contracts the reclamation of the features to local vendors. During calendar year 2017, DMLR's AML program eliminated over 812 acres of abandoned coal mined lands. Without proper regrading, revegetation, and reclamation, these abandoned mined lands would have continued to contribute pollution loads of sediment, dissolved solids, and, in some circumstances, acid mine drainage to coalfield watersheds.

TMDL Implementation through BMPs and Offsets

In addition to the elimination of nonpoint source pollution by the reclamation of abandoned coal mined lands, DMLR encourages the reduction and elimination of nonpoint source pollution through the agency's BMPs and offset approach to TMDL implementation in its joint mining and discharge permitting processes. In 2017, TMDL offset projects were calculated to reduce total suspended solids loads to coalfield streams from nonpoint source pollution by 341 tons and total dissolved solids loads by 10,058 tons, the first time that pollution reduction efforts exceeded 10,000 tons. A brief description of DMLR's TMDL implementation approach follows.

DMLR tracks the reported pollution wasteloads from all joint mining and discharge permits, the wasteloads entering a watershed are summed, and the aggregated mining wasteloads are compared to the aggregate transient pollution allocations taken from approved TMDL reports. The net difference between the two constitutes pollution reductions needed for the watershed. This evaluation is produced in tabular form and is used by DMLR for permit decisions. Permittees are required to achieve those pollution reductions via BMPs or offset projects to reduce nonpoint sources of pollution.

The utilization of BMPs, wasteload reduction actions, and offsets as part of DMLR's discharge permitting approach for active mining is helping Virginia reduce pollution and reach the TMDL goals of water quality restoration in coalfield streams. To date, a large variety of additional BMPs and offset projects have been completed by coal mine permittees to comply with TMDL requirements. Often these practices include remining and eliminating abandoned mine features. In several cases, NPS-pollution-reducing offsets represent reclamation and restoration projects that permanently abate total suspended solids and total dissolved solids pollution by millions of kilograms annually. Many of these offsets would not otherwise be completed. DEQ has been very supportive of DMLR's TMDL approach and has documented the recovery of several impaired coalfield stream segments over the past few years including Middle Creek, Swords Creek, Garden Creek, Gin Creek, Dumps Creek, and Stone Creek. Benthic macroinvertebrate monitoring conducted by DMME at HUC-12 level watersheds over the past two years show additional previously impaired streams meeting general standards. Those include Black Creek, Straight Creek, and Callahan Creek.

Orphaned Mine Land (OML) Program

DMME's Division of Mineral Mining administers the [Orphaned Mine Land Program](#). It receives funding from the Section 319(h) NPS program to conduct inventories of orphaned mine land to assist in prioritizing sites

for reclamation. As of November 20, 2017, 3,127 sites have been inventoried in 571 of Virginia's 1,247 watersheds, or 45.8% the state's total watersheds. Of the inventoried sites, 1,061 sites (33.9%) were identified as safety hazards, and 235 sites (7.5%) were identified as environmental hazards. Of the 1,129 hazardous sites, 167 (14.8%) were identified as both safety and environmental hazards. These mines are prioritized for remediation. To date, \$3,752,076 from the interest on the Minerals Reclamation Fund has been expended on environmental and safety hazard remediation on 133 sites, which represent 11.8% of the inventoried orphan mineral mines.

URBAN PROGRAMS

Erosion and Sediment Control

Effective July 1, 2013, the Erosion and Sediment Control Program transferred from DCR to DEQ and the State Water Control Board. During the reporting period, the main focus of DEQ central and regional office staff has been assisting local governments with the implementation of their newly adopted local stormwater management programs, which address erosion and sediment control in a manner that is consistent with the Erosion and Sediment Control Law and attendant regulations. DEQ regional office staff continued to visit small and large construction activities to perform site inspections for compliance with the 2014 Construction General Permit, which requires erosion and sediment control in a manner that is consistent with the Erosion and Sediment Control Law and attendant regulations.

Stormwater Management Program

From July 2016 through June 2017, no local governments received approval of their local stormwater management programs. A total of 94 local governments continued to implement their previously approved local stormwater management programs with the assistance of DEQ central and regional office staff. During the reporting period, DEQ central office staff developed and implemented enhancements to the previously released Stormwater Construction General Permit System. This online system enables local stormwater management programs to continue to coordinate their efforts with DEQ's issuance, modification, transfer, and termination of Construction General Permit coverage. From July 2016 through June 2017, DEQ central office staff issued new (i.e., first-time) coverage under the 2014 Construction General Permit to 324 land-disturbing activities. A total of 1,293 Construction General Permits were issued statewide. DEQ regional office staff continued to visit small and large construction activities to perform site inspections for compliance with the 2014 Construction General Permit.

Urban Nutrient Management

[Section 3.2-3602.1](#) of the *Code of Virginia* addresses the application of regulated products (fertilizer) to nonagricultural property. It calls for training requirements, establishment of proper nutrient management practices (according to Virginia's Nutrient Management Standards and Criteria), and reporting requirements for contract-applicators who apply fertilizer to more than 100 acres as well as for employees, representatives or agents of state agencies, localities, or other governmental entities who apply fertilizer to nonagricultural lands.

With regard to nutrient management, more than 69,170 acres of urban areas now have nutrient management practices in place. This total includes approximately 25,116 acres on 264 golf courses with nutrient management plans that DCR contracts to private planners. DCR anticipates having over 300 golf courses with nutrient management plans by October 2017.

A nutrient management target included in the Virginia Nonpoint Source Pollution Management Plan and the Bay Milestone process is to increase nutrient management planning to include 85% of all applicable state-owned land. To advance this goal, notifications are sent annually to all state agencies reminding them

of the need to have current plans according to the Code of Virginia. However, the total acreage is quite low on state-owned lands because most the land does not receive nutrients.

A large portion of the remaining urban acreage that could come under nutrient management is owned by private landowners. In order to continue progress toward meeting goals for the Chesapeake Bay WIP, funding support is needed to help expand the existing and developing Virginia Cooperative Extension Master Gardener (MG) Programs that have a homeowner/private landowner nutrient management focus. Since January 2015, nine MG programs have written nutrient management plans for over 1,000 homeowners totaling 695 acres. Three additional Virginia Cooperative Extension offices in urbanizing areas are looking into starting a nutrient-management-focused program, as well. The acreage reached by the MG programs will likely expand as DCR develops criteria for lower levels of urban nutrient management that still achieve nutrient reductions but do not require a Virginia-certified nutrient management planner. Currently, DCR has a grant to assist the Virginia Cooperative Extension in implementing the MG programs by providing funds for copies, pamphlets, and field supplies using a small amount of federal Chesapeake Bay grant funds. Future funding for this program is uncertain.

CHESAPEAKE BAY INITIATIVES AND POLLUTION REDUCTIONS

Significant efforts have been made and resources expended throughout the 64,000-square-mile Chesapeake Bay watershed (Figure 3-3) to restore the water quality and living resources of the Bay. Virginia's efforts are guided through the [Chesapeake Bay Total Maximum Daily Load](#) (TMDL) and the [Chesapeake Bay Program](#). The Chesapeake Bay Program is a multi-governmental cooperative partnership between Virginia, Pennsylvania, Maryland, Washington, D.C., the [EPA](#), and the [Chesapeake Bay Commission](#), a tri-state legislative body. The EPA works locally through its Chesapeake Bay Program located in Annapolis, MD. The top executive from each Bay program participant - the governors of each state, the mayor of the District of Columbia, the EPA administrator, and the Chesapeake Bay Commission chairman - compose the Chesapeake Executive Council, which has been directing Bay restoration since 1983. Representatives from each of the jurisdictions, along with officials from other federal agencies and local governments and citizen representatives meet regularly to carry out the policies set by the Chesapeake Executive Council's Chesapeake 2000 Agreement. In 2014, the Executive Council negotiated a new [Chesapeake Bay Watershed Agreement](#). The new agreement includes representation from New York, West Virginia, and Delaware.

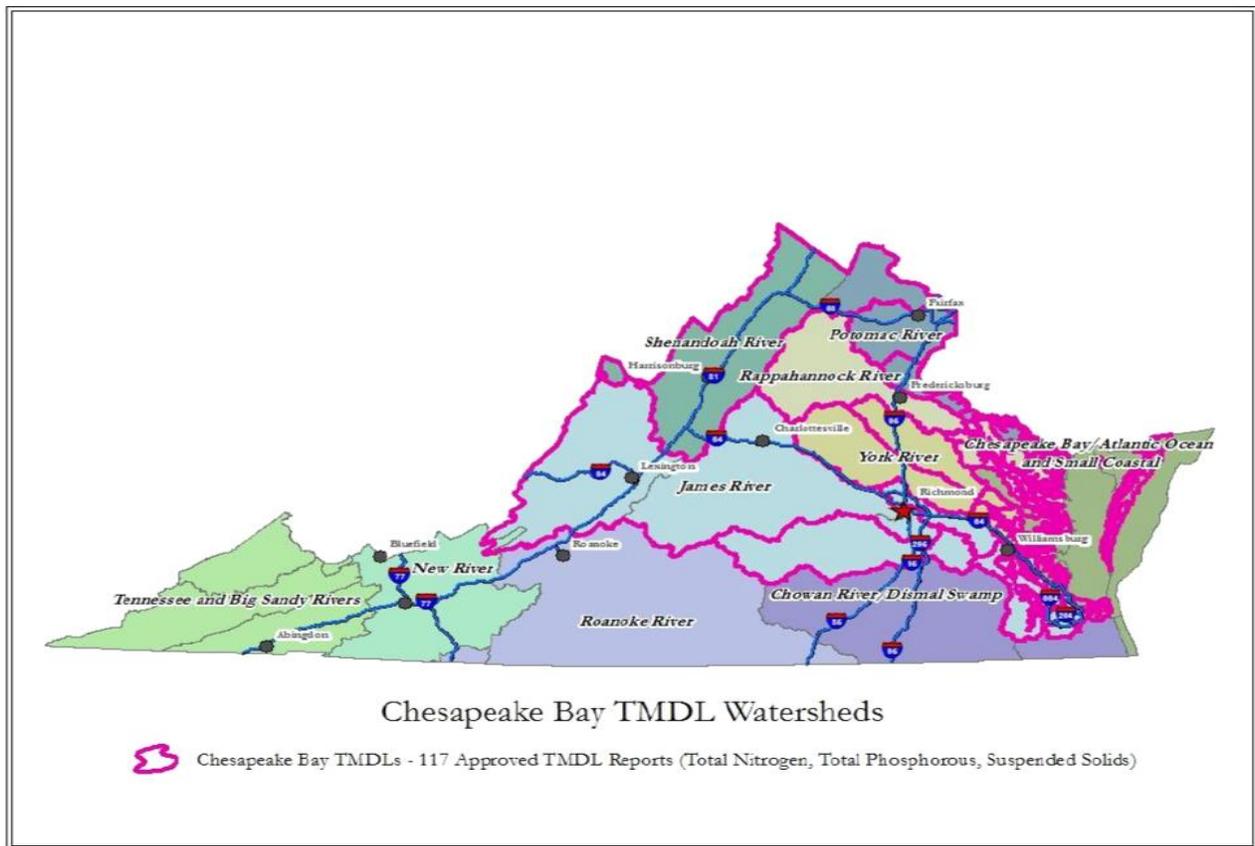


Figure 3-3: Chesapeake Bay TMDL watershed boundary

The [Chesapeake Bay 2016-2017 Programmatic Milestones](#) process is part of an accountability framework established to ensure ongoing implementation of the Watershed Implementation Plan (WIP) and Chesapeake Bay TMDL. As noted in the Milestone and Tracking Section of this plan, the Chesapeake Bay and Nonpoint Source planning efforts have been aligned to ensure coordination, efficiency, and program effectiveness. Bay program-specific goals include the following:

- Develop Chesapeake Bay WIP Milestones every two years (2016-2017, 2018-2019).
- Track, implement, and report on all Chesapeake Bay WIP 2-year Milestones (2014-2015, 2016-2017, and 2018-2019).
- Report on Bay-wide BMP activities related to Chesapeake Bay WIP accomplishments through annual National Environmental Information Exchange Network (NEIEN) BMP submissions.

Virginia submitted the [2018-2019 Draft Programmatic Milestones](#) to EPA on January 16, 2018. The document is currently under EPA review.

2017 Progress

Estimated past and present Bay loadings of nitrogen, phosphorus, and sediment from Virginia are demonstrated in Figures 3-4 through 3-6. A review of Chesapeake Bay TMDL implementation progress through 2016 shows that Virginia met its 2015 milestone targets for nitrogen and phosphorus reductions but was slightly behind for sediment. Model forecasts of the 2016-2017 milestones suggest that Virginia is on track to meet the 2017 target for achieving 60% of the required reductions for all three pollutants and very close to achieving required reductions for sediment.

Virginia's Delivered Nitrogen Loads to Chesapeake Bay

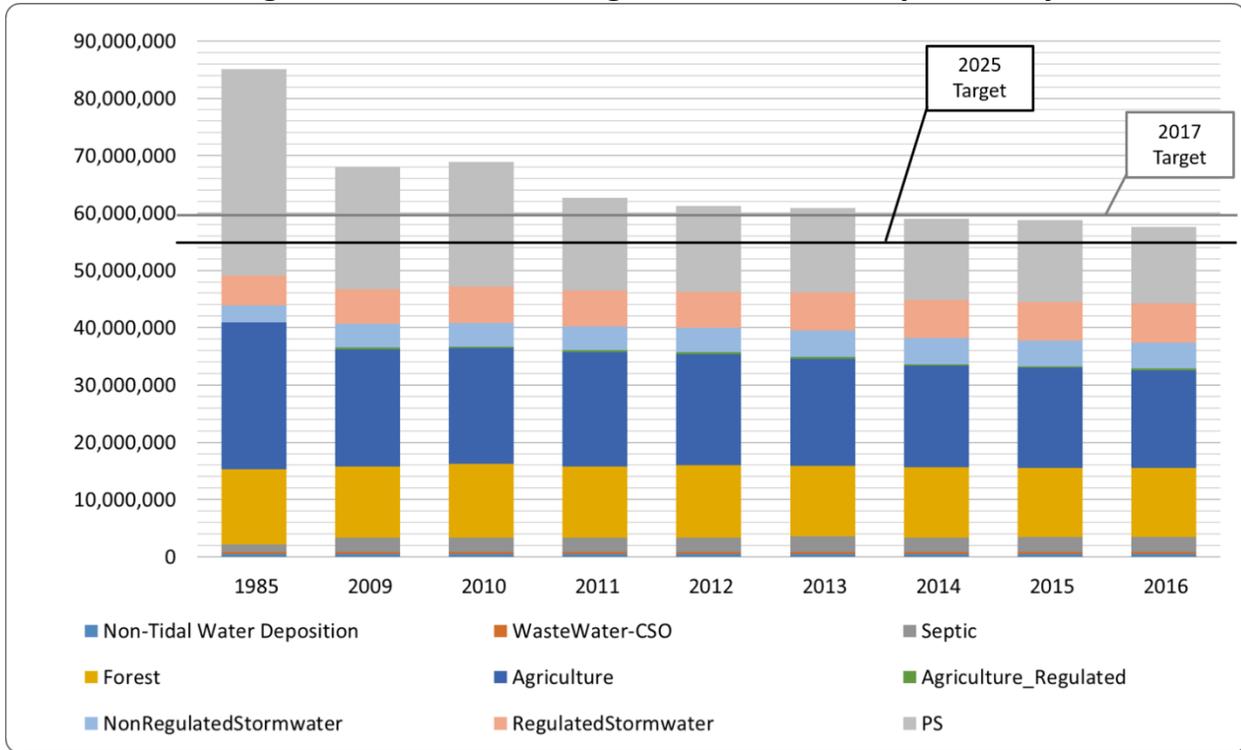


Figure 3-4: Chesapeake Bay TMDL nitrogen loadings (pounds) in Virginia through 2016

Virginia's Delivered Phosphorus Loads to Chesapeake Bay

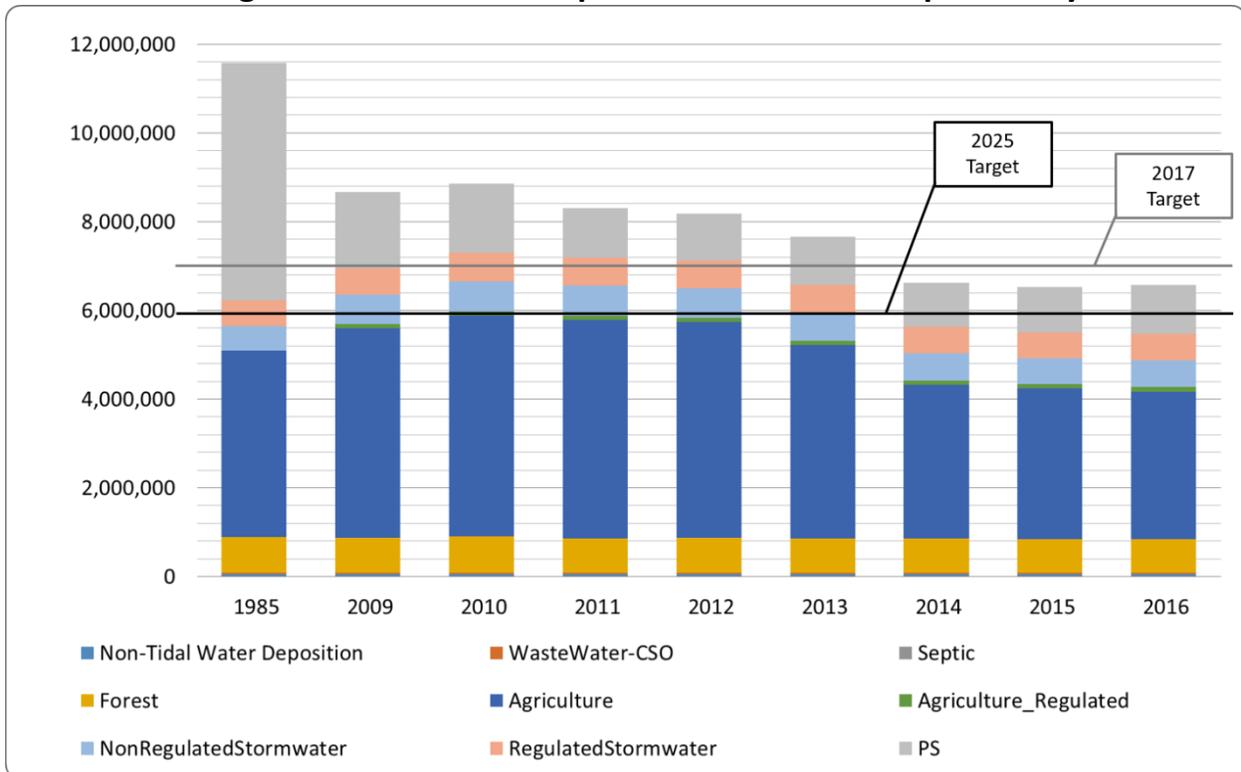


Figure 3-5: Chesapeake Bay TMDL phosphorous loadings (pounds) in Virginia through 2016

Virginia's Delivered Sediment Loads to Chesapeake Bay

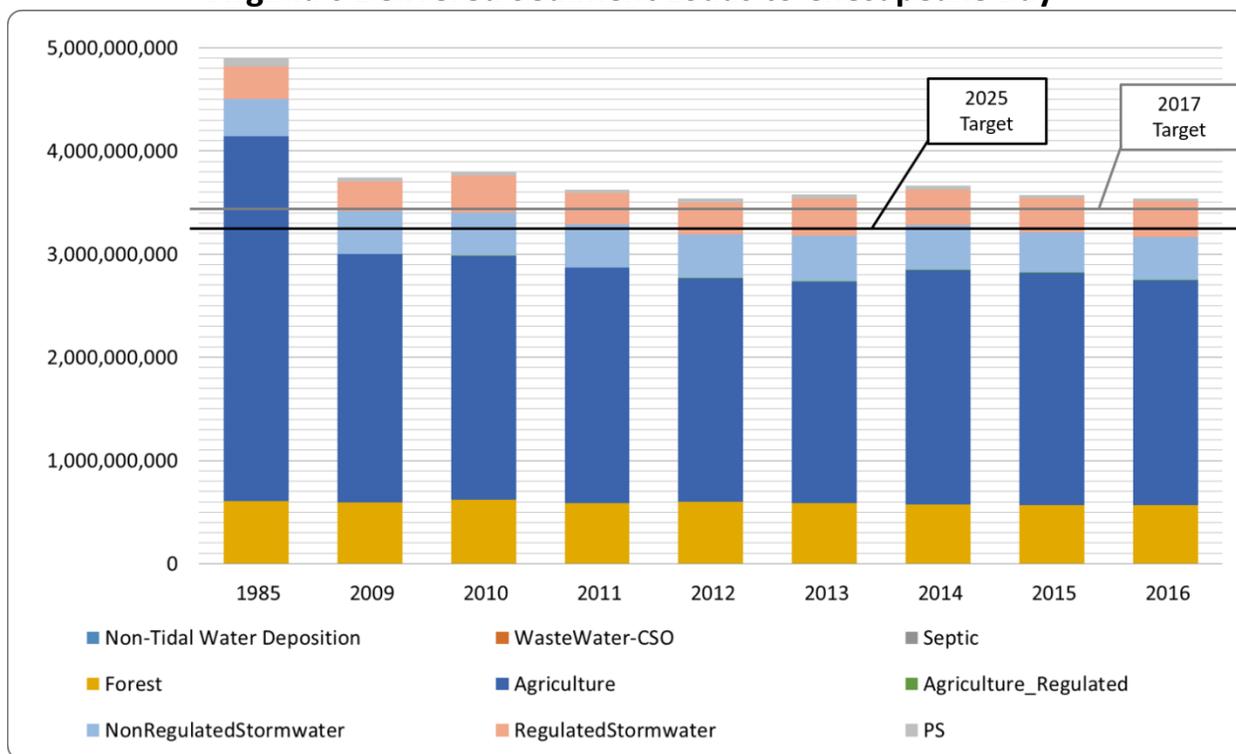


Figure 3-6: Chesapeake Bay TMDL sediment loadings (tons) in Virginia through 2016

For additional information on the Chesapeake Bay TMDL, associated implementation efforts, and progress, please visit the following websites:

- [DEQ Chesapeake Bay site](#)
- [ChesapeakeStat](#)

Chesapeake Bay Preservation Act Compliance

From September 2016 to September 2017, Chesapeake Bay Preservation Act compliance reviews were initiated for 31 localities. Twelve of those reviews have been completed; three localities were deemed to be fully compliant. For nine of the localities, DEQ staff identified deficiencies in their programs, assessed conditions, and established a deadline to meet those conditions. If a locality does not meet the conditions by the deadline, a warning letter is issued with a short deadline to comply. The review is passed to DEQ's Enforcement Division if the locality does not comply with the conditions after the established deadline.

A total of 40 of the 84 Bay Act localities have now gone through a second-round compliance review. During these compliance reviews, staff assess whether the locality is implementing soil and water quality conservation assessments for all active agricultural lands, the status of the water quality provisions of the local comprehensive plans, how well local governments are ensuring that impervious cover is minimized, indigenous vegetation is maintained, and land disturbance is minimized on approved development projects, and septic tank pump-out requirements. As part of the compliance review process, localities are required to submit annual reports on their continued implementation of the Bay Act. Based on the 2016 annual report cycle, a total of 580 soil and water quality conservation assessments were conducted and 23,030 septic systems were pumped out.

Virginia Coastal Zone Management

As part of the ensuing five-year Section 309 Strategies for 2016-2020, the Virginia Coastal Zone Management Program will focus on Cumulative and Secondary Impacts of Development, Coastal Hazards, and Ocean Resources. The final year of PDC water quality projects (2011-2015) was completed September 30, 2016. Grantees completed FY16 projects in the following focal areas: Ocean Resources (ocean planning, marine debris) and Cumulative and Secondary Impacts of Growth and Development (water quality, shoreline management, working waterfronts, and special area management planning).

Key activities included:

- Hampton Roads Regional Planning District Commission worked with the local governments of Norfolk and Suffolk to develop implementable policies to assist local government in addressing the requirements of the new Virginia Stormwater Management Regulations and the Chesapeake Bay Total Maximum Daily Load. One focus was on specific modifications to local ordinances. A second focus provides an example of how local governments can use Geographic Information Systems (GIS) to model the physical and environmental impacts of some of the proposed changes.
- Middle Peninsula Planning District Commission addressed rural water quality issues (roadside ditch management).
- Northern Virginia Regional Commission is working with Northern Virginia Master Gardeners and Master Naturalists training them as volunteer community liaisons to promote creation of native landscapes in both residential and commercial spaces. NVRC has also worked with DEQ remediation to promote restoration of residential landscapes with native plants.

Looking ahead, a key program challenge is limited funding available for a competitive process to address issues among eight coastal planning regions. However, PDCs that received grant awards have leveraged funds and established new partnerships that may help them moving forward.

Virginia Land Cover Database Project

The 2014 General Assembly authorized funding from the WQIF to update the Commonwealth's statewide digital orthography to improve land coverage data necessary to assist local governments in planning and implementing their stormwater management programs. The selected contractor, WorldView Solutions, began work in July 2015 and completed the development of the Chesapeake Bay portion of the state by the scheduled deadline of June 2016; the final products are now available on the [VGIN website](#). The completion of the final land cover dataset for the remainder of Virginia (non-Bay watersheds) was released in December 2016.

Chapter 4 – Nonpoint Source Program 2017 Implementation Goal and Milestone Table

Activity toward meeting the Virginia Nonpoint Source Pollution Management Plan milestones and goals through December 31, 2017 are summarized in Table 4-1 below. In an attempt to make this table more complete and consistent with other reports, we have expanded it to a larger, more complex version than has appeared in previous years' NPS annual reports. Please be aware that DEQ attempts to integrate the two-year Chesapeake Bay Milestone development and update process into the annual reporting process. As a result, some milestones that were initially identified in the 2014 NPS Plan are no longer being tracked, and new milestones were identified through the Chesapeake Bay Milestone development process. The table below attempts to show a compendium of milestones including all that were initially identified in the 2014 NPS Plan and new milestones added during the last three years.

Table 4-1: Virginia Nonpoint Source Pollution Management Plan milestone progress

VA Statewide Milestones		Lead	2019 Goal	2017 Status
Agriculture - GOAL: Widespread adoption of cost-effective agricultural BMPs				
A1	Determine resource needs for agricultural BMP implementation through SWCDs. Conduct an annual agricultural needs assessment for General Assembly by November 1 of every year.	DCR-DSWC	1 report per year	IN PROGRESS - The Stakeholder Advisory Group legislative report will now serve as the Annual Report. The report was completed on October 1, 2017 and includes numerical data as of August 31, 2017. The link to the report is http://www.dcr.virginia.gov/soil-and-water/rmp .
A2	Enhanced funding for livestock exclusion. Fund qualified stream exclusion practices at 100% with state funds.	DCR-DSWC	100% of SL-6 signed up by 6/30/2015	NO LONGER TRACKED - Replaced with CBA1.
A3	Track voluntary BMP collection statewide through development of BMP dataset for input to EPA-CBPO Watershed Model.	DCR-DSWC	Ongoing	NO LONGER TRACKED.
A4	Develop agricultural NPS assessment data. Data developed, analyzed, and reported to DEQ.	DCR/DEQ	1 report every 2 years	CONTINUING - NPS Assessment developed for 2014 and 2016; 2018 data under development with expected completion in May of 2018; deadline is December 2018.

VA Statewide Milestones		Lead	2019 Goal	2017 Status
CBA1	Track and report the progress of livestock stream exclusion initiative. (Phase I WIP, pg. 63)	DCR	Report number of acres of vegetative buffers established, linear feet of stream-banks protected, and number of animal units excluded.	IN PROGRESS - DCR continues to prioritize implementation of Stream Exclusion with Grazing Land Management (practice "SL-6"). State cost-share funds will have reduced the backlog from ~\$31M to less than \$16M by the end of state FY2017. During the period January 1, 2016 – December 31, 2017, 1,551 acres of vegetative buffers were established and 1,602,643 linear feet of stream bank protected.
CBA2	Continue development and certification of the Resource Management Plan (RMP) Program and promote adoption in coordination with industry partners. (Phase I WIP pg. 59, Phase II WIP pg. 19)	DCR	RMPs developed or certified on at least 10,000 acres of agricultural operations per year.	IN PROGRESS - DCR will continue to enter into contracts to develop and certify Resource Management Plans. Between November 1, 2016 and June 30, 2017, 14,726 acres of new RMPs were developed in the watershed.
CBA3	Tabulate the number of cost-shared and voluntary agricultural BMPs both existing and planned in RMPs.	DCR	Produce an annual RMP report that tabulates existing and scheduled BMPs.	COMPLETE - The Stakeholder Advisory Group legislative report will now serve as the Annual Report. The report was completed on October 1, 2017 and includes numerical data as of August 31, 2017. The link to the report is http://www.dcr.virginia.gov/soil-and-water/rmp (look in the "links" section at the bottom of the webpage).
CBA4	Project the necessary pace of agricultural BMP implementation needed to meet 2025 WIP reduction targets.	DCR	Produce an Agricultural Needs Assessment report at least bi-annually.	IN PROGRESS - Updates to the agricultural needs assessment were prepared in August 2016 and 2017. A full assessment will be prepared in 2018.

VA Statewide Milestones		Lead	2019 Goal	2017 Status
A16	Follow up with small AFO owners that are implementing remedies as initiated under the Small AFO Strategy.	DEQ/ VDACS	Track and report program results annually. Follow up where necessary.	COMPLETE - DEQ will provide results of follow-up efforts by the target deadline and then on an annual basis. Improvements to tracking efforts are complete. Follow-up reporting is expected to be available December 31, 2018.
A17	Provide outreach opportunities related to Small AFO Strategy.	DEQ/ VDACS	Outreach opportunities (e.g., meetings with farmers and agency personnel, farm field days, farmer trainings, etc.)	COMPLETE - This milestone is an ongoing effort. Continue to provide opportunities for education related to the Small AFO Strategy as well as promote the program. DEQ provided one outreach opportunity during this calendar year. Replaces NM Replaces NM 8.
Nutrient Management - GOAL: Improve water quality in Virginia's streams and rivers and the Chesapeake Bay				
NM3	Increase the number of nutrient management plans on unpermitted dairies; 75% of facilities will have a NM plan by 12/31/2016. (CB A.7)	DCR- DSWC	75% of all facilities	COMPLETE - As of December 2017, 242 unpermitted dairies have active nutrient management plans, 69 of which did not have plans in 2016. There are only 287 remaining dairies that are unpermitted in the Bay region of Virginia. DCR shall continue to strive for 20 additional plans on unpermitted dairies each year, however, changes in Bay Grant Guidance (Local Funding) will prevent funding this milestone in the 2018 grant cycle and beyond.
NM5	Increase nutrient management planning to include 85% of all applicable state-owned land. Each year, 780,000 cumulative acres of agricultural nutrient management plans.	DCR- DSWC	780K ac NMP, cumulative	NO LONGER TRACKED.
NM7	Complete evaluations of the remaining small AFOs in Virginia's portion of the Chesapeake Bay watershed in accordance with the Small AFO Strategy developed in cooperation with VDACS. Approximately 460 small AFOs remain to be evaluated out of the 800 identified in the WIP.	DEQ/ VDACS	460 AFOs evaluated by 12/31/19	CONTINUING - DEQ continues to work to complete the evaluations on the remaining 95 poultry operations in the Bay. DEQ expects to have this completed by December 31, 2018.

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CBA5	Increase the number of nutrient management plans on unpermitted dairies. (Phase I WIP, pg. 76)	DCR	20 new small dairy plans per year; WIP Goal: 75% of facilities participating by 2025	COMPLETE - As of December 2017, 242 unpermitted dairies have active nutrient management plans, 69 of which did not have plans in 2016. There are only 287 remaining dairies that are unpermitted in the Bay region of Virginia. DCR shall continue to strive for 20 additional plans on unpermitted dairies each year; however, changes in Bay Grant Guidance (Local Funding) will prevent funding this milestone in the 2018 grant cycle and beyond.
CBA6	Increase the number of nutrient management plans on unpermitted beef operations.	DCR	Survey to determine the number of unpermitted beef operations.	CONTINUING - DCR met with Virginia Tech in October 2017. Virginia Tech was not willing to commit to assisting with identifying the beef operations in Virginia.
CBA7	Issue/re-issue contracts to develop nutrient management plans on unpermitted dairies.	DCR	\$265,000 in contracts with private nutrient management planners	COMPLETE - As of December 2017, 242 unpermitted dairies have active nutrient management plans, 69 of which did not have plans in 2016. There are 287 remaining dairies that are unpermitted in the Bay region of Virginia; DCR is still hopeful nutrient management plans can be written for 20 unpermitted dairies each year. Approximately \$173,420 was spent over the two-year milestone period on contracts with private nutrient management planners; however, only approximately \$30,420 was spent for unpermitted dairies. It was anticipated that the average unpermitted dairy would be about 300 acres; the average dairy has been less than 100 acres in size. Changes in Bay Grant Guidance (Local Funding) will prevent funding this milestone in the 2018 grant cycle and beyond.
CBA8	Increase nutrient management plans on small farms.	DCR	15,000 new acres on small farms under nutrient management. These will include a number of small dairies and beef operations related to Milestones A5 and A6.	IN PROGRESS- As of December 31, 2017, there are 694 farms that are under 75 acres in size with plans. There have been 43 nutrient management plans written covering 5,245.1 acres. Meetings have been conducted with over 300 farmers in this size range to discuss the advantages of nutrient management planning.

VA Statewide Milestones		Lead	2019 Goal	2017 Status
CBA9	Project the number of additional/expanded poultry houses and assess any resulting increase in nutrients based on trends in permitting.	DEQ/ DCR	Annually report additional or expanded poultry houses and evaluate impacts to WIP allocations based on site-specific factors.	COMPLETE - This milestone is an ongoing effort. Information is collected when permit applications are processed and permits are approved. DEQ received and processed applications for 28 new poultry operations in 2016 and 34 in 2017. DEQ received and processed applications for expansions of eight existing poultry operations in 2016 and 16 in 2017.
CBA10	Conduct continuing education classes and administer nutrient management certification examinations.	DCR	6 classes and 2 exams each year	COMPLETE - Two sets of training classes were held in 2017; thirty-nine people attended. Two certification exams were also held in 2017. Seventeen candidates attended. There were 8 exams given, 10 total training schools provided in coordination with the exams given, and 5 DCR continuing education classes conducted.
CBA11	Renew relationship with fertilizer companies to encourage and track precision agricultural application Small AFO Strategy.	DCR	45,000 acres of precision agriculture each year	CONTINUING - Currently 19,740 acres of precision agriculture on record. DCR will have additional acreage to report in late January 2018.
Agricultural Stewardship Act - GOAL: Provide a commonsense solution to water pollution problems caused by agricultural operations				
AS 8	Respond to all water quality complaints in a timely fashion.	VDACS		CONTINUING – Ongoing.
Virginia Resource Management Program (RMP) - GOAL: Encourage the implementation of additional agricultural BMPs and increase the reporting and verification of voluntary BMPs				
RM1	Achieve widespread implementation of the RMP by agricultural producers. Continue promotion and development of the Resource Management Program. Develop RMP on at least 40 agricultural operations annually by 12/31/2015. (CB A.6)	DCR- DSWC	40 RMPs annually	CONTINUING - DCR will continue to enter into contracts to develop Resource Management Plans. In calendar year 2016, 47 new RMPs were developed for 19,500 acres statewide.

VA Statewide Milestones		Lead	2019 Goal	2017 Status
Forestry – GOAL: Provide technical services, BMP information, and silvicultural activity enforcement on the Commonwealth's forest watersheds, non-tidal wetlands, and riparian areas to help ensure the quality of drinking and recreational waters from these areas for future generations				
F1 (F3)	Continue with BMP training sessions for forest harvesting contractors, Professional Foresters and forest landowners.	VDOF	4 training sessions each year	IN PROGRESS - Conducted 16 Logger Training Programs during the program year with a total of 430 attendees present. Six of those were in the Core area (152 attendees) and 10 courses were for Logger Continuing education (278 attendees).
F2	Develop new online BMP training program for harvest contractors through Virginia Tech's Sustainable Harvesting and Resource Professional (SHARP) Logger Program focusing on underutilized harvesting BMPs and considerations for biomass harvesting practices.	VDOF	1 online training program each year	IN PROGRESS - In 2017 to-date, VDOF has held two face-to-face BMP Update Programs that are now required in lieu of online class participation for the SHARP Logger Program. This 3-hour program will be offered 6 more times in late 2017. The program covers new research in water quality BMPs and BMP monitoring and focus on those BMPs that have been identified as needing improvement by the VDOF monitoring program. This educational opportunity gives loggers an opportunity to interact with instructors as well as other loggers and contractors in a classroom environment.
F3	Continue BMP implementation monitoring to determine BMP rates being applied to forest harvest sites within the Bay Watershed through funding provided by a CBRAP Grant.	VDOF	Annual Monitoring Report due in February of each year	IN PROGRESS - This annual monitoring report was produced in February 2017 for calendar year 2016. A new report for 2017 will come out in February 2018. Field work for 2017 will be completed by December 31, 2017. The latest report can be found at: http://www.dof.virginia.gov/infopubs/bmp-reports/BMPs-Imp-Monitoring-2016_pub.pdf
F5	Continue enhanced enforcement of the Virginia Silvicultural Water Quality Law in the Chesapeake Bay Watershed utilizing CBRAP grant funding.	VDOF	Enforcement on 100% of harvest sites based upon agency-established procedures and harvest inspection of each harvest site	IN PROGRESS - In fiscal year 2017, VDOF was involved with 186 water quality actions initiated under the Silvicultural Law. This is a decrease of 29 percent from FY2016. Of these actions, one resulted in a Special Order being issued for a violation of the law.

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F6	Provide cost-share funding to landowners to establish riparian forest buffers that would not otherwise qualify for cost-share funding through federal programs. (Phase I WIP, pg. 62)	VDOF	90% of harvested area treated	COMPLETE - Twenty-one projects have been completed; over 80% of the projects are located within the Bay watershed. Virginia Trees for Clean Water Program uses funding from several sources that complement each other. By having the addition of the WQIF funds, VDOF was able to offer the funding on a statewide basis and had a project in the Bay watershed in Gloucester County. VDOF has provided funding to nonprofits such as Capital Trees and Friends of the Blue Ridge Parkway and Homeowners Associations and several cities and towns across Virginia. Twenty projects were located within the Bay watershed. All the projects have been completed.
F7	Slow the loss of forestland conversion and associated water quality benefits resulting from necessary municipal infrastructure development.	VDOF	Integrate VDOF forestland loss mitigation assessments of proposed development projects into ongoing state environmental impact review (EIR) processes.	COMPLETE - VDOF reached its 2016 goal of 2,000 acres of forestland conversion avoided. It has now collaborated with Virginia's other natural resource agencies and the Office of the Secretary of Natural Resources to establish protocols for negotiating with proposers of landscape-scale, long, linear infrastructure projects the mitigation of unavoidable losses of upland forests as a way to reduce the rate of high conservation value forestland to non-forest use. In 2017, this group provided technical and analytical support to the Secretary of Natural Resources for the purpose of assessing the impact of forest loss due to the proposed construction of two long, linear infrastructure construction projects across the Commonwealth.
F8	Continue to focus riparian forest buffer establishment efforts in Potomac River Watershed and expand these efforts to the northern piedmont through the hiring of Buffer Specialists to work with NRCS, FSA, DCR, VDOF, SWCD and other partners through a focused riparian forest buffer - GIS targeting and CREP initiative.	VDOF	Target three specific watersheds to concentrate RFB CREP establishment, two in the Shenandoah Valley and one in the Central Piedmont of Virginia.	IN PROGRESS - Funding for three positions is being provided through a grant from FSA through USDA Forest Service Region 8. All positions are currently filled and all CREP re-enrollment inspections for calendar year 2016-17 have been completed. Outreach to landowners that have been identified as needing buffers is underway with a new brochure having been developed and the list of landowners distributed. The suspension of CREP for several months early in 2017 has hindered progress in CREP signups and subsequent buffer enrollment for CREP. The CREP program has recently been reopened at a reduced funding level but signups are currently underway.
F9	Permanently conserve forestland through permanent conservation easements or acquisition.		Conserve 1,200 acres annually across the Virginia portion of the	IN PROGRESS - In 2017, the VDOF permanently protected 6,371 acres of open space through 23 conservation easements and another 33 acres in one amendment. The agency now holds 154 easements covering nearly 43,000 acres.

VA Statewide Milestones		Lead	2019 Goal	2017 Status
			Bay Watershed.	
F10	Identification of incentives and drivers to assist communities directing growth away from key forestland assets such as groundwater recharge areas, intact and productive forests, and wildlife corridors to ensure forestland economic and ecosystem values are considered and weighed against competing land use options in land development decisions.		Discussions with pilot area localities to encourage adoption of policies directing growth away from key forestland assets.	COMPLETE - VDOF and its Healthy Watersheds Forest/TMDL project partners completed between 2016 – 2017 a year-long in-the-field series of conversations, over 60 in total, ranging from one-on-one discussions, to small groups, to large groups covering local landowners, local elected and professional officials, forestry and agricultural landowners, land trusts, NGOs, elected representatives, and others to learn what people will accept with regard to policies, incentives, etc., what the challenges are associated with forestland retention actions, and how to address those challenges. All of those findings and recommendations have been submitted to the Chesapeake Bay Program partners and the state governments of Virginia and Pennsylvania in the project’s final report submitted June 30, 2017.
F11	Initiate dialogue with EPA, Bay jurisdictions, and others to determine the feasibility of achieving credited TMDL nutrient or sediment reductions from conserving existing forestland in the context of the Chesapeake Bay model.	DEQ/ VDOF	Convene a group comprised of EPA, Bay jurisdictions, state agencies, and other stakeholders to initiate a dialogue that focuses on valuing conservation of existing forestland in the Chesapeake Bay model.	COMPLETE - A team led by VDOF with partners DEQ, Rappahannock River Basin Commission, George Washington Regional Commission, Chesapeake Bay Commission, Water Resource Center at Virginia Tech, The Nature Conservancy, and Pennsylvania Natural Resource agencies have been working with EPA and the Chesapeake Bay Program since 2014 to build a case for forestland retention credit in the TMDL. In phase I, Virginia quantified that the value of retaining forestland to meet Chesapeake Bay TMDL requirements and determined that up to \$125M in offset savings could be achieved in its pilot project test area alone compared to what the TMDL model currently projects if more forestland were to be retained. In Phase II Pennsylvania peer reviewed and validated Virginia’s methodology and findings. Virginia produced through extensive discussions throughout the Rappahannock River Basin with localities and numerous other stakeholder groups a “toolbox” of policy and other incentives that can be used to stimulate forestland retention in land use planning decision making and also identified and focused discussions on some of the key challenges that thwart enhanced forestland retention planning, so possible solutions can be explored. The June 30, 2017 Healthy Watersheds TMDL/Forests project final report was submitted to the Commonwealths of Virginia and Pennsylvania, the Rappahannock River Basin Commission, the Chesapeake Bay Program Partnership and numerous other interested parties.

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Resource Management and Land Conservation GOAL: Conserving Virginia's most valued natural and cultural resources and complete an assessment that will result in a statewide ecologically healthy watersheds list.				
LC1	By December 31, 2014, develop priorities and goals for Land Conservation in Virginia to be accomplished by 12/31/2017.	DCR-OLC/ DCR-DNH	Goals established.	COMPLETE - In December 2016, Governor Terry McAuliffe announced that the Commonwealth reached its goal of protecting 1,000 Virginia Treasures. Looking forward, Virginia's land conservation programs will continue to build upon prior achievements. State agencies and private land trusts will continue to reach out to landowners and encourage efforts to conserve priority lands such as farms, forests, natural areas, historic resources, and public access to waterways.
HW1	By 2020, Virginia will conclude an assessment that will result in a statewide ecologically healthy watersheds list.	DCR-DNH	Assessment concluded by 2020.	IN PROGRESS - The Department of Conservation and Recreation, Division of Natural Heritage (DNH) has completed a statewide resource threat and vulnerability assessment that permits prioritizing resources for conservation based on future potential changes. The DNH is completing a revision to the Watershed Integrity Model, now referred to as the Conservation Vision Watershed Model, that will improve watershed planning and conservation efforts in the Commonwealth. Updates to 10-year-old data in Bay Watershed portions of the state have been completed. Ecologically Healthy Water Natural Heritage Element Occurrences have been added to DCR Natural Heritage Biotics Database.
On-site Septic Systems				
S1	Develop and implement operation and maintenance (O&M) portions of final <i>Alternative Onsite Sewage Systems (AOSS) Regulations</i> (12VAC5-613). Issue manual and track implementation through 12/31/2014. (CB OSS.1)	VDH	Completed 12/31/2014	NO LONGER TRACKED.
OSS1	Train agency staff on new inspection, compliance, verification and enforcement procedures for alternative onsite sewage systems.	VDH		CONTINUING - The policy to implement civil penalties for owners who fail to properly operate and maintain their alternative onsite sewage systems is under final review. Additionally, VDH is working to ensure accurate tracking procedures are in place prior to implementation of the civil penalty policy. The policy is under review by the Health Commissioner's office. VDH does not have an anticipated timeline of when the policy will be approved.
OSS2	Implement a Global Positioning System (GPS) guidance policy for VDH staff in order to assign spatial location information to onsite sewage systems in the state.	VDH	Capture location of all new AOSS installed in the Bay watershed during the	COMPLETE - Special projects focused on gathering GPS coordinates for AOSS were implemented in four local health districts. The GPS coordinates will be incorporated into VDH's Virginia Environmental Information System (VENIS) database and will contribute toward completing the electronic inventory of all onsite sewage systems in the state. These four projects gathered spatial coordinates for over 1,000 alternative onsite septic systems and improved data accuracy in the statewide environmental health database. Additionally, VENIS database developers created a

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			milestone period.	custom report to identify onsite sewage systems that have spatial data associated with the electronic record. This report will improve tracking of AOSS with GPS coordinates and identify local health districts that may not be collecting spatial data for newly installed AOSS.
OSS3 (S2)	Work with DEQ and local governments to capture and report the number of septic tank pump-outs that occur as a result of the Chesapeake Bay Preservation Act requirements (local ordinances), voluntary efforts, and repairs throughout the Bay watershed.	VDH/DEQ	36,000 septic tanks pumped annually	IN PROGRESS - From July 1 2015, through July 1, 2016, Bay Act localities reported that a total of 23,030 septic tanks were pumped out in Chesapeake Bay Preservation Areas. Pump-out data for the period covering July 2016 through July 2017 will not be obtained until the end of January, as that is DEQ's deadline for the receipt of Annual Reports from localities. Through the compliance evaluation process, DEQ continues to conduct compliance reviews of local implementation of the Bay Act, including the pump-out requirements. In instances where a locality does not adequately ensure that septic tanks are pumped out every 5 years, the locality is given a compliance condition and a deadline for meeting the condition.
OSS4 (S6)	Report the number of alternative onsite sewage systems (AOSS) meeting the current BMPs for 20%, 38%, 50%, and 69% reduction.	VDH	13,500 lbs TN load reduction over baseline conditions at the edge of drainfield during the milestone period	COMPLETE - Installed BMPs for FY2016 were reported to DEQ on October 1, 2016. VDH reported 162 BMPs with 20% nitrogen reduction, 456 BMPs with 50% nitrogen reduction, and 115 BMPs with 69% nitrogen reduction. In combination with other onsite septic sector BMPs, VDH reported a total of 13,236 lbs TN reduced during Fiscal Year 2016. BMPs were reported to DEQ on October 2, 2017.
OSS5	VDH continues to operate the VENIS database and look for ways to improve its functionality.	VDH	Update or replace VENIS database for improved functionality by December 31, 2018.	CONTINUING - VDH published a Request for Proposals (RFP) to update or replace the VENIS database. Prospective database development companies met with VDH in November 2016 to review the agency's needs and submit proposals. The new or updated environmental health database will incorporate enhanced BMP tracking capabilities, as well as improved synchronization with spatial data management software. Three database development candidates were selected to compete for the database contract. The contract remains under review by the VDH Office of Financial Management. No timeline for completion is available. The deadline for full development and implementation of the new database is December 31, 2018.
OSS6	Work with EPA and other TMDL stakeholders to better predict nitrogen losses through various soil types and treatment unit combinations in order to improve the accuracy of the Chesapeake Bay	VDH	Incorporate improved methods for prediction of nitrogen attenuation	CONTINUING - VDH participated in an Attenuation Expert Review Panel of the Water Quality Goal Implementation Team (WQGIT) to better predict nitrogen attenuation through various soil types and at various points through the groundwater cycle. A final report has been released by the expert panel and approved by the WQGIT, and the new attenuation rate estimates have been incorporated into the upcoming Chesapeake Bay Phase 6 Model. Additionally, VDH staff is chairing a second Onsite BMP Review Panel that is considering two new BMPs for the onsite sector. The expert panel

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	Watershed Model predictions for the onsite sector, especially for systems located above the geologic fall line.		into Chesapeake Bay Phase 6 model.	review is underway and is expected to be completed by April 2018. Variable attenuation rates were applied to the onsite septic sector nitrogen loads according to soil types in the Phase 6 Chesapeake Bay Watershed Model. Compared to the static 40% pass-through rate from the previous watershed model, Virginia now has an average 31.28% pass-through rate. This reduces Virginia's delivered nitrogen load from the onsite septic sector from 3,088,876 pounds to 2,416,262 pounds.
OSS7	Reduce repair time for failing onsite sewage.	VDH	By 2018, repair 43% of failing onsite sewage systems statewide within 60 days of becoming aware of the failure.	CONTINUING - Two recent developments will help VDH reduce their response time. (1) Because cost to homeowner is a major hurdle in many repairs, recent amendments to AOSS regulations (12VAC5-613), effective July 17, 2017, will allow homeowners to repair failing systems discharging directly to groundwater at a lower cost. Furthermore, VDH continues to look for funding sources that will assist homeowners on repairing failing septic systems and installing nitrogen-reducing AOSS. (2) VDH's strategic vision is to shift evaluation and design services for onsite sewage systems and private wells to the private sector in an orderly manner, so limited VDH resources can be focused on improving public health and groundwater supplies. House Bill 2477 (2017 General Assembly session) directs VDH to take eight steps associated with the HB558 (2016 General Assembly session) plan to transition direct design and soil evaluation services to the private sector.
OSS8	Work with DEQ and local governments to capture and report the number of connections to public sewer throughout the Bay watershed.	VDH/DEQ	600 sewer connections by 12/31/15	CONTINUING - VDH coordinated with several local wastewater authorities and localities to identify new sewer line connections during FY2016. Additionally, a spatial dataset is under development of all public sewer service areas in the state. VDH has worked with localities and wastewater authorities across the state, as well as state agencies and the Chesapeake Bay Program, to gather this information. VDH recently coordinated with City of Suffolk and City of Chesapeake public works to obtain data on connections to public sewer. These data were reported along with the onsite septic sector's other BMPs on October 2, 2017, including nitrogen-reducing alternative onsite sewage systems and septic tank pump-outs.
S7	Work with local governments and recipients of 319(h) project funding to capture and report the number of residential septic systems addressed through grant projects completed throughout Virginia.	DEQ	250 systems annually	From July 1, 2016 through July 1, 2017, at least 651 homes with septic issues were addressed through Section 319(h) funding.
Resource Extraction - GOAL: Reduce water quality impacts association with current and abandoned/orphaned resources extraction activities.				
RE1	Enhance coordination between DEQ and DMME to collect and report data on BMPs installed on active mine sites as well as reclamation of active	DMME/DEQ	Ongoing long-term goal thru 12/31/2018	CONTINUING

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	and abandoned and orphaned mines. (CB E.1)			
RE2	Ensure compliance with permit conditions for proper site planning and BMP implementation. (CB E.2)	DMME	24,000 acres E&S each year	CONTINUING - In 2017, DMME's Division of Mineral Mining had 34,244 acres under erosion and sediment control standards, and these sites were all under inspection by the Division.
RE3	Document and report reclamation of active, orphaned, and abandoned mine sites. (CB E.3)	DMME	1,000 acres documented each year	COMPLETE - In 2017, DMME's Division of Mineral Mining documented the completion of reclamation on 215 acres of mined land.
RE4	Reduce water quality impacts associated with resource extraction activities by proper site planning and BMP implementation land in prioritization of areas for reclamation activities.	DMME		CONTINUING - All water leaving permitted mineral mines in Virginia as a point source discharge is regulated by DEQ under their VPDES program. Inventory and investigation of potential water quality impacts of orphaned mineral mine sites is continuing.
RE5	Inventory, monitor, and report areas contributing significant sediment and mine water discharges to waterbodies and consider pollution as part of the selection process for determining which sites will be reclaimed.	DMME		CONTINUING - As of the end of 2017, a total of 3,129 orphaned mined land sites have been inventoried in 572 of Virginia's 1247 watersheds, or 45.9% of the state's total watersheds. To date, \$3,752,076 has been spent on remediation of environmental and safety hazard remediation on 133 sites. Investigation and inventory of additional sites continues, as does remediation as funds become available.
RE6	DMME investigates reported occurrences of environmental pollution including NPS pollution and, when appropriate, takes jurisdictional action to eliminate, abate, or prevent water resource degradation.	DMME		CONTINUING - During 2017, there were 4 instances of adverse offsite water quality impacts associated with mining on 443 permitted mineral mine sites. In all cases, conditions were investigated, violations were issued, and the problems were corrected.

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Urban Programs (Stormwater Management and Erosion and Sediment Control) - GOAL: control stormwater from developed sites to protect downstream properties and local streams and to minimize the potential for flooding				
U2	Implement Virginia Conservation Assistance Program (VCAP) residential scale urban BMP cost share program.		Report installed practices in annual progress report.	IN PROGRESS - Installed practices will be reported in the VCAP annual report. The report is due to DEQ after the January 15, 2017 Milestones reporting deadline. This milestone addresses EPA identified concerns about urban nutrient management implementation rates by requiring participants to commit to managing fertilizer application.
U5	Achieve reductions from new development and redevelopment using urban BMPs through ramped-up compliance with the Virginia Stormwater Management Permit (VSMP) and the stormwater provisions of the Chesapeake Bay Preservation Act (CBPA). Consolidated BMP tracking system will capture BMPs installed for both CBPA and VSMP compliance. (CB U.7)	DEQ	System completed by 12/31/17	NO LONGER TRACKING. In 2017, the VSMP program integrated its tracking and reporting requirement into DEQ's BMP Warehouse tool to allow for permittees to report their progress. This information will then be able to be reported for bay requirements.
Urban Nutrient Management				
U11	Promote Nutrient Management (UNM) on Urban Turf.	DCR	Certify 6 new UNM planners; implement 6 new VA Grass Roots programs; increase volunteer capacity by 60 new Master Gardeners.	COMPLETE - Two urban nutrient management training sessions were held in 2017; twenty-six people attended. There has been a very slight reduction in the number of urban nutrient management planners. In February 2016, there were 134 planners; by the end of 2017, there were 132. The Virginia Grass Roots program has stalled. While meetings have been held and ideas have been discussed, no new programs have been initiated. The Master Gardener program continues to assist homeowners by developing nutrient management plans. These programs contribute to accelerating implementation of urban nutrient management. Over 1000 of these nutrient management plans were written, covering 669 acres. To date, we do not have the exact number of Master Gardeners who have been added to the program.
U12	Complete development of online fertilizer sales data tracking system.	VDACS	Automated fertilizer sales data tracking	COMPLETE - Completed June 2016. Data reporting and tracking system was available for use for 2016 reporting year. This milestone demonstrates substantial progress in resolving EPA identified

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				concerns about compliance with Virginia Fertilizer Law and documentation of non-farm fertilizer sales/trends.
U13	Utilize improved fertilizer sales data. Updated fertilizer sales data will be compared to historic fertilizer sales data and/or baseline as basis for continued credit for Urban Phosphorus fertilizer legislation.	VDACS	Data developed, analyzed, and reported to DEQ	COMPLETE - Fertilizer sales tonnage data collected by VDACS for July 2016 – June 2017 was submitted to DEQ on November 21, 2017. This milestone demonstrates substantial progress in resolving EPA identified concerns about compliance with Virginia Fertilizer Law and documentation of non-farm fertilizer sales/trends.
UNM1	Nutrient Management on Urban Turf – update standards and criteria per 2013 legislation. Cumulative. (CB U.9)	DCR-DSWC	110 urban nutrient management planners, 35 VT extension specialists and 600 VDACS-certified fertilizer applicators by 12/31/2015	CONTINUING - 171 urban nutrient management planners have been certified in the program and 20 VT extension personnel have been trained and certified. VDACS has reported that over 900 people have been certified through their fertilizer applicator program.
UNM2	Nutrient management on urban turf – residential sector. (CB U.10)	DCR-DSWC	6 urban residential turf pilot projects by 12/31/2015	CONTINUING.
UNM3	Nutrient management on urban turf grass – golf courses. Begin development of cost-share program for golf course nutrient management. (CB U.11)	DCR-DSWC	Urban nutrient management plans completed on 11,000 acres of golf courses by 12/31/2015	COMPLETE - 181 golf courses totaling 18,961 acres have plans.
UNM4	Nutrient management on urban turf – state-owned facilities. (CB U.12)	DCR/VDACS	85% of facilities will have active plans by 12/31/2015.	COMPLETE - 86% of state owned facilities have current plans.

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Chesapeake Bay and Coastal Zone Management Programs				
CB1	Conduct compliance reviews of local Chesapeake Bay Act programs once for each locality by 2019.	DEQ	Complete a compliance review of local Bay Act programs once for each locality by 2019.	CONTINUING - As of January 2017, 18 Chesapeake Bay Preservation Act Compliance Reviews have been initiated, and 13 have been completed. An additional five reviews are now being initiated. Of the 13 reviews that have been completed, DEQ imposed compliance conditions on nine of those localities. In instances where deficiencies in program implementation were identified, DEQ requires localities to address the deficiencies within a designated time frame. Should localities not address the conditions, DEQ has the authority to undertake enforcement. As of this date, all localities that have received conditions are actively addressing them.
CZ1	Develop 5-year Section 309 Strategies (2016-2020) by 10/1/2015.	DEQ- CZP	Strategies developed by 10/1/2015	COMPLETE.
CZ2	Implement Current 5-year Section 309 Strategy (2011-2016).	DEQ- CZP	Strategy implemented	COMPLETE.
CZ3	Water quality projects implemented through regional governments: competitive process underway to determine direction for next two years of funding, 9/1/2014 - 9/1/2016.	DEQ	Water quality projects implemented	COMPLETE.
Watershed Source Water and Groundwater Protection				
SW1	55% of the population protected by waterworks with a substantially implemented protection plan and 16% of community water systems protected.	DEQ/ VDH	55% population and 16% of systems protected	COMPLETE - These goals were met or exceeded at 68% and 37%, respectively.
SW2	The Source Water Protection strategy will continue to focus on education, empowerment, and financing initiatives through its various programs and partnerships.	DEQ/ VDH	Continued implementation of strategy	CONTINUING.

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Watershed Planning and Implementation				
W1	Address water quality impairments through evaluation of pollutant loadings and land uses and by prescribing pollutant reductions through TMDL development. Maintain full engagement of stakeholders during this process. Continue current pace of TMDL development, developing 100 TMDL equations per 2-year period, while allowing for exploration of non-TMDL approaches. Under the 2013 303(d) Vision, this milestone will evolve into a goal of meeting a portion of impairments by unit area.	DEQ	Equivalent to 50 TMDL equations per year ~250 equations by 2019	CONTINUING - Over the past fiscal year, 35 TMDL equations (31 new, 4 revised), each representing a watershed area draining to impaired surface waters, have been approved by EPA. Another 23 (10 new, 13 revised) are complete, have been approved by the State Water Control Board, and were submitted to EPA for final approval.
W5	Number of TMDL Implementation Plans or Watershed Based Plans completed and EPA-approved.	DEQ	25 new Plans by 2019 (Goal 102 total)	CONTINUING - The 2017 goal is complete with 17 new plans completed since 2014, a total of 89 plans completed through June 2017. This activity is 56; 99% of 2017 goal (of 89 plans) and 86% of 2019 goal of 102 plans.
W6	Number of waterbody impaired segments that have TMDL Implementation Plans or Watershed Based Plans (cumulative).	DEQ	50 new impaired segments by 2019 (Goal 390 total)	IN PROGRESS - 106 impaired segments addressed in plans since 2014 baseline (total 460 segments as of June 2017) addressed; 123% of 2017 goal (of 375 segments) and 118% of 2019 goal (of 390 segments).
W7	Number of TMDL implementation projects active annually.	DEQ	20 per year	IN PROGRESS - 20 active 319(h)-funded projects; 377 BMPs installed in 46 implementation watersheds. 72 total active projects statewide; 2,759 BMPs installed in 204 watersheds. Includes 218 miles of stream access fenced from livestock access, excluding over 27,000 animals from streams.
W9	Update DEQ TMDL BMP Cost-share Guidelines by June of every year.	DEQ	5 guidelines developed annually	IN PROGRESS - 2015, 2016, 2017, and 2018 guidelines developed and approved.
W14	Enhance DEQ's Comprehensive Environmental Data System (CEDs) to integrate Implementation Plan	DEQ	Enhance data system.	COMPLETE - Phase 1 of the TMDL Implementation Plan module for CEDs, which includes tracking implementation, completed in June 2017. Phase 2 will start in March 2018.

VA Statewide Milestones		Lead	2019 Goal	2017 Status
	spatial data into existing DEQ datasets.			
W15	Development of specifications for DEQ Nonpoint Source BMP Database. Develop database and all features by 6/30/2016.	DEQ	Develop by 6/30/2016.	COMPLETE - In development: first phase completed, second phase completed August 2018; third phase is being proposed but will not start until calendar year 2018.
W16	Number of waterbodies identified in VA's Integrated report (IR) as being primarily NPS-impaired that are partially or fully-restored (WQ-10): Identify partially or fully restored waterbodies in Appendix C of state's IR primarily impaired by NPS pollutants in 303(d) list or integrated report.	DEQ	1 Type-1 Success Story per year, 5 by 2019	COMPLETE - EXCEEDED - 3 Type-1, addressing 6 impairments published.
W17	Number of waterbodies identified in VA's IR as being primarily NPS-impaired that show water quality improvements (WQ-10): Identify waterbodies in Appendix C of state's IR primarily impaired by NPS pollutants in 303(d) list or IR that demonstrate a significant trend of improved water quality; document interim progress towards restoration.	DEQ	2 Type-2 Success Stories per year per year (if not Type-1) and 10 stories by 2019	IN PROGRESS - Zero Type-2 published, 2 additional Type 1 published; instead Type 1 success stories were completed.
W18 - W20	Estimated annual reductions of NPS pollutants from Section 319-funded projects in pounds of nitrogen (N) (WQ-9a), pounds of phosphorous (P) (WQ-9b), tons of sediment (S) (WQ-9c), and colony forming units of bacteria (B).	DEQ	N: 2,206,053 lbs; P: 227,395 lbs; S: 8,020 tons; B: 7.138E+15 CFU	IN PROGRESS - Pollution reductions entered into EPA's Grants Reporting and Tracking System; FY2017 reductions: 742,201 lbs N; 78,529 lbs P; 462,520 tons sediment; 4.83E+16 CFU bacteria.

VA Statewide Milestones		Lead	2019 Goal	2017 Status
W22	Annually report on implementation progress for selected active IPs in accordance with the milestone goals and timelines established in approved plans and current grant agreements.	DEQ	Reported 12/31/2016 and annually.	IN PROGRESS – reports on implementation progress of 11 plans are included in the 2017 annual report (see Appendix 2).
W23	Explore opportunities to estimate and report a) progress from alternative sources of implementation for selected projects, and b) implementation progress for other TMDL Implementation projects.	DEQ	Complete exploration by 12/31/2016.	IN DEVELOPMENT – with the development of Phase 2 of DEQ’s BMP Warehouse, the ability to identify BMP implementation from other sources may be easier to accomplish. Since Phase 2 will not be completed until August 2018, it may take a year or more before data is entered into the new portions of the BMP Warehouse.
W24	In addition to two-year updates of program milestones, DEQ will update the NPS Pollution Management Plan on a five-year cycle.	DEQ	Update by 7/1/2020	IN DEVELOPMENT – DEQ will start in March 2018, the process of updating VA’s 2014 NPS Pollution Management Plan. It is anticipated that a draft update will be submitted to EPA for initial review in June 2019 and a final will be submitted to EPA by 9/30/2019.
Water Quality Programs				
WQ3	Maintain water quality monitoring of NPS implementation project areas to document success.	DEQ	Report number of stations monitored.	CONTINUING - 127 stations in monitored in 2016 and 2017.
WQ4	Continue water quality monitoring for watersheds associated with USDA’s National Water Quality Initiative.	DEQ/ NRCS	3 projects	CONTINUING - 3 projects monitored in 2017 that will continue for 2018.
WQ6	No net loss of existing wetland acreage, functions, and designated uses in all surface waters, as determined by analysis of Total Wetland Credits versus Total Wetland Impacts Permitted (acres).	DEQ	Ongoing long-term goal through 12/31/2018	CONTINUING - Ongoing.

VA Statewide Milestones		Lead	2019 Goal	2017 Status
Watershed Prioritization				
WP1	Complete Nonpoint Source Assessment chapters for the 2014, 2016, and 2018 Integrated 303(d) 305(b) reports.	DEQ/ DCR	1 report every two years (2014, 2016, 2018)	CONTINUING - 2014 NPS Assessment completed and part of 2014 Integrated Report; 2016 NPS assessment completed and will be part of 2016 Integrated Report; 2018 NPS Assessment underway.
WP2	Develop and implement a watershed prioritization process for TMDL development, NPS and IP program planning, and NPS implementation, and follow the timeline in new 303(d) vision. Compose Priority Watershed Framework Document or GIS Layer, entitled Approval of Alternative Clean-up Plans (e.g., non-TMDL Watershed Based Plans) by 2014. Articulate priorities by 2016, alternatives by 2018.	DEQ	Framework and process by 2015	CONTINUING - Prioritization for TMDL development completed; prioritization process for IP development is in process; prioritization process for TMDL implementation completed.
WP3	Establish watershed roundtables for priority river basins to provide watershed-based forums for stakeholders to participate in defining critical watershed needs, targeting problems for solutions, and providing input on potential management options to restore and protect water quality.	DEQ	12 watershed groups	CONTINUING - 7 roundtables in the Bay area and 2 roundtables in the Southern Rivers were active in 2016-2017. Three roundtables did not seek funding during this reporting cycle.

Appendix 1 – TMDL IPs: Completed or Under Development, January 2001 - June 2017

Watershed (# of impairments / # of impaired segments)	Location (county or city)	Impairment	Lead	Fiscal year Completed
Middle Fork Holston (3/3)	Washington	Bc	DCR	2001
North River (Muddy, Lower Dry, Pleasant, and Mill Creek) (5/4)	Rockingham	Bc, Be (Nitrate)	DCR	2001
Upper Blackwater River (4/4)	Franklin	Bc	DCR	2001
Catoctin Creek (4/4)	Loudoun	Bc	DCR	2004
Holmans Creek (2/2)	Shenandoah	Bc, Be (sed)	DCR	2004
Four Mile Run (1/1)	Arlington, Alexandria	Bc	DEQ	2004
Willis River (1/1)	Cumberland, Buckingham	Bc	DCR	2005
Chowan Study Area (9/9)	Multiple Counties	Bc	DEQ	2005
Moore's Creek (1/1)	Charlottesville, Albemarle	Bc	DEQ	2005
Guest River (5/5)	Wise, Scott, Dickenson	Be (sed)	DEQ	2005
Lower Blackwater, Maggoddee and Gills Creek (3/3)	Franklin	Bc	DCR	2005
Lynnhaven (shellfish) (2/2)	VA Beach	Bc	DEQ	2005
Cooks Creek and Blacks Run (6/2)	Rockingham, Harrisonburg	Bc, Be (sed & P)	DCR	2006
Thumb, Deep, Carter and Great Runs (4/4)	Fauquier, Stafford	Bc	DCR	2006
Big Otter (8/8)	Bedford, Campbell	Bc	DCR	2006
Mill and Dodd Creeks (2/2)	Floyd, Montgomery	Bc	DCR	2006
Little and Beaver Creek (3/2)	Bristol, Washington	Bc, Be (sed)	DCR	2006
Stroubles Creek (1/1)	Montgomery	Be (sed)	DEQ	2006
Back Creek (2/1)	Pulaski	Bc, Be (sed)	DEQ	2006
Abrams and Opequon Creek (8/5)	Frederick, Winchester	Bc, Be (sed)	DEQ	2006
Knox and PawPaw Creek (4/2)	Buchanan	Bc, Be (sed)	DEQ	2007
Hawksbill and Mill Creek (2/2)	Page	Bc	DCR	2007
Looney Creek (1/1)	Botetourt	Bc	DCR	2007
Upper Clinch River (1/1)	Tazewell	Be (sed)	DCR	2008
Occahannock Creek (shellfish) (1/1)	Accomack	Bc	DCR	2008
Falling River (1/1)	Campbell, Appomattox	Bc	DCR	2008
Dumps Creek (2/1)	Russell	TSS, TDS	DEQ	2008
Bluestone River (2/1)	Tazewell, Bluefield	Bc, Be (sed)	DCR	2008
Smith Creek (2/1)	Rockingham, Shenandoah	Bc, Be (sed)	DEQ	2008
Appomattox River – Spring Creek, Briery Creek, Bush	Prince Edward, Amelia	Bc	DCR	2008

Watershed (# of impairments / # of impaired segments)	Location (county or city)	Impairment	Lead	Fiscal year Completed
River, Little Sandy River and Saylers Creek (5/5)				
Appomattox River – Flat, Nibbs, Deep and West Creeks (4/4)	Amelia, Nottoway	Bc	DCR	2008
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
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
Cub, Turnip, Buffalo and UT Buffalo Creeks (4/4)	Appomattox, Charlotte	Bc	DCR	2009
Hazel River Watershed (4/4)	Culpeper, Madison, Rappahannock	Bc	DCR	2009
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
Upper & Lower Middle River, Moffett Creek & Polecat (7/5)	Augusta	Bc, Be (sed)	DCR	2010
Mill and Powhatan Creek (2/2)	James City County	Bc	DEQ	2010
Lewis Creek (1/1)	Russell	Be (sed)	DCR	2010
Browns, Craig and Marsh Runs (3/3)	Fauquier	Bc	DCR	2010
Little Dark Run and Robinson River (3/3)	Culpeper & Madison	Bc	DCR	2010
Rock Island, Austin, Frisby, Troublesome Creeks, North and Slate Rivers (6/6)	Buckingham	Bc	DCR	2010
Hays, Moffatts, Otts and Walker Creeks (4/4)	Augusta & Rockbridge	Bc	DCR	2010
Christians Creek and South River (6/3)	Augusta & Waynesboro	Bc, Be (sed)	DCR	2010
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

Watershed (# of impairments / # of impaired segments)	Location (county or city)	Impairment	Lead	Fiscal year Completed
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
York Basin Watersheds – Beaver Creek, Goldmine Creek, Mountain Run, Pamunkey Creek, Plentiful Creek, Terry’s Run (6/6)	Louisa, Orange, Spotsylvania	Bc	DCR	2011
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
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
Moore’s Creek, Lodge Creek, Meadows Creek and Schenks Branch (4/4)	Albemarle, Charlottesville	Be (sed)	DEQ	2012
Lower Banister River, Polecat Creek and Sandy Creek (3/3)	Halifax, Pittsylvania	Bc	DCR	2013
Middle Fork Holston River & Wolf Creek (8/6)	Abingdon, Smyth, Washington, Wythe	Bc, Be (sed)	DCR	2013
Spout Run (4/3)	Clarke	Bc, Be (sed)	DCR	2013
Piankatank River, Milford Haven, Gwynns Island (17/16)	Matthews, Middlesex, Gloucester	Bc	DCR	2013
Mill Creek, Cove Creek, Miller Creek, Stony Fork, Tate Run, S.F. Reed Creek, Reed Creek (9/9)	Wythe	Bc	DEQ	2013
Beaverdam, Boatswain Creek, Chickahominy River, Collins Run, Stony Run (5/5)	Hanover, Henrico, Charles City, Richmond	Bc	DEQ	2013
Rockfish River (4/4)	Nelson	Bc, Be (sed)	DEQ	2013

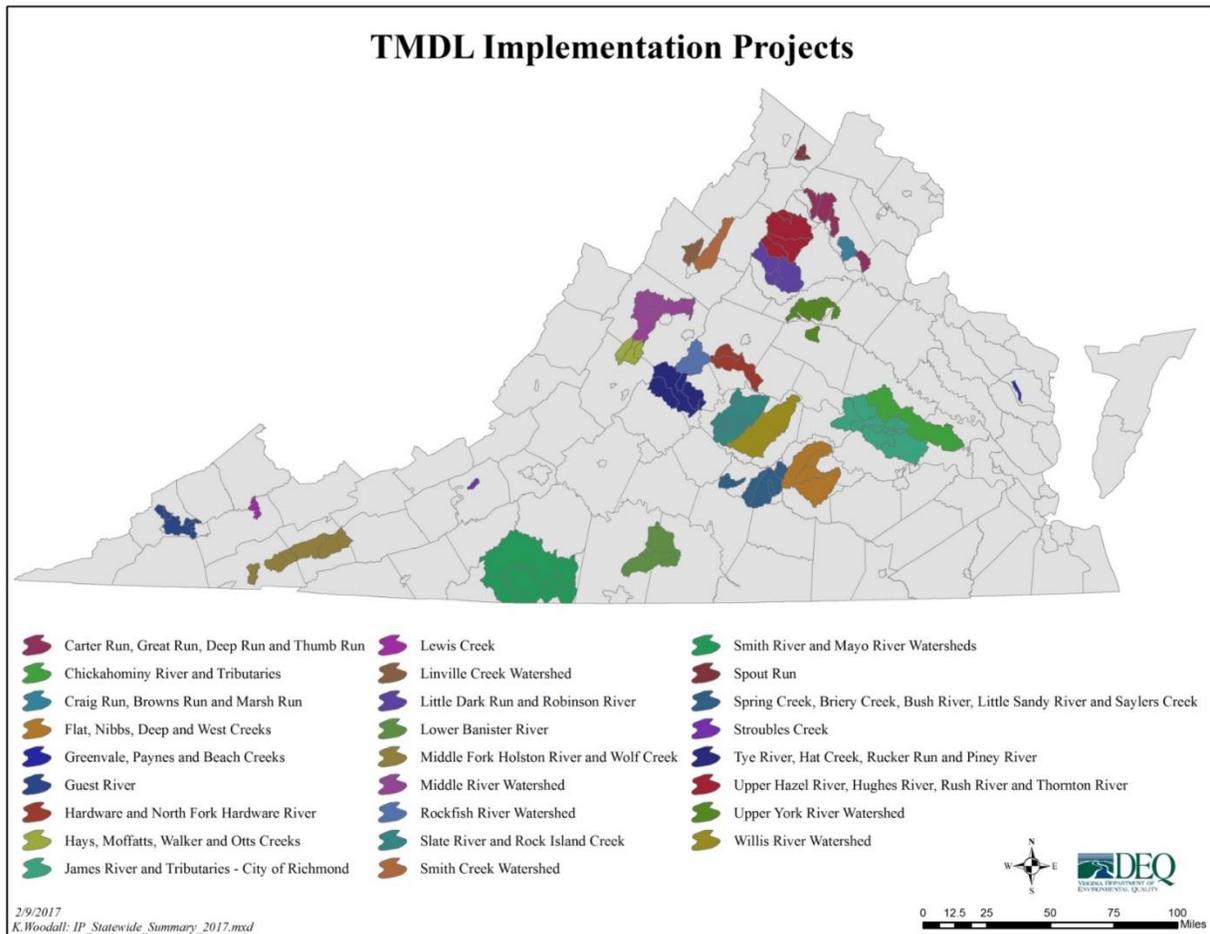
Watershed (# of impairments / # of impaired segments)	Location (county or city)	Impairment	Lead	Fiscal year Completed
South Fork Mayo River, North Fork Mayo River, Blackberry Creek, Smith Creek, Marrowbone Creek, Leatherwood Creek (8/8)	Henry, Patrick, and City of Martinsville	Bc	DEQ	2013
Darden Mill Run, Mill Swamp, Three Creek (6/9)	Brunswick, Greenville & Southampton	Bc	DEQ	2013
North Fork Holston River (35/35)	Scott, Washington, Smyth, Russell, Bland, Tazewell	Bc, Temp	DEQ	2013
Linville Creek (2/1)	Rockingham, Broadway	Bc, Be (sed)	DEQ	2014
Wards Creek, Upper Chippokes Creek, Western Run, Crewes Channel, West Run, James River (6/6)	Charles City, Henrico & Hanover	Bc	DEQ	2014
Elk and Cripple Creek (2/2)	Grayson & Wythe	Bc	DEQ	2014
Tye River, Hat Creek, Rucker Run, Piney River, Mill Creek, Turner Creek, Rutledge Creek, Buffalo River (8/8)	Amherst, Nelson	Bc	DEQ	2014
Mattawoman, Hungars, UT-Hungars, Barlow, Jacobus, The Gulf (6/6)	Northampton	Bc	DEQ	2015
Colliers Creek, North Fork Buffalo Creek, South Fork Buffalo Creek, Buffalo Creek, Cedar Creek (5/5)	Rockbridge	Bc	DEQ	2015
Crab Creek (2/1)	Town of Christiansburg, Montgomery County	Bc, Be (sed)	DEQ	2015
Fairview Beach (1/1)	King George	Bc	DEQ	2015
Chestnut Creek (2/2)	Carroll & Grayson, Town of Galax	Bc, Be (sed)	DEQ	2015
Roanoke River Watersheds -Part 1 – Mud Lick Creek, Mason Creek, Murray Run, Ore Branch, Peters Creek, Roanoke River, Carvin Creek, Glade Creek, Laymantown Creek, Tinker Creek, Back Creek (40/34)*	Botetourt, Montgomery, Roanoke, Roanoke City, Salem, Town of Vinton	Bc, Be (sed)	DEQ	2015/2016
Turley Creek, Long Meadow (2/2)	Rockingham	Be (sed)	DEQ	2016
Chuckatuck Creek, Brewers Creek (2/2)	Suffolk	Bc	DEQ	2016
Banister River, Winn Creek (3/3), Terrible Creek	Town of Halifax, Halifax	Bc	DEQ	2016
Hardware River (2/2)	Albemarle, Fluvanna	Bc	DEQ	2016

Watershed (# of impairments / # of impaired segments)	Location (county or city)	Impairment	Lead	Fiscal year Completed
Upper Rapidan River Watersheds - Garth Run, UT Rapidan River, Rapidan River, Beautiful Run, Rapidan River, UT Rapidan River, Poplar Run, Blue Run, Marsh Run, Rippin Run (10/10).	Albemarle, Greene, Madison, Orange	Bc	DEQ	2016
Roanoke River Watersheds- Part 2 – North Fork Roanoke River, South Fork Roanoke River, Bradshaw Creek, Wilson Creek (8/4)	Floyd, Montgomery, Roanoke	Bc, Be (sed)	DEQ	2017
Crooked Run, Stephens Run, West Run, and Willow Run (4/4)	Frederick, Warren	Bc	DEQ	2017
Upper Clinch River and Tributaries (8/8)	Tazewell	Bc	DEQ	2017
Blackwater Creek, Clinch River, N.F. Clinch River, Stock Creek and Moll Creek (11/11)	Scott, Russell, Wise	Bc	DEQ	2017*
Cromwells Run, Little River, Upper Goose Creek (3/3)	Fauquier, Loudoun	Bc	DEQ	UD
Yeocomico River (13/13)	Northumberland, Westmoreland	Bc	DEQ	UD
Dan River- Birch Creek, Byrds Branch, Doubles Creek, Fall Creek, Sandy Creek (94/94)	Pittsylvania, Halifax	Bc	DEQ	UD
Little Calfpasture River (1/1)	Augusta, Rockbridge	Be (sed)	DEQ	UD
Powell River, North Fork Powell, South Fork Powell, Butcher Creek, Wallen Creek (12/10)	Lee, Wise	Bc, Be (sed)	DEQ	UD
Accotink Creek (3/3)	Fairfax, Fairfax County	Chloride	DEQ	UD
<p><i>Total IPs Completed: 88 IPs, 460 Impairments; Total IPs Under Development (UD): 6 IPs, 126 impairments.</i></p> <p><i>Watershed segment "UT" = unnamed tributary</i></p> <p><i>Impairment types: Bc = bacteria, Be = benthic, DO = dissolved oxygen, TSS = total suspended solids, TDS = total dissolved solids, Sed = sediment, Temp = temperature</i></p> <p><i>* IP has been completed and submitted to USEPA, but not yet approved.</i></p>				

Appendix 2 – Watershed Implementation Project Reports

This appendix provides comprehensive summaries of select TMDL implementation projects. These projects implemented agricultural, residential septic, and urban BMP activities in impaired watersheds.

Map of Implementation Projects highlighted in Appendix I of the 2017 NPS Annual Report



Summaries of seven (7) closeout reports and eleven (11) progress reports are provided in this appendix. Five (5) additional projects were underway, but progress reports were not developed. These are listed at the end of the appendix with further explanation. All reports, including PDFs of the progress reports, can be found [here](#).

PROJECT CLOSEOUT REPORTS

Closeout reports describe accomplishments to-date and provide a justification of why Federal Section 319(h) funding ceased in the watershed. These projects received targeted 319(h) funding, and some projects have received supplemental state funding. Summaries of seven (7) closeout reports are provided, including hyperlinks to online versions of the reports.

- **Craig, Browns and Marsh Runs**

The Craig Run, Browns Run, and Marsh Run watersheds are in the Rappahannock River Basin in Fauquier County. The implementation project to address their bacteria impairments began in January 2012 and ended in June 2017. It was administered by the John Marshall SWCD and supported the implementation of 558 acres of pasture management and 58 acres of permanent vegetative cover on cropland. In addition, 16 livestock stream exclusion projects were installed during this period, totaling 64,560 linear feet of fencing. The residential program supported 19 septic tank pump-outs, almost 50% of the implementation goal, as well as repair or installation of waste treatment systems at 9 other homes. Staff believed that low participation was likely due to southern Fauquier County residents' hesitance to get involved with the government, as well as the inability of many residents to front the cost of various practices. Initially Virginia had committed five years of funding to allow sufficient time to accomplish key IP goals. Upon completion of the initial five years, the partnership assessed the viability of the project for continuance. It was determined that although significant progress had been made that there was not sufficient interest on the part of potential participating landowners to make it economically efficient to continue the project beyond the initial five-year commitment. VADEQ water quality data collected in Marsh Run for the period of 2011 through 2016 indicate possible water quality improvement, but data over the same period in Craig Run indicate an increase in violations of the standard. Monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes.

- **Hays, Moffats, Walker, and Otts Creeks**

Listed as impaired for bacteria, Hays Creek and its tributaries (Otts, Moffats, and Walker Creeks) are in the Upper James River Basin in Augusta and Rockbridge Counties. The Natural Bridge SWCD administered the watersheds' implementation project, which was active between July 2012 and June 2017. The project funded agricultural and residential septic practices including 31,544 feet of stream exclusion fencing, 24 acres of riparian buffer, and 159 acres of cover crops. The residential program had comparatively low participation but supported 12 septic tank pump-outs as well as the installation of one septic system and one alternative waste system. The agricultural program was initially very successful, expending all initially allocated cost-share funds for livestock exclusion practices. While much of the additional funds awarded in 2015 went unspent, many producers opted for another program offered through the Natural Resource Conservation Service, which resulted in additional livestock stream exclusion in the watershed. Water quality data collected by VADEQ for the period of 2010 through 2017 in Hays Creek suggest possible water quality improvements. However, monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes.

- **Lower Banister River**

The Lower Banister River and its tributaries (Sandy and Polecat Creeks) are in Pittsylvania and Halifax Counties in the Roanoke River Basin. The Lower Banister River TMDL residential septic and pet waste implementation project, which was active between July 2013 and December 2016, aimed to address the bacteria impairments in the Halifax County portion of the implementation watershed. It was administered by Tri-County Community Action Agency (TCCAA) in partnership with Halifax SWCD and Virginia Cooperative Extension. A total of \$30,781.59 spent funded technical assistance as well as cost-share on 20 septic tank pump-outs, three septic system repairs, and one septic system installation.

Despite outreach efforts through radio public service announcements and information distributed via churches and community volunteers, the rural nature and relatively isolated, elderly population of this watershed made implementation challenging. Many residents could not afford the out-of-pocket expense. Plumbing Rehabilitation Program (IPR) funding was utilized as match on some repair projects to assist those with financial need. Other challenges include misinformation regarding the cost of septic pump-outs, confusion about income eligibility, and interested citizens residing outside the implementation area. Regarding the pet waste portion of the program, landowners did not want to sign agreements for placement of pet waste units. Water quality data collected by VADEQ for the period of 2010 through 2017 suggest possible degradation in water quality in the Lower Banister River watershed. However, monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes.

- **Rockfish River**

Part of the James River Basin, the Rockfish River watershed in Nelson and Albemarle Counties was listed as impaired due to violations of the State's Water Quality Standards for fecal coliform bacteria. Despite extensive outreach efforts by the Thomas Jefferson SWCD, the agricultural program has proven challenging to implement. The owners of several large agricultural operations in the watershed who initially expressed interest in the program eventually postponed projects due to concerns about a natural gas pipeline expected to cross through their properties. Nonetheless, four livestock stream exclusion projects were completed totaling 10,520 linear feet of fencing; 10 acres of riparian buffer (45% of the implementation goal) were also funded. The residential program has received greater interest from landowners: residential septic issues were addressed at 69 properties. VADEQ water quality data for the period of 2011 through 2017 suggest possible water quality decline over the sampling period, largely driven by the number of violations in 2016. However, monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes.

- **Thumb, Great, Carter, and Deep Runs**

In Fauquier and Stafford Counties, Thumb, Carter, Great, and Deep Runs are part of the Rapidan-Upper Rappahannock Basin in the Chesapeake Bay watershed. An implementation project to address the bacteria impairments in all four watersheds began in June 2006; however, in 2012, only Carter and Thumb Runs were continued until the project ended in June 2017. The Fauquier County Health Department was contracted to provide technical assistance and educational outreach to homeowners for the residential septic program, while the John Marshall SWCD administered the agricultural BMP program. Of note, nearly 80 miles of livestock stream exclusion fencing was installed in the watersheds, representing 85% of the goal listed in the TMDL implementation plan. In addition, 445 acres of improved pasture management, 94 acres of vegetative cover on cropland, 247 septic tank pump-outs, 69 septic system repairs, 16 septic system installations, and one alternative waste system installation were completed. Implementation efforts coincided with water quality improvements in the Carter Run watershed, which led to the development of an EPA Success Story about the watershed in 2014 (available [here](#)). Water quality data collected by VADEQ for the period of 2006 through 2016 suggest continued water quality improvement in Carter Run. However, monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes.

- **Spout Run**

In the Clarke County portion of the Shenandoah River Basin, Spout Run is listed as impaired for violating water quality standards for bacteria and the General Standard (benthic) due to the presence of excessive sediment. Started in 2014, the implementation project's residential and urban programs were administered by Clarke County, while the Lord Fairfax SWCD was responsible for the agricultural program. Because of low levels of interest in the septic and pilot equine BMP programs, funds were

redirected to additional livestock stream exclusion fencing projects, which concluded June 2017. A total of \$784,993 in funds were expended on practices including 100% of the implementation goal for riparian buffer and 612% of the goal for cover crops. In addition to the remediation of 35 residential septic issues, 2 wetland restoration projects were implemented and 2,000 feet of streambank stabilization were funded. Overall, lower than expected implementation, especially with regard to equine BMPs, was attributed to lack of landowner interest. Water quality data collected by VADEQ for the period of 2007 through 2017 and analyzed for violations of the bacteria standard suggest possible water quality improvement in Spout Run. However, monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes.

- **Stroubles Creek**

The Stroubles Creek watershed is in the Montgomery County portion of the New River Basin; it was listed as impaired due to violations of the General Standard (benthic) with sediment identified as the primary stressor causing the impairment. The Section 319(h)-funded implementation project administered by the Virginia Tech Biological Systems Engineering (BSE) Department started in May 2014 and concluded in March 2017; prior to that, Virginia Tech and partners worked on implementing BMPs listed in the TMDL IP. The \$81,970 expended funded 10,560 feet of stream fencing, four urban bioretention BMPs and 6,336 feet of streambank restoration. BSE also created an Adopt-A-Stream program for 1.2 miles of the creek, a data transmission system to route data automatically through the existing STREAM Lab wireless system, and a project website with a story map. Water quality data collected by VADEQ for the period of 2007 through 2017 and analyzed for violations of the bacteria standard suggest possible water quality degradation in Stroubles Creek. However, long-term VSCI scores (a measure of benthic health) have improved since 2002. Monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes.

ONGOING WATERSHED PROGRESS REPORTS

Individual watershed progress reports are available on DEQ's [website](#) and will be updated as projects advance.

Federal Section 319(h) TMDL Implementation Projects – Current Projects: These projects support agricultural, residential septic, and urban BMP activities in impaired watersheds. They are supported mainly by Federal 319(h) funds, but some have received supplemental state funding from either the Water Quality Improvement Fund or the Virginia Natural Resources Commitment Fund.

- **Flat and Nibbs Creeks**

Located in Amelia and Nottoway Counties, the watersheds of Flat, Nibbs, Deep, and West Creeks are in the James River Basin. Targeted agricultural funding was discontinued in June 2015; however, the Piedmont SWCD has continued to implement agricultural BMPs to address the bacteria impairments in the creeks. A total of 109 stream exclusion practices have been installed, fencing livestock from 288,229 feet of stream and producing 62 acres of vegetative buffers – three times the goal set by the TMDL implementation plan. Additionally, 44,166 feet of stream fencing was maintained for an additional period, 286% of the implementation goal. Initiated in July 2015, the residential septic grant originally excluded Deep and West Creeks and was scheduled to end in December 2017. However, due to continued interest, the grant was expanded to include Deep and West Creeks and extended until December 2018. The residential septic grant program has funded 24 septic tank pump-outs, three septic system repairs, seven septic system installations, and two alternative waste treatment systems. Water quality data collected by VADEQ for the period of 2007 through 2017 suggest possible water quality decline in Flat Creek and possible water quality improvement in Nibbs Creek. However,

monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes.

- **Hardware River**

The Hardware River implementation watershed in the James River Basin in Albemarle and Fluvanna Counties was listed as impaired due to violations of Water Quality Standards for bacteria. Since September 2016, the Thomas Jefferson Soil and Water Conservation District (TJSWCD) has administered the Hardware River TMDL implementation project, which supports both agricultural and residential septic BMP implementation. Owing to outreach efforts through direct mailings, flyers, site visits, and an appearance at a well-attended Farm Bureau meeting, staff have drawn strong interest in the agricultural program. In the first nine months of implementation, 31 fencing practices were installed, excluding livestock from 21,208 feet of stream, and 38 acres of cover crops (75% of the total implementation goal) were implemented. Comparatively, the residential implementation program has progressed slowly; 16 pump-outs, two septic system repairs were performed and one new septic system was installed. TJSWCD continues to seek assistance from county health departments in increasing awareness about the residential septic program, especially among low income residents. As implementation efforts have only just begun, any effect of implementation on water quality cannot yet be observed.

- **Linville Creek**

The Linville Creek watershed is in the Shenandoah River Basin in Rockingham County and is listed as impaired due to violations of the State's Water Quality Standards for fecal coliform bacteria and the General Standard (benthic) due to excess sediment. The Shenandoah Valley SWCD (SVSWCD) administers a residential septic, pet waste, and stormwater BMP implementation project, which began in July 2015. Notably in the agricultural program, 243 acres of cover crops were funded this year, bringing the total installed to 34% of the implementation goal. The residential septic program continues to be well-received; 29 septic tank pump-outs were performed, almost double the number funded last fiscal year. Additionally, four septic systems were repaired, four septic systems were installed, and one alternative waste treatment system was installed. SVSWCD continues to promote the program through outreach efforts to watershed landowners including postcard mailings and an article featured in a local publication. Challenges in securing installation locations and adequate contractor assistance for stormwater BMPs have persisted. SVWCD continues to explore other partnerships and options to meet stormwater BMP goals. As most BMPs were installed after January 2016, any effect of implementation on water quality cannot yet be observed.

- **Robinson River and Little Dark Run**

Bacteria loadings to the Robinson River and Little Dark Run watersheds in the Madison County portion of the Rappahannock River Basin caused the waterbodies to violate the state water quality standard for bacteria. A state-funded implementation project started in 2012 and a 319(h)-funded project commenced in 2015 have both been administered by the Culpeper SWCD. Between July 2016 and June 2017, 54 septic tank pump-outs, four septic system repairs, and one septic system replacement were completed in the watersheds. Also during that time, 14 stream exclusion fencing systems were installed, protecting 68,075 feet of stream. Other agricultural projects completed during this period include, 523 acres of small grain cover crop and 300 acres of harvestable cover crop were completed. Measured improvements in water quality at two stations in Robinson River (Station # 3-ROB017.24 at the Route 638 bridge and 3-ROB024.06 at the Route 649 crossing) have allowed Virginia to remove from a 4.15-mile and a 3-mile section of the river from the 303(d) list of impaired waters. A NPS success story for EPA publication was submitted in July 2016 and can be found [here](#). However, water quality data collected between 2004-2017 in Robinson River, suggest possible water quality decline. Monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes. However,

- **[Slate River and Rock Island Creek](#)**
 The Slate River and Rock Island Creek watersheds in the James River Basin, Buckingham County, were listed as impaired due to violations of the State’s Water Quality Standards for bacteria. Through the joint efforts of the VADEQ, DCR, and the Peter Francisco SWCD, as well as other stakeholders, various agricultural and residential BMPs have been installed through a 319(h)-funded TMDL implementation project that began in July 2011. From July 2016 through June 2017, 15,481 linear feet of livestock exclusion fencing was installed, and a support for an extension of the Conservation Reserve Enhancement Program (CREP) watering system was provided. Also, 26 septic tank pump-outs and one septic system installation were completed. Water quality data collected by VADEQ for the period of 2009 through 2016 indicate potential improvement in water quality in Slate River. However, monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes.

- **[Spring Creek, Briery Creek, Little Creek, Saylers Creek, and Bush River](#)**
 The Spring Creek, Briery Creek, Little Creek, Saylers Creek, and Bush River watersheds located primarily in Prince Edward County were listed as impaired due to violations of the State’s Water Quality Standards for fecal coliform bacteria. The Piedmont Soil and Water Conservation District (PSWCD) administered a successful grant-funded implementation project from 2006 to 2015 to provide cost-share on agricultural BMPs and has since partnered with local organizations including the Prince Edward County Health Department to administer a program to provide financial assistance for the implementation of residential septic BMPs in these watersheds. Since the residential septic implementation program began in 2016, PSWCD has helped to address septic issues from a total of 24 homes. PSWCD also continues to apply other funding sources to agricultural implementation in these watersheds, including a total of over 50 miles of stream exclusion fencing installed, which exceeds the Phase 1 implementation goal. Additionally, over 35,000 feet of stream fencing have been maintained, which represents 330% of the implementation goal. Measured decreases in the violation rates in Little Sandy Creek allowed Virginia to remove 2.91 miles of the initially-listed 7.35 miles from the 303(d) list of impaired waters in 2012. The Nonpoint Source Success Story can be found [here](#). Water quality data collected by DEQ for the period of 2007 through 2017 in Briery Creek and 2009 through 2017 in Spring Creek indicate a possible decline in water quality in the former and a possible improvement in the latter. More consistent monitoring over a longer period of time with is needed to assess water quality changes.

- **[Tye River](#)**
 The Tye River watershed, part of the James River Basin in Nelson and Amherst Counties, includes the Tye River and its tributaries, Hat Creek, Rucker Run, and Piney River, which were all listed as impaired for bacteria. The implementation project, administered by the Thomas Jefferson SWCD since July 2015, has been extremely successful in both the agricultural and residential septic BMP programs. All agricultural BMP funds granted to the TJSWCD were allocated within the first year, even after DEQ awarded a supplemental grant solely for livestock exclusion BMP cost-share. Having funded the installation of 72,666 feet of stream exclusion fencing, TJSWCD continues to see significant demand for technical and financial assistance for livestock exclusion projects. Other agricultural practices installed include 88 acres of cover crops and 55 acres of riparian buffers. The residential septic BMP program is on track to meet implementation goals, as well, with continued interest from landowners in the watershed. VADEQ water quality data collected between 2006 and 2017 in Tye River, suggest possible water quality degradation. However, the Tye River Implementation Project started in July 2015 with most of the installed BMPs occurring after January 2016; monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes

- [Upper Hazel River](#)
The Upper Hazel River watershed is in the Rappahannock River Basin in Rappahannock, Madison, and Culpeper Counties and is part of the Chesapeake Bay watershed. The Culpeper SWCD administers the agricultural and residential septic BMP programs for the implementation project, which started in 2009 to address the bacteria impairments in the watershed. From July 2016 through June 2017, the CSWCD installed 26 agricultural BMPs. These included 17 livestock stream exclusion practices resulting in a total of 30,645 linear feet of stream exclusion fencing. In addition, 84 acres were planted under small grain and mixed cover crop for nutrient and residue management in the watersheds. In the residential septic program, 61 BMPs were installed between July 2016 and June 2017, including 47 septic system pump-outs, 10 septic system repairs, and four septic system replacements. Bacteria data analyzed by DEQ for the period of 2007 through 2017 suggest a possible improvement in water quality over the sampling period. However, monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes.
- [Upper Middle Fork Holston River](#)
The Middle Fork Holston River is part of the Tennessee River Basin in Smyth, Washington, and Wythe Counties; it was listed as impaired on due to violations of the State's Water Quality Standards for fecal coliform bacteria and the General Standard (benthic), with the latter being attributed to excessive sediment. Due to unsatisfactory completion of project deliverables by the New River Highlands RC&D, the Evergreen SWCD assumed responsibility for the remaining project activities (active only in Smyth County portions of the watershed) in May 2016, extended the timeline, and expanded the project area to include other areas where people had shown interest. In the thirteen months since the administrative transition, the residential septic program exceeded expectations and completed sixty septic tank pump-outs, three connections to public sewer, two repairs and four septic system installations. Additionally, the pet waste educational program installed sixteen pet waste stations in a partnership with the Town of Marion and Town of Chilhowie. The agricultural program funded 10 practices fencing livestock from 35,571 linear feet of stream, as well as 986 acres of pasture management and 33 acres of permanent vegetative cover on cropland. As implementation efforts have only just gained momentum, any effect of on water quality cannot yet be observed in this watershed.
- [Upper Rapidan River](#)
The Upper Rapidan River watershed spans portions of Virginia's Albemarle, Greene, Madison, and Orange counties in the James, Rappahannock, and York River Basins. The ten impairment watersheds were listed as impaired due to violations of Water Quality Standards for bacteria. Agricultural and residential septic implementation projects in the Upper Rapidan River watershed are administered by the Culpeper Soil and Water Conservation District (CSWCD). A remarkable 156 acres of permanent cover was established on cropland, 363% of the IP goal, and 62% of the necessary cover crop acreage has been implemented. Additionally, a total of 16 stream exclusion practices have been installed, fencing livestock from 65,803 feet of stream. Staff are steadily making progress toward goals outlined in the grant, including 45 septic tank pump-outs, four septic system repairs, and installation of three new septic systems. A high level of participation is in part due to this being the first time septic cost-share has been available for this area. Extensive outreach is underway to reach residential septic landowners, especially those in rural areas with steep or poorly drained soils. As implementation efforts have only just begun, any effect of implementation on water quality cannot yet be observed.
- [Upper York River \(Orange County portions\)](#)
The Upper York River and its impaired watersheds, located in Orange, Louisa, and Spotsylvania Counties, are listed as impaired for bacteria. An implementation project to specifically address the Orange County portion of the watersheds has been administered by the Culpeper SWCD since July 2012. Between July

2016 and June 2017, four livestock stream exclusion systems were established, totaling 46,330 linear feet of fencing. In addition, maintenance work was completed on 9,750 feet of stream fencing and 502 acres were planted under small grain and mixed cover crop for nutrient and residue management. Under the residential BMP program, 26 septic tank pump-outs, four septic system repairs, and two septic system replacements were completed. Water quality data collected by VADEQ in Pamunkey Creek for the period of 2005 through 2017 suggest potential decline in water quality. However, monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes.

ACTIVE WATERSHED PROJECTS WITHOUT PROGRESS REPORTS

During 2017, Virginia DEQ provided Federal 319(h) funds for implementation projects whose level of implementation did not warrant a full progress report. Information regarding these projects will be included in future reports and may be found on the [Virginia TMDL Implementation Projects](#) website.

- **Chestnut Creek**
- **Greenvale, Payne, and Beach Creeks**
- **Middle Clinch River**
- **Middle River**
- **Upper Clinch River**

Appendix 3 – Glossary of Best Management Practice (BMP) Names

Acronym	Meaning
CCI-CNT	Long Term Continuous No-Till Planting System
CCI-SE-1	Stream Exclusion - Maintenance Practice
CRFR-3	CREP Riparian Forest Buffer Planting
CRLF-1	CREP Buffer Length Recording Practice
CRSL-6	CREP Grazing land protection
CRWP-2	CREP Streambank protection
CRWQ-1	CREP Grass filter strips
CRWQ-11	CREP Agricultural Sinkhole Protection
FR-1	Aforestation of Erodible Crop and Pastureland
FR-3	Woodland Buffer Filter Area
LE-1T	Livestock Exclusion with Riparian Buffers for TMDL Imp.
LE-2	Livestock Exclusion with Reduced Setback
LE-2T	Livestock Exclusion with Reduced Setback for TMDL Imp.
NM-1	Nutrient Management Plan Writing and Revision
NM-2	Nutrient Management Plan Implementation and Record Keeping
NM-3	Sidedress Application of Nitrogen on Corn
RB-1	Septic Tank Pump-out
RB-2	Connection to Public Sewer
RB-3	Septic Tank System Repair
RB-4	Septic Tank System Replacement
RB-4P	Septic Tank System Installation/Replacement with Pump
RB-5	Installation of Alternative Waste Treatment System
SL-1	Long Term Vegetative Cover on Cropland
SL-10T	Pasture Management
SL-11	Permanent Vegetative Cover on Critical Areas
SL-15A	Continuous High Residue Minimal Soil Disturbance Tillage System
SL-15B	Continuous No-Till Forage Production System
SL-6	Stream Exclusion with Grazing Land Management
SL-6A	Small Acreage Grazing System
SL-6AT	Small Acreage Grazing System (TMDL)
SL-6B	Alternative Water System
SL-6T	Stream Exclusion with Grazing Land Management for TMDL Imp.
SL-7	Extension of CREP Watering Systems
SL-7T	Support for Extension of CREP Watering Systems - TMDL
SL-8	Protective Cover for Specialty Crops
SL-8B	Small Grain and Mixed Cover Crop for Nutrient Management and Residue Management
SL-8H	Harvestable Cover Crop
SL-9	Grazing Land Management
WP-1	Sediment Retention, Erosion or Water Control Structures
WP-2	Streambank Protection (Fencing)
WP-2A	Streambank Stabilization
WP-2B	Stream Crossing and Hardened Access
WP-2C	Stream Channel Stabilization
WP-2T	Stream Protection - TMDL
WP-3	Sod Waterway
WP-4	Animal Waste Control Facilities
WP-4B	Loafing Lot Management System
WQ-1	Grass Filter Strips
WQ-11	Agricultural Sinkhole Protection
WQ-4	Legume Based Cover Crop