# Virginia Nonpoint Source Pollution Management Program

## 2018 Annual Nonpoint Source Report

### July 1, 2017 through June 30, 2018

### Issued: 6/21/2019

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# 2018 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.

# 2018 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 Source (NPS) Pollution Management Program activities undertaken by DEQ and cooperating agencies during Virginia fiscal year 2018 (FY18), which covers a period from July 1, 2017 through June 30, 2018. 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, 44 TMDL equations (28 new, 16 revised), each representing a watershed area draining to impaired surface waters, have been approved by EPA. 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 plans that outline BMP implementation strategies in predominantly nonpoint source (NPS) polluted watersheds
- developing TMDLs that are more easily implemented

Further, DEQ employs a statewide strategy to prioritize watersheds for TMDL development or TMDL alternative development for the six-year window, 2016-2022. Watersheds are prioritized based on types of impairment, public interest, available monitoring, regional input, and available funding.

During this program year, Virginia developed three (3) implementation plans (IPs) that addressed 16 impaired segments; in addition, six (6) IPs addressing 126 impairments were under development but were not completed or approved by the end of the fiscal year. Since 2001, Virginia has developed 90 implementation plans addressing 476 impairments, thereby exceeding the 2014 NPS goal for number of impairments addressed in IPs by 24%; in fact, as of June 2018, Virginia has already exceeded its 2019 goal by 22%.

DEQ and its partners also jointly funded implementation in 76 implementation plan areas comprising 198 watersheds, resulting in the installation of 2,321 agricultural and residential septic BMPS that excluded livestock from 237 miles of stream and addressed straight pipes and failing septic systems from 421 homes. Expenditures for these projects totaled $17,142,440, consisting of $11,902,176 of federal and state funds and $5,240,265 in landowner contributions. Collectively, these efforts achieved pollutant reductions of 2,417,162 pounds of nitrogen, 82,768 pounds of phosphorus, 63,579 tons of sediment, and 4.73E+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 FY18 goal for total number of Success Stories and has exceeded by 9% its FY18 goal for number of segments discussed in those reports; two (2) Success Stories were submitted for three (3) impaired watershed segments with water quality improvements attributable to TMDL implementation actions. The two Success Stories developed in Virginia in 2018 were *Implementing*

*Best Management Practices Improves Benthic Communities in Willis River* and *Implementing Best Management Practices Improves Aquatic Health of Dumps Creek, Russell County, 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 remains an important agricultural program milestone. Applications for 100% state-funded livestock stream exclusion were accepted from January 2013 through June 2015. As of January 2019, there were only $6.2 million in pending applications remaining. Over $95 million has been expended or obligated for a total statewide initiative of $101 million. Through 2018, a total of 2,165 practices have been completed and another 189 have been funded and are awaiting completion. Only 118 practices are awaiting funding. Once completed, these 2,472 practices will protect almost 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 August 31, 2018, there were 457 plans covering 106,125 acres statewide. Further, the 2018 calendar-year goal of 10,000 acres covered by RMPs in the Chesapeake Bay watershed was surpassed with 69 plans covering more than 14,000 acres.

As part of DCR's nutrient management program, staff prepared nutrient management plans on 110,419 acres. Private nutrient management planners have developed or revised nutrient management plans statewide for 500,000 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, 2017 through March 31, 2018, VDACS-ASA program staff responded to 60 official water quality complaints. In 24 of the 60 complaints (40%), 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 90 small AFOs remain to be evaluated out of the 800 identified in the Chesapeake Bay Watershed Implementation Plan (WIP). This number is down from 95 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 FY18, VDOF field personnel inspected 4,774 timber harvest sites across Virginia on 216,077 acres – a slight decrease in the number of acres harvested in FY2017.

Another focus of the VDOF water quality program is training harvesting contractors in water quality protection techniques. For FY18, there were 20 training programs offered with a total of 606 attendees present.

The VDOF has had a statewide audit system in place since 1993 to track trends in forestry BMP implementation and effectiveness. In 2018, 93.3 percent of the timber harvest acres in Virginia conducted within the boundaries of the Bay Watershed were under BMPs. This reduction from previous years is attributed to how wet conditions were in fiscal year 2018. The audit also showed that 100 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 FY18, VDOF was involved with 192 water quality actions initiated under the Silvicultural Law. Of these actions, two (2) 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 including the following:

- The conservation easement program aims to maintain large, unfragmented blocks of forestland, ensuring the land is available for forest management in perpetuity. In FY18, VDOF permanently protected 7,824 acres of open space and more than 39 miles of water courses through 24 conservation easements.
- In its Riparian Forest Buffer tax credit program from Tax Year 2017, VDOF issued tax credits on 65 applications covering 996.1 acres of retained forested buffers. The tax benefit to forest landowners was $16,549.45 on timber valued at $1,750,212.61.
- The Forest Stewardship Program assists non-industrial private landowners in improving the management of private non-industrial forestlands for multiple resources. In total for FY18, nearly 3,600 plans were prepared on nearly 164,500 acres.
- 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 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. Using sub-meter resolution imagery will also make it easier for reporting TMDL progress for 2018 and beyond when the Bay model will be revised.

## 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 through a stream ecological integrity assessment known as the Interactive Stream Assessment Resource (INSTAR).

The 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. Further, new partnerships have been explored with those in the land protection and land brokering industry to advance the protection of lands directly benefiting Healthy Waters.

## 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, 2017 through June 30, 2018, VDH issued 9,079 new construction permits; 1,431 were for installation of alternative onsite sewage systems (AOSS). During the same period, VDH issued 3,347 repair permits statewide; 263 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 FY18, DEQ provided funding to pump out septic systems, repair or replace failing septic systems, or remove straight pipes from at least 551 homes using $322,533 from grant funding sources and landowner contributions. Grant funds active in FY18 were distributed throughout nine 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. 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. 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. Although most onsite services will be gradually eliminated, VDH has been directed to develop "hardship guidelines" under which VDH will remain as a provider of last resort for onsite sewage system and private well evaluation and design services.

## 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 2018, DMLR's AML program addressed over 641 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 2018, TMDL offset projects were calculated to reduce total suspended solids loads to coalfield streams from NPS pollution by 304 tons and total dissolved solids loads by 6,700 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 December 20, 2018, a total of 3,156 sites have been inventoried in 576 of Virginia's 1,247 watersheds, or 46.2% 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 10.3% of the inventoried orphan mineral mines.

## URBAN PROGRAMS

With regard to nutrient management, more than 65,000 acres of urban areas now have nutrient management practices in place. This total includes approximately 28,787 acres on 316 golf courses with nutrient management plans that DCR contracts to private planners. DCR has completed the golf course project at this time and will be working with courses over the next 18 months on plans that will expire for renewal.

## CHESAPEAKE BAY INITIATIVES AND POLLUTION REDUCTIONS

The Chesapeake Bay 2018-2019 Programmatic Milestones, approved by EPA in July 2018, are part of an accountability framework established to ensure ongoing implementation of the Watershed Implementation Plan (WIP) and Chesapeake Bay TMDL. Cheapeake Bay Act implementation continued during FY18. From September 2017 to September 2018, Chesapeake Bay Preservation Act compliance reviews were initiated for 14 localities. Eleven of those reviews have been completed. A total of 53 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 2017 annual report cycle, a total of 131 soil and water quality conservation assessments were conducted, and 17,099 septic systems were pumped out.

# 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, urban runoff, rural runoff, and improper animal waste, mining, and forestry practices. Pollutants from these sources including nutrients, sediment, and bacteria, typically accumulate on land from where they are 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 a 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?

The Virginia Department of Environmental Quality (DEQ) is the lead agency for the Commonwealth's NPS 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. DEQ is working to develop an update of the five-year plan for October 2019-September 2024.

# Chapter 2 – Accomplishments in TMDL Development and Implementation, Watershed Restoration, and Local Water Quality Improvements

## TMDL Development and Implementation Process

Virginia manages water quality of its streams, lakes, reservoirs and tidal waters though a continuing planning process modeled after Section 303 of the Clean Water Act. To address NPS pollutant loads, impaired waterbodies in Virginia (those that do not meet water quality standards) are identified and restored through an approach involving the ongoing, interrelated processes of water quality monitoring, assessments, TMDL development, and TMDL implementation.

## TMDL Development and Implementation Goals

Figure 2-1 summarizes the Virginia fiscal year 2018 (FY18) goals for each step in the process to identify and restore impaired waters in Virginia.

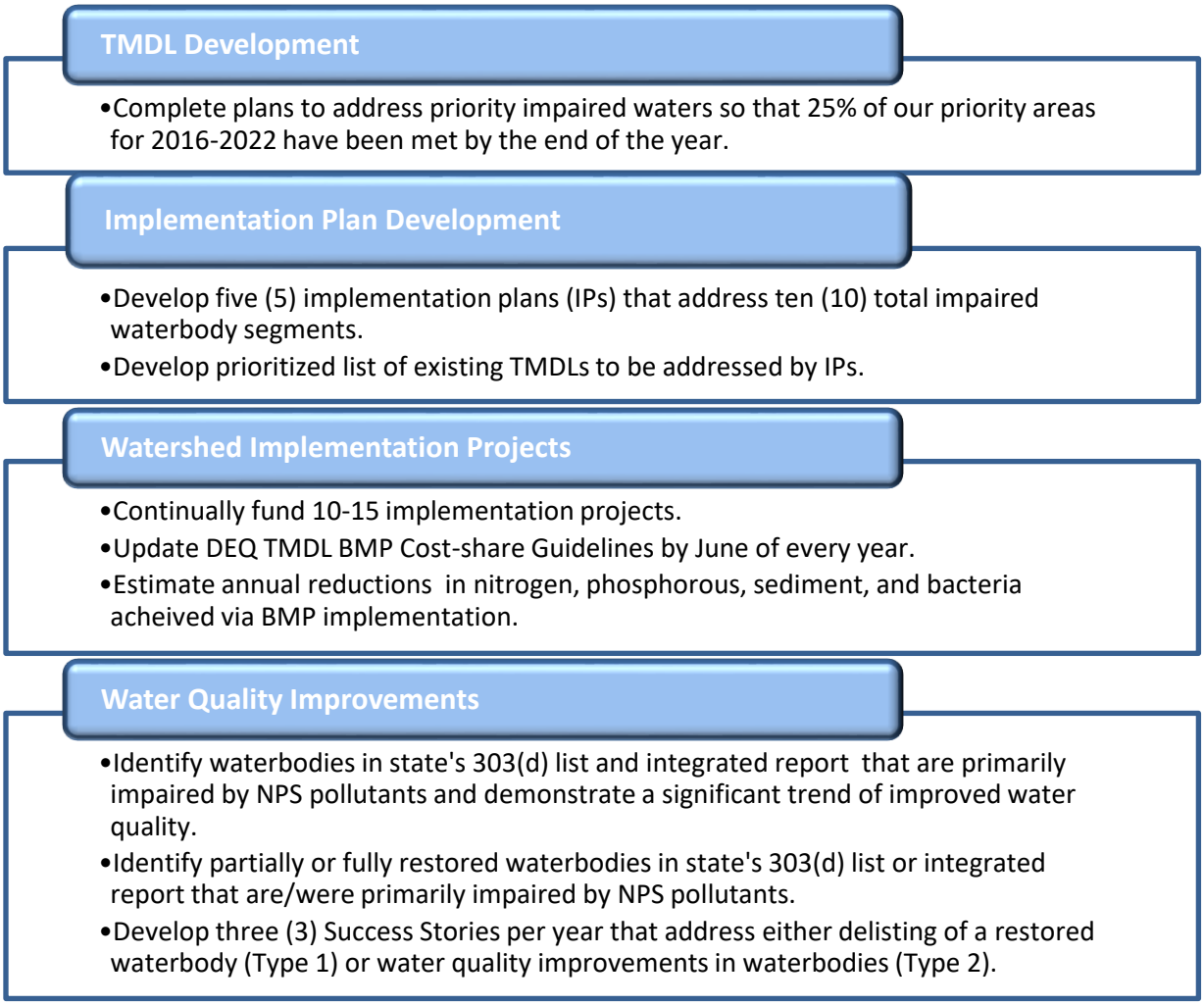


**Figure 2-1: General goals of the TMDL development, planning, and implementation program for FY18**

## TMDL Development and Implementation Progress

### TMDL Development Progress

Figure 2-2 shows the number of TMDL equations by pollutant across Virginia since the inception of the TMDL program in 2001. As of June 2018, 44 TMDL equations (28 new, 16 revised), each representing a watershed area draining to impaired surface waters, have been approved by EPA since July 2017 (FY18). Therefore, 24% of priority area TMDLs were developed and approved in VAFY18, just short of the goal of addressing 25% of priority areas.

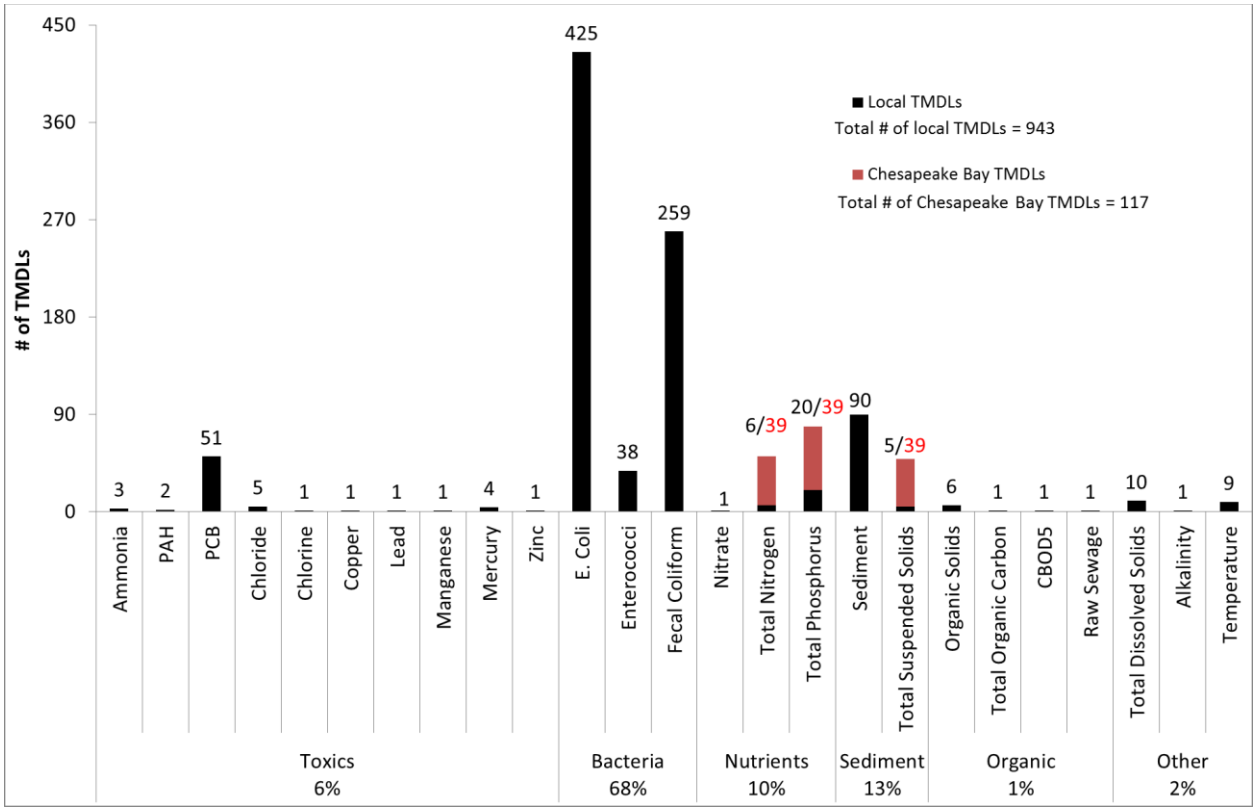


**Figure 2-2: TMDL equations developed since 2001, classified by pollutant**[1]

Based on the 2016 Integrated Report, Virginia estimates that 8,358 miles of rivers, 79,901 acres of lake, and 2,046 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 plans that outline BMP implementation strategies in predominantly nonpoint source (NPS) polluted watersheds
- developing TMDLs that are more easily implemented

[1] The graph includes TMDL equations reported previously and newly adopted equations. In some instances, previously established TMDLs were superseded by revised TMDLs. Supersession can be one equation replacing another or one equation replacing many equations.

Starting in the winter of 2014, DEQ began prioritizing watersheds for TMDL development, TMDL alternative development for the six-year window, 2016-2022. Watersheds are prioritized based on types of impairment, public interest, available monitoring, 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. Most recently in 2018, EPA gave states the opportunity to adjust their priorities lists to adapt to changes in program resources. This revised list was noticed for public comment on April 2, 2018. The comment period ended on May 4th, 2018 with no comments received, after which the list was finalized and submitted to EPA. The priority watersheds through 2022 include 3,710 river and stream miles, 4,699 acres for lakes and reservoirs, and 268 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.

## IP Development Progress

In FY18, DEQ and other partners developed three (3) IPs addressing 16 impaired segments; these have been approved by EPA. 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 FY18.

**Table 2-1: TMDL implementation plans completed or under development during FY18**

| Watershed (# of impairments / # of impaired segments) | Location (county or city) | Impairment | Status |
|---|---|---|---|
| **Cromwells Run, Little River, Upper Goose Creek (3/3)** | Fauquier, Loudoun | Bc | C** |
| **Little Calfpasture River (1/1)** | Augusta, Rockbridge | Be (sed) | C** |
| **Powell River, North Fork Powell, South Fork Powell, Butcher Creek, Wallen Creek (12/10)** | Lee, Wise | Bc, Be (sed) | C** |
| **Dan River- Birch Creek, Byrds Branch, Doubles Creek, Fall creek,Sandy Creek (94/94)** | Carroll, Floyd, Halifax, Henry, Patrick, Pittsylvania | Bc | C* |
| **Yeocomico River (13/13)** | Northumberland, Westmoreland | Bc | UD |
| **Accotink Creek (3/3)** | Fairfax, Fairfax County | Chloride | UD |
| **Woods Creek IP (1/1)** | Lexington, Rockbridge | Bc | UD |
| **Bullpasture River IP (1/1)** | Bath, Highland | Bc | UD |
| **Mattaponi River IP (14/14)** | Caroline, King and Queen, Spotsylvania | Bc | UD |

*Impairment types: Bc = bacteria, Be = Benthic, Sed = sediment*
*Status "C" = IP complete in FY18; Status "UD" =IP under development*
**IP has been completed and submitted to USEPA, but not yet approved.*
***IP has been approved by USEPA, but not yet approved by the State Water Control Board.*

Since 2001, Virginia has completed 90 IPs that address 476 impairments. Figure 2-3 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.

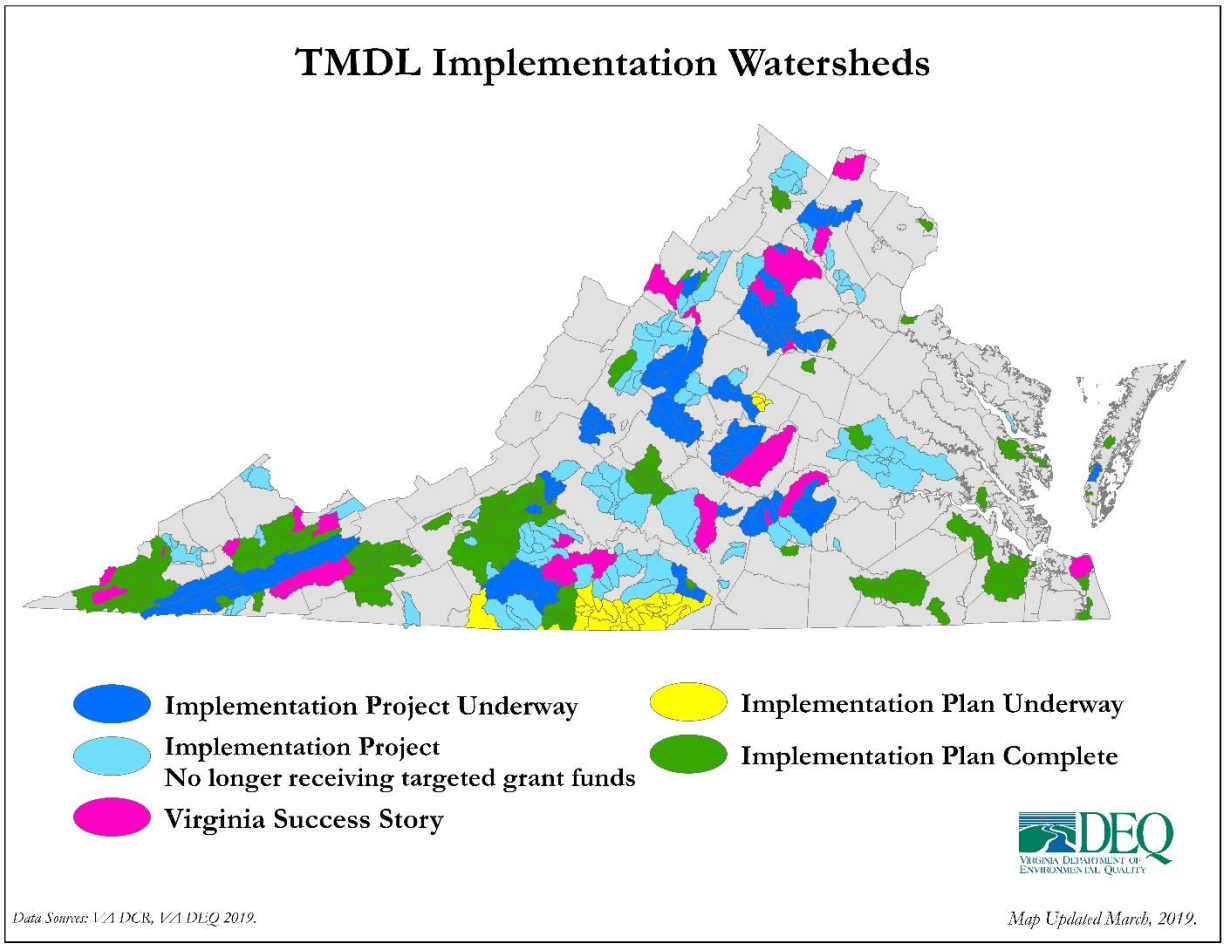


**Figure 2-3: Status of planning and implementation of IPs by watershed through August 2018**

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 2018, the ratio of plans to impairments was five-to-one. Figure 2-4 below demonstrates the overall trend in numbers of IPs and impairments addressed.

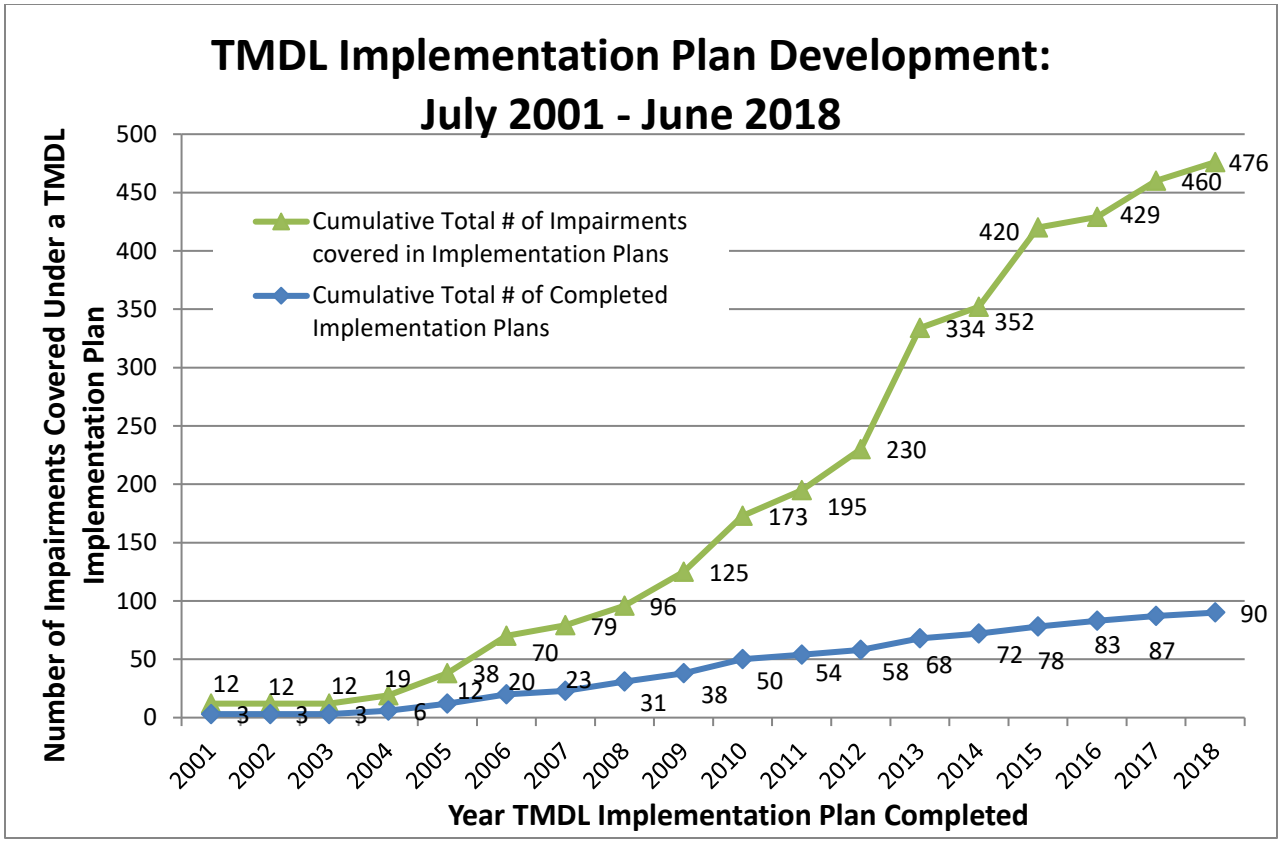


**Figure 2-4: Cumulative summary of TMDL IP development and number of impairments addressed by each IP**

The rate of TMDL IP development exceeds the current goals stated in the 2014 Nonpoint Source Program Management Plan. As of 2018, Virginia has exceeded the goal for number of impairments addressed in IPs by 24%; in fact, as of June 2018, Virginia has already exceeded its 2019 goal by 22%.

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

| Goal | FY14 Baseline | FY17 Goal | FY18 Goal | FY19 Goal | FY17 Actual | FY18 Actual | % Progress of FY17 Goal | % Progress of FY18 Goal | % Progress of 2019 Goal as of FY18 |
|---|---|---|---|---|---|---|---|---|---|
| # of Implementation and Watershed Plans Completed | 72 | 89 | 95 | 102 | 88 | 90 | 99% | 94.7% | 88% |
| # of Impairments Addressed by Implementation Plans | 354 | 375 | 383 | 390 | 460 | 476 | 123% (exceeds) | 124% (exceeds) | 122% (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)). Table 2-3 summarizes implementation for the projects active in FY18 including the years and sources of implementation funding.

**Table 2-3: 319(h)-funded TMDL implementation Plan projects active in Virginia, fiscal year 2018**

| Implementation Plan | Years of Implementation and Funding |
|---|---|
| Beaver Creek and Little Creek | Special 2018 Livestock Exclusion Funding |
| Briery, Little Sandy, Spring, Saylers Creeks and Bush River | §319(h): 2016-2019 (residential)<br>WQIF/VNRCF: 2007-2015 (agriculture) |
| Buffalo Creek, Colliers Creek and Cedar Creek | §319(h): 2018-2020 |
| Chestnut Creek | §319(h): 2016-2018 |
| Cripple Creek and Elk Creek | Special 2018 Livestock Exclusion Funding |
| Chickahominy River | §319(h): 2015-2018 (No BMPs Reported) |
| Flat, Nibbs, Deep and West Creeks | §319(h): 2015-2019 (septic); WQIF/VNRCF: 2007-2015 (agriculture) |
| Hardware and North Hardware River | §319(h): 2015-2019 |
| Linville Creek | §319(h): 2015-2019 |
| Little Dark Run and Robinson River | §319(h): 2015-2021 |
| Middle Clinch River | Special 2018 Livestock Exclusion Funding |
| North Fork Holston River – Scott County | §319(h): 2017-2020 (Residential Only) |
| North Fork Holston River – Washington County | §319(h): 2017-2020 |
| Opequon Creek Watershed | Special 2018 Livestock Exclusion Funding |
| Slate River and Rock Island Creek | §319(h): 2010-2020 |
| Smith River and Mayo River | §319(h): 2015-2017, 2018-2020 (Residential Only) |
| South River and Christians Creek | §319(h): 2017-2020 (Agriculture Only) |
| Tye River, Hat Creek, Rucker Run, and Piney River | §319(h): 2015-2021 |
| Upper Clinch River Watershed | §319(h): 2016-2019 |
| Upper Hazel River, Hughes, Rush, and Thornton Rivers | §319(h): 2009-2019, VNRCF: 2011-2015, WQIF: 2007-2009; 2016-2019 |
| Upper Rapidan River | §319(h): 2016-2021 |
| Upper York River (Orange County) | §319(h): 2012-2019, VNRCF: 2012-2015; WQIF: 2016-2019 |
| 319(h) = Federal EPA Nonpoint Source Implementation Grant; WQIF = Watershed Improvement Fund; VNRCF = State Virginia Natural Resources Commitment Fund | Note: Although not referenced specifically above, all projects had active agricultural implementation from DCRs' VACS program through FY18. Please note that in FY18 DEQ conducted a one-time Livestock Stream Exclusion Initiative that funded work in 4 watershed without concurrent, full-scale implementation projects. |

The 22 implementation projects listed above were supported in part by federal EPA §319(h) grants. Of these, 20 projects successfully installed BMPs in FY18 and collectively spent $5,724,686 in state, federal and private funds on 669 BMPs installed in 20 IP areas encompasing 69 Implementation watersheds. In

addition, DCR and other partners administered federal, state, and private funds, partly through the Virginia Agricultural Cost Share (VACS) program, to install an additional 1,652 BMPs in 62 IP areas and 136 TMDL watershed implementation plan areas totalling $11,417,754 in BMP costs. A total of 2,321 BMPs were installed in 76* IP areas encompassing 185* IP watershed areas. Table 2-4 below summarizes the BMP installation in implementation plan areas, distinguishing implementation that was and was not coordinated by DEQ.

**Table 2-4: Summary of BMP installation by coordination of work (DEQ or otherwise), FY18**

| Coordination of Work | # of IP Reports | # of IP Watersheds | # of BMPs | Total BMP Cost | % of BMP | % of Funding | % # of IP Watersheds |
|---|---|---|---|---|---|---|---|
| Coordinated by DEQ | 20 | 69 | 669 | 5,724,686 | 29% | 33% | 34% |
| Not Coordinated by DEQ | 62 | 136 | 1,652 | 11,417,754 | 71% | 67% | 68% |
| **Total** | **76*** | **185*** | **2,321** | **$17,142,440** | -- | -- | -- |

*Some IPs include BMP installations both coordinated and not coordinated by DEQ. Note that 2 implementation projects coordinated by DEQ in FY18 did not complete BMPs

Implementation was almost evenly split between work within and outside of the Chesapeake Bay drainage. Of the BMPs installed, 48% were outside of the Chesapeake Bay, accounting for 51% of the total BMP funding and working in 44% of the implementation plan watersheds. Table 2-5 below summarizes the BMP installation in implementation plan areas within the Chesapeake Bay drainage basin and activity outside of the Chesapeake Bay.

**Table 2-5: Summary of BMP installation by water basin, FY18**

| Watershed Drainage Basin | # of IP Reports | # of IP Watersheds | # of BMPs | Total BMP Cost | % of BMP | % of Funding | % # of IP Watersheds |
|---|---|---|---|---|---|---|---|
| Chesapeake Bay | 43 | 110 | 1,213 | $8,316,821 | 52% | 49% | 567% |
| Outside Chesapeake Bay | 33 | 88 | 1,108 | $8,825,620 | 48% | 51% | 44% |
| **Total** | **76** | **198** | **2,321** | **$17,142,440** | **100%** | **100%** | **100%** |

In FY18, a total of 2,321 BMPs were installed costing a total of $11,902,176 of federal,state and other funds and $5,240,265 of landowner contributions for an overall total of $17,142,440 spent on BMPs in watersheds with TMDL implementation plans. A total of 359 BMPs were installed with partial or full funding from Federal Section 319(h) funding from the EPA. A summary of FY18 funding for BMP implementation in TMDL watershed areas is provided in Table 2-6 below.

**Table 2-6: Summary of BMP installation by funding source within IP watersheds, FY18**

| Funding Source(s) | # of BMPs | $ of Cost-share Paid | $ of Landowner contribution | Total BMP Cost |
|---|---|---|---|---|
| Federal-319H | 345 | $574,082 | $323,007 | $897,090 |
| Federal-319H & State **Funding** | 14 | $401,069 | $4,716 | $405,785 |
| Federal-NRCS_RCPP | 16 | $160,124 | $388,414 | $548,538 |
| Local Funding | 5 | $94,947 | $2,159 | $97,105 |
| Not Specified | 428 | $0 | $1,594,446 | $1,594,446 |
| State-CREP | 69 | $320,227 | $467,444 | $787,671 |
| State-VACS | 1,351 | $10,217,800 | $2,389,013 | $12,606,813 |
| State-VACS & Remediation Funds | 2 | $76,304 | $2,961 | $79,265 |
| State-WQIF | 91 | $57,622 | $68,105 | $125,727 |
| **Grand Total** | **2,321** | **$11,902,176** | **$5,240,265** | **$17,142,440** |

Each watershed presents unique opportunities and challenges that affect the success of BMP implementation. Table 2-7 itemizes BMP installations and related costs in the 76 TMDL implementation plans and 194 implementation watersheds that received cost-share funds in FY18.

**Table 2-7: Cost-share funds spent on implementation in FY18 classified by TMDL watershed**

| TMDL Implementation Plan & TMDL Implementation Watershed | # BMPs | Cost-Share Paid | Landowner Contribution | Total Cost |
|---|---|---|---|---|
| Back Bay Watershed | 15 | $28,531 | $0 | $28,531 |
| Back Creek | 3 | $104,067 | $2,645 | $106,712 |
| Banister River, Winn Creek, and Terrible Creek | 4 | $38,083 | $4,595 | $42,678 |
| Beaver Creek and Little Creek | 12 | $77,188 | $4,169 | $81,356 |
| Big Otter River Watershed | 18 | $1,078,086 | $389,524 | $1,467,610 |
| Blackwater River (Upper, Middle, North Fork and South Fork) | 7 | $151,451 | $51,197 | $202,648 |
| Buffalo Creek, Colliers Creek and Cedar Creek | 8 | $15,719 | $25,695 | $41,413 |
| Carter Run, Great Run, Deep Run and Thumb Run | 9 | $36,033 | $0 | $36,033 |
| Catoctin Creek | 16 | $40,935 | $11,453 | $52,389 |
| Cedar Creek, Hall Creek, Byers Creek and Hutton Creek | 4 | $2,276 | $0 | $2,276 |
| Chestnut Creek Watershed | 7 | $11,102 | $4,731 | $15,833 |
| Chickahominy River and Tributaries | 42 | $80,222 | $0 | $80,222 |
| Chowan River Watershed | 213 | $253,166 | $103,926 | $357,092 |
| Chuckatuck and Brewers Creek | 4 | $25,282 | $0 | $25,282 |
| Clinch River and Cove Creek | 20 | $605,617 | $74,352 | $679,969 |
| Cooks Creek and Blacks Run | 15 | $5,189 | $100,626 | $105,815 |
| Crab Creek | 2 | $26,472 | $7,611 | $34,083 |
| Craig Run, Browns Run and Marsh Run | 5 | $25,620 | $5,891 | $31,511 |
| Cripple Creek and Elk Creek | 31 | $346,869 | $90,662 | $437,531 |
| Cub Creek, Turnip Creek, Buffalo Creek and UT to Buffalo Creek | 4 | $125,236 | $1,076 | $126,312 |
| Fairview Beach | 1 | $728 | $0 | $728 |
| Falling River | 3 | $60,799 | $11,179 | $71,978 |
| Flat, Nibbs, Deep and West Creeks | 46 | $270,731 | $303,806 | $574,537 |
| Goose Creek | 15 | $134,260 | $27,263 | $161,522 |
| Greenvale, Paynes and Beach Creeks | 9 | $5,363 | $6,964 | $12,326 |
| Guest River | 2 | $22,605 | $12,143 | $34,748 |
| Hardware and North Fork Hardware River | 24 | $209,144 | $15,348 | $224,492 |
| Hawksbill Creek and Mill Creek | 8 | $81,589 | $38,269 | $119,858 |
| Hays, Moffatts, Walker and Otts Creeks | 15 | $81,407 | $24,157 | $105,564 |
| Holmans Creek | 5 | $40,147 | $2,635 | $42,782 |
| James River - Lynchburg | 3 | $70,339 | $170,609 | $240,947 |
| James River and Tributaries - City of Richmond | 40 | $146,335 | $6,321 | $152,656 |
| Kings Creek | 1 | $1,941 | $0 | $1,941 |
| Linville Creek Watershed | 37 | $56,942 | $148,590 | $205,533 |
| Little Calfpasture River | 3 | $22,305 | $24,614 | $46,919 |
| Little Dark Run and Robinson River | 91 | $448,677 | $24,870 | $473,547 |
| Little River Watershed | 3 | $64,949 | $53,326 | $118,275 |
| Long Meadow Run and Turley Creek | 19 | $80,072 | $141,617 | $221,689 |
| Looney Creek | 1 | $12,296 | $2,918 | $15,214 |

| TMDL Implementation Plan & TMDL Implementation Watershed | # BMPs | Cost-Share Paid | Landowner Contribution | Total Cost |
|---|---|---|---|---|
| Lower Banister River | 13 | $87,360 | $9,101 | $96,461 |
| Lower Blackwater River, Maggodee and Gills Creek | 6 | $100,381 | $22,522 | $122,903 |
| Middle Clinch River | 13 | $761,093 | $176,233 | $937,325 |
| Middle Fork Holston River and Wolf Creek | 40 | $166,351 | $16,330 | $182,681 |
| Middle River Watershed | 57 | $56,629 | $35,541 | $92,170 |
| Mill Creek, Montgomery County | 2 | $0 | $10,880 | $10,880 |
| Mill Creek, Northampton County | 3 | $6,312 | $0 | $6,312 |
| Mill Creek, Powhatan Creek Watersheds | 1 | $1,864 | $0 | $1,864 |
| Mossy Creek, Long Glade Run and Naked Creek | 58 | $267,275 | $114,714 | $381,989 |
| North Fork Holston River Watershed | 37 | $389,689 | $132,747 | $522,436 |
| North Landing Watershed (including Milldam, Middle, West Neck and Nanney Creeks) | 25 | $58,461 | $0 | $58,461 |
| North River | 52 | $154,608 | $522,484 | $677,092 |
| Occohannock Creek | 8 | $7,781 | $2,627 | $10,408 |
| Opequon Creek Watershed | 3 | $75,948 | $22,338 | $98,285 |
| Piankatank River, Gwynns Island, Milford Haven | 65 | $51,410 | $0 | $51,410 |
| Pigg River and Old Womans Creek Watersheds | 28 | $661,778 | $162,071 | $823,849 |
| Reed Creek Watershed | 32 | $381,487 | $141,391 | $522,878 |
| Rockfish River Watershed | 2 | $300 | $350 | $650 |
| Slate River and Rock Island Creek | 70 | $134,906 | $126,670 | $261,576 |
| Smith Creek Watershed | 23 | $46,032 | $313,241 | $359,273 |
| Smith River and Mayo River Watersheds | 27 | $372,325 | $61,901 | $434,226 |
| South River Watershed and Christians Creek | 80 | $260,064 | $126,148 | $386,212 |
| Spout Run | 2 | $94,527 | $31,971 | $126,498 |
| Spring Creek, Briery Creek, Bush River, Little Sandy River and Saylers Creek | 57 | $98,112 | $176,953 | $275,065 |
| The Gulf, Barlow, Mattawoman, Jacobus and Hungars Creeks | 13 | $28,892 | $3,133 | $32,025 |
| Three Creek, Mill Swamp, Darden Mill Run | 504 | $293,141 | $211,897 | $505,038 |
| Tye River, Hat Creek, Rucker Run and Piney River | 36 | $308,840 | $170,707 | $479,548 |
| Upper Banister River and Tributaries | 22 | $282,351 | $201,855 | $484,206 |
| Upper Clinch River and Tributaries | 1 | $54,612 | $0 | $54,612 |
| Upper Clinch River Watershed | 1 | $2,785 | $31,016 | $33,801 |
| Upper Hazel River, Hughes River, Rush River and Thornton River | 69 | $103,805 | $25,840 | $129,645 |
| Upper Nansemond River | 45 | $72,070 | $0 | $72,070 |
| Upper Rapidan River | 95 | $1,041,002 | $71,171 | $1,112,173 |
| Upper Roanoke River - Part 1 | 2 | $9,662 | $9,337 | $18,999 |
| Upper Roanoke River - Part 2 | 4 | $114,845 | $88,075 | $202,920 |
| Upper York River Watershed | 51 | $295,156 | $139,579 | $434,735 |
| Willis River Watershed | 9 | $172,551 | $188,662 | $361,213 |
| **Grand Total** | **2,321** | $11,902,176 | $5,240,265 | $17,142,440 |

## 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 FY18 resulted in the reduction of 2,417,162 pounds of nitrogen, 82,768 pounds of phosphorous, 63,576 tons of sediment, and 4.76E+16 colony forming units (CFU) of fecal coliform bacteria. Tables 2-8 and 2-9 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 2-8: Summary of pollutants reduced through TMDL implementation in FY18**

| 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 | 669 | 1,652 | 2,321 |
| Total Pounds Nitrogen Reduced | 374,818 | 2,042,344 | 2.417,162 |
| Total Pounds Phosphorus Reduced | 15,911 | 66,857 | 82,768 |
| Total Tons Sediment Reduced | 18,046 | 45,532 | 63,579 |
| Total of Bacteria Reduced (cfu) | 1.85E+16 | 2.88E+16 | 4.76E+16 |

**Table 2-9: Summary of BMP implementation for TMDL projects in FY18**

| Practice | Practice Description | # of BMPs | Extent of BMP Installed | Riparian Buffer (Acres) | Units |
|---|---|---|---|---|---|
| CCI-CNT | Long Term Continuous No-Till Planting Systems | 13 | 477 | | Acres |
| CCI-SE-1 | Stream Exclusion - Maintenance Practice | 59 | 327,049 | | Lin. Feet |
| CRFR-3 | CREP Woodland Buffer Filter Area | 34 | 72 | 72 | Acres |
| CRSL-6 | CREP Stream Exclusion with Grazing Land Management | 32 | 67,976 | 59 | Lin. Feet |
| CRWQ-1 | CREP Herbaceous Riparian Buffers | 3 | 4 | 4 | Acres |
| FR-1 | Afforestation of Crop, Hay and Pasture Land | 8 | 147 | | Acres |
| FR-3 | Woodland buffer filter area | 5 | 18 | | Acres |
| LE-1T | Livestock Exclusion with Riparian Buffers for TMDL Imp. | 12 | 49,022 | 42 | Lin. Feet |
| LE-2 | Livestock Exclusion with Reduced Setback | 7 | 18,690 | - | Lin. Feet |
| LE-2T | Livestock Exclusion with Reduced Setback for TMDL Imp. | 2 | 7,366 | - | Lin. Feet |
| RB-1 | Septic Tank Pumpout | 342 | 343 | | Count |
| RB-3 | Septic Tank System Repair | 16 | 16 | | Count |
| RB-3R | Conventional Onsite Sewage Systems Full Inspection and Non-permitted Repair | 11 | 11 | | Count |
| RB-4 | Septic Tank System Replacement | 41 | 41 | | Count |
| RB-4P | Septic Tank System Installation/Replacement with Pump | 8 | 8 | | Count |
| RB-5 | Installation of Alternative Waste Treatment System | 2 | 2 | | Count |
| SL-1 | Long Term Vegetative Cover on Cropland | 22 | 669 | | Acres |
| SL-10T | Pasture Management | 1 | 120 | | Acres |
| SL-11 | Permanent vegetative cover on critical areas | 4 | 7 | | Acres |
| SL-15A | Continuous High Residue Minimal Soil Disturbance Tillage System | 26 | 670 | | Acres |

| Practice | Practice Description | # of BMPs | Extent of BMP Installed | Riparian Buffer (Acres) | Units |
|---|---|---|---|---|---|
| SL-6 | Stream Exclusion With Grazing Land Management | 191 | 761,542 | 708 | Lin. Feet |
| SL-6B | Alternative Water System | 2 | 53 | - | Acres |
| SL-6T | Stream Exclusion with Grazing Land Management for TMDL Imp. | 2 | 8,290 | 7 | Lin. Feet |
| SL-7 | Extension of CREP Watering Systems | 8 | 589 | - | Acres |
| SL-8 | Protective cover for specialty crops | 10 | 341 | | Acres |
| SL-8B | Small Grain and Mixed Cover Crop for Nutrient Management and Residue Management | 1175 | 43,514 | | Acres |
| SL-8H | Harvestable Cover Crop | 237 | 12,412 | | Acres |
| SL-9 | Grazing Land Management | 1 | 30 | | Acres |
| VSL-8B | Voluntary Small Grain and Mixed Cover Crop for Nutrient Management and Residue Management | 5 | 230 | | Acres |
| WP-2 | Streambank protection (fencing) | 5 | 8,066 | 7 | Lin. Feet |
| WP-2A | Streambank Stabilization | 2 | 180 | | Lin. Feet |
| WP-3 | Sod waterway | 2 | 2 | | Acres |
| WP-4 | Animal waste control facilities | 19 | 20 | | Count |
| WP-4B | Loafing lot management system | 2 | 2 | | Sq. Feet |
| WQ-12 | Roof Runoff Management System | 3 | 13,830 | | Acres |
| WQ-4 | Legume Based Cover Crop | 9 | 808 | | Acres |
| | Grand Total | 2321 | | 899 | |

BMP installation efforts in FY18 resulted in the implementation of:
**2,321 BMPs**,
**899 acres of riparian buffer,** and
**237 miles (1,252,002 linear feet) of stream fenced from livestock access,**
**which excluded 13,094 animal units 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; 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 NPS 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 on 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 FY18 goal for number of Success Stories and has exceeded by 9% its FY18 goal for number of segments discussed in those reports (see Table 2-10); two (2) Success Stories were submitted for three (3) impaired watershed segments with water quality improvements attributable to TMDL implementation actions. Table 2-11 lists all 36 Success Stories published since 2001 about Virginia watershed segments that have been partially or fully restored (Type 1 Stories – 26 published) or have shown progress toward achieving water quality goals (Type 2 stories – 10 published). Links to those Stories are provided where available.

**Table 2-10: Summary of Success Story goal attainment, FY18**

| Type of Success Story | Goal Unit | FY14 Baseline | FY17 Goal | FY17 Actual | FY18 Goal | FY18 Actual | FY19 Goal | % Progress of FY17 Goal | % Progress of FY18 Goal | % Progress of 2019 Goal |
|---|---|---|---|---|---|---|---|---|---|---|
| Partial or Full Restoration (Type 1) | Stories | 7 | 10 | 13 | 11 | 15 | 12 | 130% | 136% | 125% |
| Partial or Full Restoration (Type 1) | Segments | 12 | 15 | 23 | 16 | 26 | 17 | 153% | 163% | 153% |
| Significant Water Quality Improvement (Type 2) | Stories | 8 | 14 | 9 | 16 | 9 | 18 | 64% | 56% | 50% |
| Significant Water Quality Improvement (Type 2) | Segments | 9 | 15 | 10 | 17 | 10 | 19 | 67% | 53% | N/A |
| **Major Goal: Total Stories** | **Stories** | **15** | **24** | **22** | **27** | **24** | **30** | **92%** | **89%** | **80%** |
| **Major Goal: Total Stories** | **Segments** | **21** | **30** | **33** | **33** | **36** | **36** | **110%** | **109%** | **100%** |

**Table 2-11: Published Success Stories through FY18**

| 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 | 2001 | Mining |
| 1 | 0 | 1 | Toncrae 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 |

| 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 | 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 | Upper 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 | 2018[1] | TMDL Implementation |
| 1 | 1 | 0 | Stone Creek | 2018[1] | TMDL Implementation |
| 2 | 2 | 0 | Willis River | 2018[2] | TMDL Implementation |
| 1 | 1 | 0 | Dumps Creek | 2018[2] | TMDL Implementation |

[1] These stories were submitted to EPA in 2017 and approved and published by EPA in 2018

[2] These stories were submitted to EPA by 6/30/18 but were not yet approved or published by EPA

DEQ completed two Success Stories in 2018:

1. *Willis River*
   Bacteria primarily from forest and agricultural lands impaired water quality in Willis River causing violations of the state's General Standard for aquatic life. Consequently, two segments (4.83 miles and 15.2 miles) of Willis River were listed as impaired on Virginia's 2008 Section 303(d) Total Maximum Daily Load Priority List and Report. Installing residential and 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.
2. *Dumps Creek*
   Total dissolved solids and suspended solids from coal mine drainage areas impaired water quality in Dumps Creek causing violations of the state's General Standard for aquatic life. Consequently, one segment (3.54 miles) of Dumps Creek was listed as impaired on Virginia's 1994 Section 303(d) Total Maximum Daily Load Priority List and Report. A number of BMPs were implemented in currently and previously mined watershed areas, which helped improve benthic macroinvertebrate communities. These water quality improvements allowed Virginia to remove both segments from the state's impaired waters list in 2016.

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.

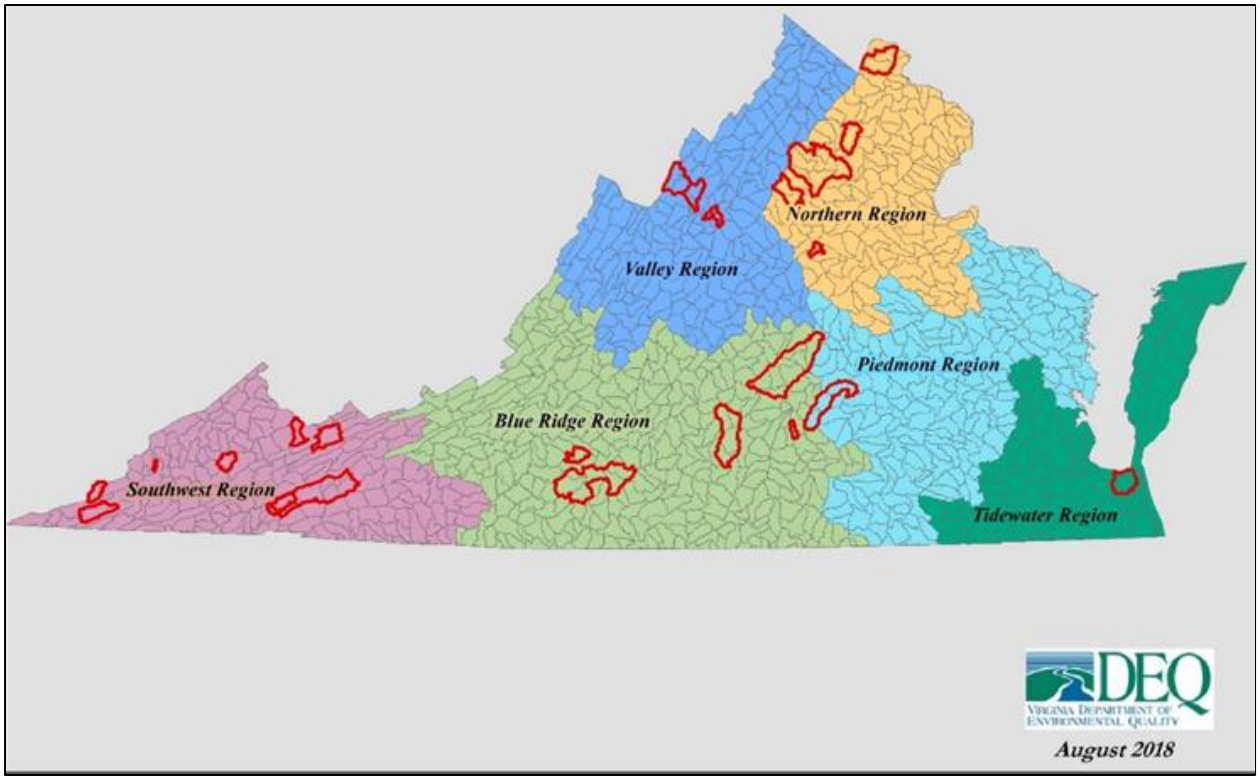


**Figure 2-5: Geographic Location of Virginia watersheds with Success Stories (outlined in red), 2002-2018**

## 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 2018 within many program areas. The TMDL IP Development program continues to exceed annual goals for the number of impairments addressed by IPs or watershed-based plans. The program continues the trend established in 2016 of exceeding its annual and five-year goals and has already exceeded the 2019 goal for the number of impairments covered by an IP.

**Table 2-12: Comparative summary of TMDL and TMDL IP development accomplishments in 2016 vs. 2017vs. 2018**

| Program Area | Metric of Progress | Status: VAFY16 | Status: VAFY17 | Status: VAFY18 |
|---|---|---|---|---|
| TMDL Development | Total # of TMDL equations completed and submitted to or approved by EPA | 45 | 58 | 44 |
| TMDL IP Development | Total # of impairments included in IPs (completed or under development) | 455 | 586 | 602 |
| TMDL IP Development | % of annual goal for impairments addressed by a completed IP | 116% | 123% | 124% |
| TMDL IP Development | % of 2019 goal for impairments addressed by a completed IP | 110% | 118% | 123% |

In 2018, the TMDL Implementation Program saw a decrease in BMP installation within completed Implementation Plan Areas compared to 2017 (see Table 2-13 below). This can be mainly attributed to the decrease in funding allocated to agricultural BMP installation from the state-funded Virginia Agricultural Cost-share Program. However, compared to 2016, the 2018 program still showed a 200% increase in BMP installation. The 2018 program was still able to protect 85 miles of stream from livestock access

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" process improvement exercise, which concluded in fall of 2018.

- As part of a leadership training program for DEQ staff, the 319(h) underwent a "lean" process improvement exercise. This process systematically evaluated procedures, programs, policies and other elements of the Section 319 Nonpoint Source Program to identify process improvements and savings in time or funding, as well as 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 explore ways in which it could increase partner capacity and recruit willing participants. One avenue DEQ explored was to broaden and strengthen its partnerships with other statewide agencies and organizations. In 2018, DEQ began promising collaborations with the Virginia Department of Health and the Southeast Rural Community Assistance Program to help the NPS program strengthen its residential septic program.
- Project partners sometimes struggle to effectively manage and administer their implementation projects. It requires a unique skillset to be able to navigate the administrative details of a nonpoint source subrecipient award while simultaneously marketing and implementing cost-share opportunities. Staff continue to develop tools and resources that will increase implementation projects' success.
    - Staff began to revise project management materials and investigate marketing and promotional options to assist the program to accomplish its goals.
- 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 2-13: Comparative summary of NPS implementation program accomplishments in 2016 vs. 2017 vs. 2018**

| Program Area | Metric of Progress | Status: VAFY16 | Status: VAFY17 | Status: VAFY18 |
|---|---|---|---|---|
| NPS Implementation | # of IPs with BMP installation | 58 | 72 | 76 |
| NPS Implementation | % of completed IPs with BMP Implementation | 70% | 83% | 84% |
| NPS Implementation | # of BMPS installed in IP areas | 881 | 2,759 | 2,321 |
| NPS Implementation | # of BMPS in IP areas funded with 319(h) | 391 | 377 | 345 |
| NPS Implementation | Total state/federal $ for BMPS in IP areas | $8,105,583 | $13,316,377 | $11,902,176 |
| NPS Implementation | Miles of streams excluded from livestock access | 177 | 218 | 237 |
| Success Stories | # of impaired segments addressed by a Success Story | 27 | 33 | 36 |
| Success Stories | % annual goal of # of segments addressed by Success Stories | 100% | 110% | 100% |

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 in 2017 to address residential septic issues. In 2018, DEQ looked at the results of those program improvements.

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.
- DEQ invested heavily in creating and updating a TMDL Implementation Plan and Project tracking system that was integrated into DEQ's Comprehensive Environmental Data System (CEDS). This implementation plan module (IP CEDS) will provide real-world applications for tracking the implementation of goals identified in implementation plans (e.g., watershed-based plans).

# 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 2018, DCR oversaw the completion and installation of over $16.9 million in agricultural BMPs, including over $9.5 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 FY18***

| Costs and Funding Category | Amount |
|---|---|
| Actual BMP Cost | $16,970,659 |
| Total Cost-Share Paid | $9,731,915 |
| State Cost-Share Paid | $9,592,504 |
| Non-State Cost-Share Paid | $139,410 |
| Other Funding Amount | $807,403 |
| Farmer Cost Before Tax Credit | $6,431,342 |
| Tax Credit Amount Issued | $1,164,128 |

*Figures do not include approved BMPs carried forward into FY18 that are awaiting completion.

**Table 3-2: Edge of field nutrient and sediment reductions resulting from state-funded agricultural BMP implementation in FY18***

| Total Nitrogen Reduction (pounds/year) ** | Total Phosphorus Reduction (pounds/year)** | Total Sediment Loss Reduction (tons/year) |
|---|---|---|
| 9,389,383 | 3,137,091 | 856,631 |

*Figures do not include approved BMPs carried forward into FY18 that are awaiting completion.
**Total N and P Reduction numbers now include estimates for nutrient management BMPs.

Priority funding for implementation of livestock exclusion remains an important agricultural program milestone. Applications for 100% state-funded livestock stream exclusion were accepted from January 2013 through June 2015. As of January 2019, there were only $6.2 million in pending applications remaining. Over $95 million has been expended or obligated for a total statewide initiative of $101 million. Through 2018, a total of 2,165 practices have been completed and another 189 have been funded and are awaiting completion. Only 118 practices are awaiting funding. Once completed these 2,472 practices will protect almost 10 million linear feet of stream bank from livestock access.

The United States Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS) state office staff working with DCR to assist with Chesapeake Bay Total Maximum Daily Load Watershed Implementation Plan Phase III. DCR will provide USDA-NRCS with a list of those SWCD that have made the largest commitment to reduction nutrients through the implementation target date of 2025. USDA-NRCS state office has agreed to give these same SWCD greater consideration in ranking of applications for their agricultural BMP assistance programs.

### 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 August 31, 2018, there were 457 plans covering 106,125 acres statewide. Further, the 2018 calendar-year goal of 10,000 acres covered by RMPs in the Chesapeake Bay watershed was surpassed with 69 plans covering more than 14,000 acres (Table 3-3).

**Table 3-3: FY2018 Resource Management Plan (RMP) goal and progress**

| Goal | 2018 Goal | 2018 Actual | % Progress of 2018 Goal |
|---|---|---|---|
| Acres of RMPs developed in the Chesapeake Bay Watershed | 10,000 | 14,000 | 140% (exceeds) |

## Nutrient Management

DCR administers a comprehensive nutrient management program. In FY18, DCR staff prepared *nutrient management plans* on 110,419 acres. Private nutrient management planners have developed or revised nutrient management plans statewide for approximately 500,000 acres. With regard to cumulative nutrient management acreage goals, the 786,000-acre goal for cropland and hay land nutrient management plans was exceeded in previous years but is down by approximately 200,000 acres due in part to fewer plans being written by the private sector.

**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. There are 512 dairies in Virginia. Eighty-two permitted and 245 unpermitted dairies have nutrient management plans. Out of 383 dairies in Virginia's Chesapeake Bay watershed, 52 are permitted and 289 are unpermitted. 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 FY16 for private sector plan writers, $120,000 was for plans on unpermitted animal operations. These contracts expired in June 2018. DCR is currently working to establish new contracts with the private sector. 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, 2018, 5,700 tons of litter had been shipped outside of Virginia's Chesapeake Bay watershed. DCR worked with the Virginia Poultry Federation and turkey integrators to incorporate actual turkey production data into the Phase 6 Chesapeake Bay Model. The findings of this study indicated that the total population of turkeys in Virginia was over-estimated by 27 percent. The reflected changes have been integrated into the Bay model for Virginia.

## Agricultural Stewardship Act - 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, 2017 through March 31, 2018, VDACS-ASA program staff responded to 60 official water quality complaints. In 24 of the 60 complaints (40%), 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 91 small AFOs remain to be evaluated out of the 800 identified in the Chesapeake Bay Watershed Implementation Plan (WIP). This number is down from 95 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 FY18, VDOF field personnel inspected 4,774 timber harvest sites across Virginia on 216,077 acres – a slight decrease from the number of acres harvested in FY2017 (Figure 3-1).

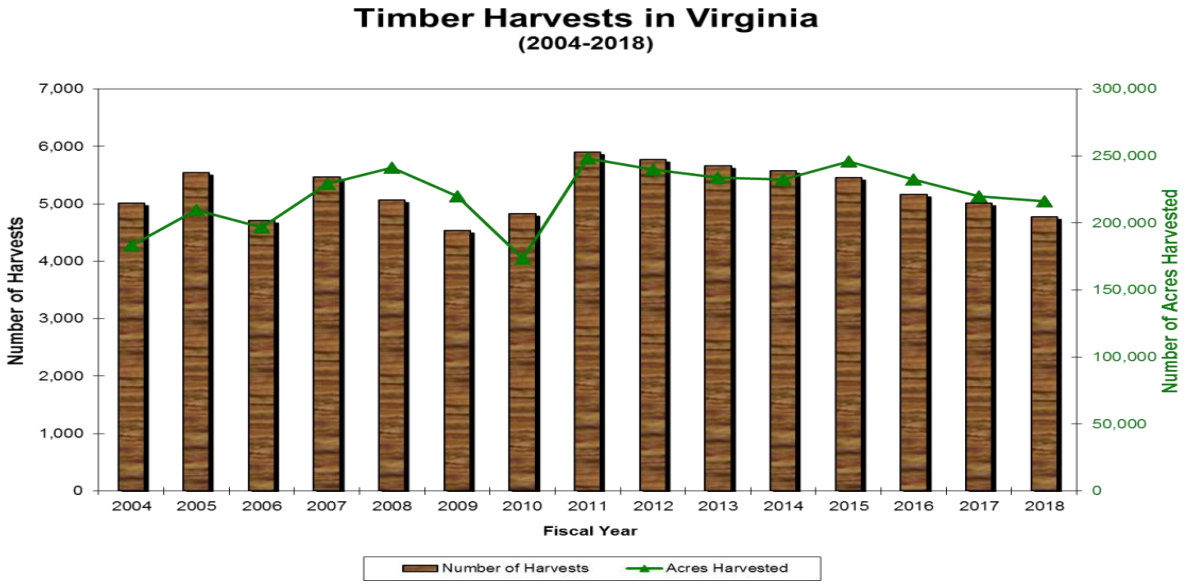


**Figure 3-1: Number of harvests inspected and total number of acres harvested: 2004 through 2018**

## Logger Education

VDOF was involved in 20 Logger education programs in FY18, educating 606 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 9,272 harvesting professionals in 304 programs relating to water quality protection since its inception. Figure 3-2 exhibits historical levels of participation in VDOF logger education programs since 2004.

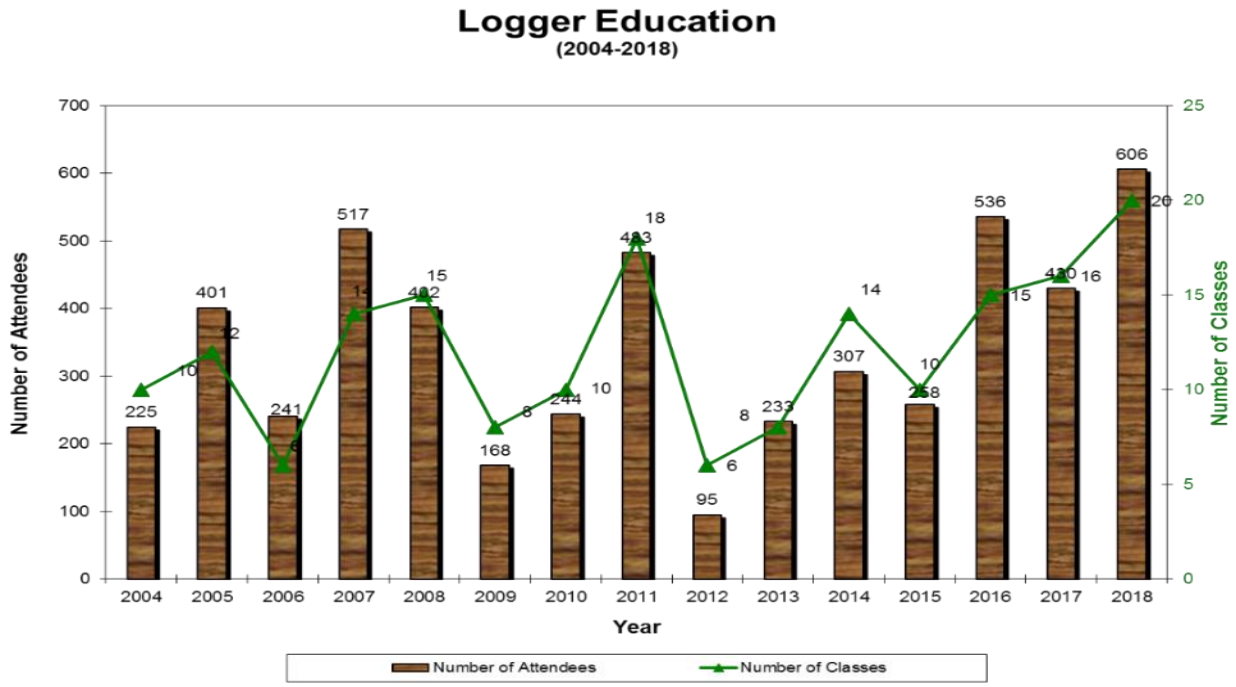


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**Figure 3-2: VDOF logger education: 2004 through 2018**

## Riparian Forest Buffers Technical Assistance

VDOF provides technical forestry expertise in the planning and creation of riparian buffers. In FY18, 68 riparian buffer establishment projects were reported for 159.3 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

This voluntary measure assures an unbroken forest groundcover near streams, 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. For Tax Year 2017, VDOF issued Riparian Forest Buffer tax credits on 65 applications covering 996.1 acres of retained forested buffers. The tax benefit to forest landowners was $16,549.45 on timber valued at $1,750,212.61.

## Easement Program

The conservation easement program to maintains large, unfragmented blocks of forestland to ensure the land is available for forest management in perpetuity. Today, VDOF holds 169 conservation easements in 56 counties and the City of Suffolk that permanently protect nearly 50,000 acres of vital forestland, making the Department the second-largest holder of conservation easements in Virginia. In FY18, the easement

program permanently protected 7,824 acres of open space and more than 39 miles of water courses through 24 conservation easements.

### 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. In addition to comprehensive plans, foresters may prepare plans for portions of properties or smaller areas, briefer plans to meet requirements for forest use-value taxation in some counties, or plans for implementing specific practices. In total for FY18, nearly 3,600 plans were prepared on nearly 164,500 acres.

### 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 will also make it easier for reporting TMDL progress for 2018 and beyond, when the Bay model will be revised.

### 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 2018 (most recent year of available data), 93.3 percent of the timber harvest acres in Virginia conducted within the boundaries of the Bay Watershed were under BMPs. The reduction of 3.3 percent from 2017 is attributed to the wet conditions of fiscal year 2018. The audit also showed that 100 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

VDOF is a reviewing agency for DEQ's and the Virginia Department of Transportation's (VDOT) environmental impact review processes. The agency evaluates proposed projects to identify the forest resources that may be impacted, provide assessments, and provide recommendations and comments pertaining to forest health, conservation, management and mitigation needs aimed at conserving Virginia's forest resources in keeping with state executive policy and/or as part of the federal consistency determination/certification process. 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 in numerous cases. DEQ has also provided project sponsors with special forestland mitigation guidance developed by VDOF in its environmental impact review instructions. VDOF has also been partnering with the Commonwealth's other natural resource agencies to look beyond the direct footprints of proposed long, linear infrastructure projects to measure the indirect impacts of forest fragmentation. VDOF was instrumental in creating the Virginia Forest Conservation Partnership (VFCP), forged to better leverage agency and organization missions, forest conservation and forest mitigation initiatives, and

available conservation financing. The group most recently provided analysis to state executive offices on the potential impact on Virginia's forest resources of the construction of multiple proposed projects to assist in refining potential mitigation options.

### 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). Thirty stream protection projects were funded in FY 2017-18 that are using portable bridges to provide stream crossing protection across the site during and after harvesting. In addition, 24 additional projects were funded under the "Virginia Trees for Clean Water" utilizing funds from the Commonwealth's WQIF. These projects included tree planting for establishment of riparian forest buffers as well as some stormwater retrofit projects that incorporated trees.

### Virginia Trees for Clean Water

Through its Virginia Trees for Clean Water program, VDOF is improving water quality across the Commonwealth by promoting on-the-ground tree planting efforts. To date, VDOF has assisted 123 projects resulting in more than 45,250 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

Since 2015, VDOF has partnered with other Chesapeake Bay jurisdictions and internally within Virginia with the Rappahannock River Basin Commission and other partners in leading a landscape-scale, Chesapeake Bay-wide initiative called the Healthy Watershed Forest/TMDL project. In Phase I of the project, Virginia successfully illustrated that 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. In Phase II, Pennsylvania peer-reviewed and validated Virginia's Phase I quantification methodology by applying it to a Pennsylvania watershed study area. In Virginia, the project team engaged in more than 60 discussion and discovery sessions in the field over a year-long period 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. The findings of Phases I and II of the project contributed significantly to the December 2017 decision of the Chesapeake Bay Program management committee to credit forestland retention in the 6.0 version of the TMDL model. In addition, the Virginia General Assembly in its 2018 session legislated some of the changes recommended by the localities in Phase II aimed at prioritizing forestland retention to meet water quality objectives.

Phase III of the project began in the spring of 2018 and will continue for up to two years. Funding is provided by the Chesapeake Bay Program through the Chesapeake Bay Trust and the U.S. Endowment for Forests and Communities. The goal of Phase III is to address challenges associated with creating the policy and financial infrastructure needed to facilitate forest and agricultural land conservation/retention on a sustainable, Chesapeake Bay-wide basis. The Phase III team will work with landowners and other county stakeholders to develop specific policies and financial benefits to landowners and taxpayers to achieve the environmental goals. It will consist of two programmatic tasks: (1) work with two Rappahannock River basin localities to develop and implement plans, policies, and ordinances to foster high quality (HQ) forest and HQ agricultural land retention; and (2) work with the financial community to develop long-term funding mechanisms supported by the private sector. A third integrating task will focus on coordinating with other Chesapeake Bay program workgroups to institutionalize findings and recommendations on a concurrent basis.

### 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 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.

VDOF has established a six-acre longleaf pine orchard at its New Kent Forestry Center near Providence Forge, Virginia. With use of improved grafting techniques, cone-bearing trees are expected by 2020, and seed production is planned to provide an annual crop of 250,000 seedlings, many of these will be grown as containerized stock at the Garland Gray Forestry Center in Sussex County, Virginia.

### Project Learning Tree

During 2018, Project Learning Tree (PLT) has provided three professional development trainings to support Meaningful Watershed Educational Experiences (MWEE) and watershed education. In May, a two-day MWEE Institute funded by a NOAA BWET grant to the VRUEC who contracted PLT was held at the New Kent Forestry Center for 25 science lead teachers and coordinators. A four-day MWEE Institute led by VDOF/PLT and VDGIF in partnership with VDOE through a NOAA BWET grant was held in June at Mathews State Forest for 15 educators. A five-day Ecology Institute held at New Kent Forestry Center on July 23 -27 for ten high school Biology and Ecology teachers funded jointly by PLT and VDOE focused on investigating watersheds and aquatic ecosystems. VDOF/PLT also participated in Back to the Bay Day at Brown's Island on June 9 to teach citizens about the importance of riparian buffer zones in keeping our waterways clean.

### 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 FY18, the VDOF was involved with 192 water quality actions initiated under the Silvicultural Law. Two (2) resulted in Special Orders being issued for violations of the law.

## 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. 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), originally designed to assist individuals with planning and land use decisions.

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.

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

New partnerships have been explored with those in the land protection and land brokering industry to advance the protection of lands directly benefiting Healthy Waters. 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, DEQ, 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.

## 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, 2017 through June 30, 2018, VDH issued 9,079 new construction permits; 1,431 were for installation of *alternative onsite sewage systems* (AOSS). During the same period, VDH issued 3,347 repair permits statewide; 263 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)

Historically, the Virginia Environmental Information System (VENIS) is the main recordkeeping tool for the agency's environmental health programs. In March of 2018, VDH began a yearlong database transition to a proprietary cloud-based system. This new system, scheduled to be fully deployed by April 2019, will replace VENIS, facilitate better data collection, and provide advanced environmental health informatics capabilities. VDH will continue working towards a complete inventory of all onsite sewage systems in the Commonwealth using the new system. However, even with the new database, this project has limitations, such as the ability to collect data due to regulatory authority.

### 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 732 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. 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 from VDH to the private sector. This shift in services will allow VDH to focus its limited resources on health monitoring, data collection and sharing, providing quality assurance inspections of private sector work, developing policies to improve health, and providing reasonable enforcement and programmatic oversight. To help implement this strategic vision, the General Assembly passed two bills in 2018 relevant to the onsite program, House Bill (HB) 887 and HB 888. HB 888 directs VDH to take steps to eliminate evaluation and design services currently provided by VDH staff. VDH already required private sectors evaluations and designs for AOSS and non-residential systems; HB 888 affects evaluation and design of conventional onsite sewage systems and private wells. Although most onsite services will be gradually eliminated, the bill directs VDH to develop "hardship guidelines" under which VDH will remain as a provider of last resort for onsite sewage system and private well evaluation and design services.

The General Assembly also passed HB 887, which revised the definition of maintenance to include the adjustment or replacement of certain onsite sewage system components (e.g., conveyance lines, distribution boxes). This eliminates the permit requirement to conduct these adjustments or replacements, thus streamlining the process to allow owners to correct sewage failures faster. Another bill, HB 885, would have provided VDH authority to develop operation and maintenance requirements for conventional onsite sewage systems; however, the bill was continued to 2019. The bill would have provided an avenue for VDH to improve reporting of septic BMPs through reporting of conventional onsite sewage system pump-outs to VDH. The bill may have also helped in developing a complete inventory of onsite sewage systems.

### 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 FY18, DEQ provided funding to pump out septic systems, repair or replace failing septic systems, or remove straight pipes from at least 551 homes using $322,533 from grant funding sources and landowner contributions (Table 3-4). Grant funds active in FY18 were distributed throughout nine river basins (Table 3-5). DEQ generally disbursed funds through SWCDs; however, in a few cases nonprofits, planning district commissions, and localities assisted with these TMDL implementation projects.

**Table 3-4: Residential septic program –grant-funded BMPs, FY18**

| 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 | 449 | 1,229.20 | 2.24E+12 | $72,379 | $74,169 | $146,548 |
| Connection to Public Sewer | RB-2 | 0 | 0 | 0 | $0 | $0 | $0 |
| Septic Tank Repair | RB-3 | 26 | 600.86 | 9.70E+11 | $49,029 | $32,206 | $81,235 |
| Conventional Onsite Sewage Systems Full Inspection and Non-permitted Repair | RB-3R | 32 | 739.52 | 1.19E+12 | $15,888 | $9,186 | $25,074 |
| Septic Tank Replacement/Installation | RB-4 | 34 | 785.74 | 1.27E+12 | $121,424 | $107,547 | $228,971 |
| Septic Tank Replacement or Installation with Pump | RB-4P | 8 | 184.88 | 2.98E+11 | $39,600 | $79,855 | $119,455 |
| Alternative Septic System | RB-5 | 2 | 46.22 | 7.46E+10 | $24,213 | $14,238 | $38,450 |
| **Total** | **N/A** | **551** | **3,586.42** | **6.04E+12** | **$322,533** | **$317,201** | **$639,733** |

**Table 3-5: 319(h)-funded residential septic BMPs by basin, FY18**

| Watershed Location | River Basin | # of BMPs | Federal 319(h) and State WQIF NPS Funds | Total Cost of Practice | Bacteria Reductions CFU | Nitrogen Reduction Lbs./Year |
|---|---|---|---|---|---|---|
| Outside Chesapeake Bay Watershed | New River | 15 | $12,754 | $15,655 | 1.72E+11 | 103 |
| Outside Chesapeake Bay Watershed | Roanoke-Dan | 7 | $768 | $4,226 | 6.72E+10 | 37 |
| Outside Chesapeake Bay Watershed | Tennessee-Clinch | 0 | $0 | $0 | 0.00E+00 | N/A |
| Outside Chesapeake Bay Watershed | Tennessee-Holston | 0 | $0 | $0 | 0.00E+00 | N/A |
| Outside Chesapeake Bay Watershed | All Basins Sub-Total | 22 | $13,522 | $19,881 | 2.39E+11 | 140 |
| Within Chesapeake Bay Watershed | James-Appomattox | 52 | $67,636 | $116,182 | 8.41E+11 | 511 |
| Within Chesapeake Bay Watershed | James-Rivanna | 30 | $7,566 | $13,503 | 2.46E+11 | 137 |
| Within Chesapeake Bay Watershed | Middle James | 82 | $57,855 | $138,235 | 7.96E+11 | 473 |
| Within Chesapeake Bay Watershed | Potomac-Shenandoah | 44 | $23,558 | $53,094 | 4.45E+11 | 265 |
| Within Chesapeake Bay Watershed | Rappahannock | 294 | $125,384 | $247,187 | 3.18E+12 | 1,886 |
| Within Chesapeake Bay Watershed | York | 27 | $27,013 | $51,652 | 2.96E+11 | 174 |
| Within Chesapeake Bay Watershed | All Basins Sub-Total | 529 | $309,011 | $619,852 | 5.80E+12 | 3,446 |
| **Outside and Within Chesapeake Bay** | **TOTAL** | **551** | **$322,533** | **$639,733** | **6.04E+12** | **3,586** |

During FY18, 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 2018, DMLR's AML program addressed over 641 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 2018, TMDL offset projects were calculated to reduce total suspended solids loads to coalfield streams from nonpoint source pollution by 304 tons and total dissolved solids loads by 6,700 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.

### 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 December 20, 2018, 3,156 sites have been inventoried in 576 of Virginia's 1,247 watersheds, or 46.2% the state's total watersheds. Of the inventoried sites, 1,058 sites (33.5%) were identified as safety hazards, and 236 sites (7.5%) were identified as environmental hazards. Of the 1,294 hazardous sites, 167 (13%) 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 10.3% of the inventoried orphan mineral mines. Through 2018 a total of 3,027 acres of mined land reclaimed.

## URBAN PROGRAMS

### 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 65,000 acres of urban areas now have nutrient management practices in place. Because of reporting/data collection limitations, the total urban acres with nutrient management is not reflective of the actual urban acreage with nutrient management; the actual acreage is much higher. This total includes approximately 28,787 acres on 316 golf courses with nutrient management plans that DCR contracts to private planners. DCR has completed the golf course project at this time and will be working with courses over the next 18 months on plans that will expire for renewal.

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 nutrient-management-focused programs, 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.

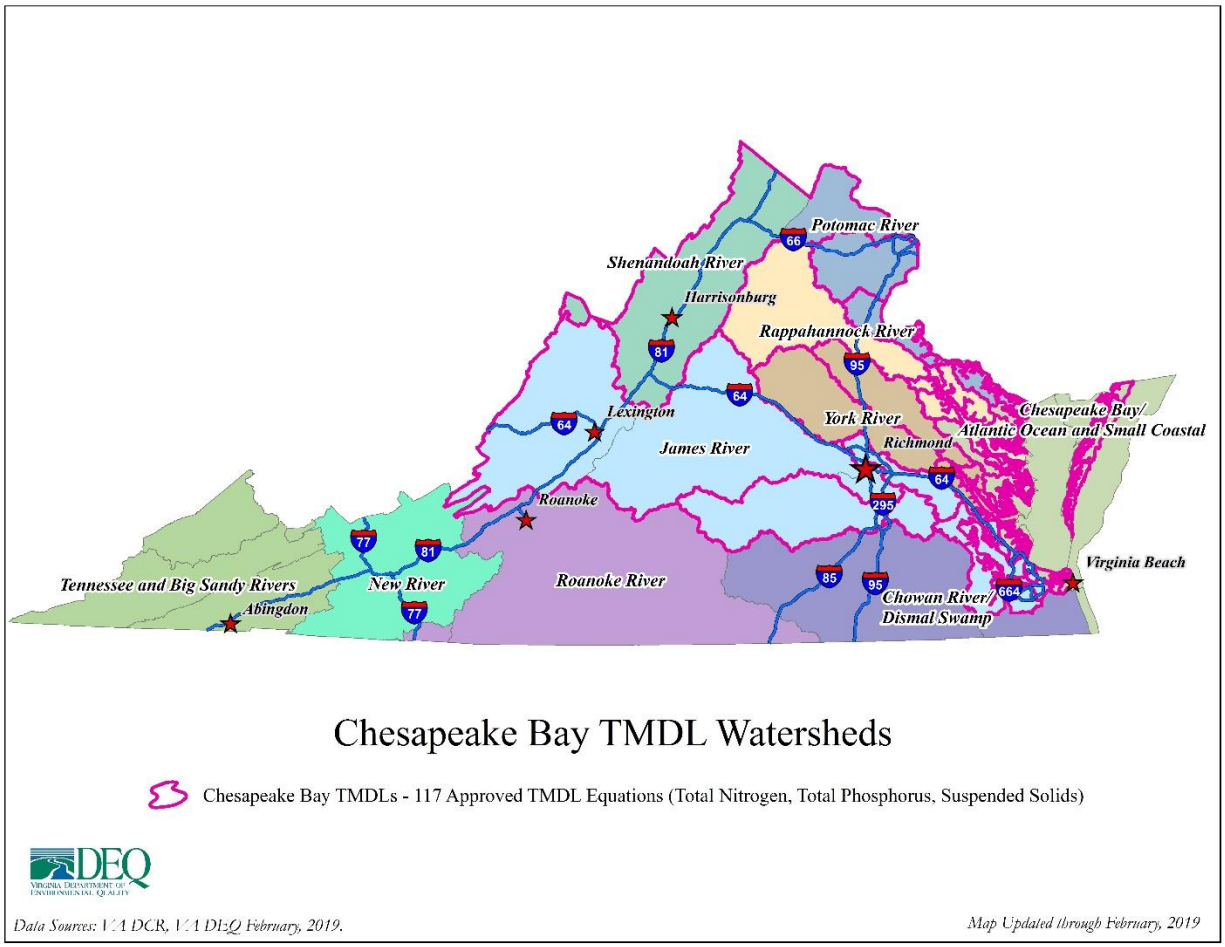



**Figure 3-3: Chesapeake Bay TMDL watershed boundary**

The Chesapeake Bay 2018-2019 Programmatic Milestones, approved by EPA in July 2018, are 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.

## 2018 Progress

For 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 2017 to September 2018, Chesapeake Bay Preservation Act compliance reviews were initiated for 14 localities. Eleven of those reviews have been completed. 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 53 of the 84 Bay Act localities have now gone through a second-round compliance review. During these compliance reviews, DEQ 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
- 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 2017 annual report cycle, a total of 131 soil and water quality conservation assessments were conducted and 17,099 septic systems were pumped out.

## Chapter 4 – Nonpoint Source Program 2018 Implementation Goal and Milestone Table

As part of the Virginia Nonpoint Source Pollution Management and Chesapeake Bay Watershed Implementation planning activities, some milestone tracking was suspended for this reporting cycle. Nonpoint Source Pollution Management Plan goals are being developed that will build upon and strengthen Chesapeake Bay Watershed Implementation Plan (WIP) milestones. Chesapeake Bay WIP milestones will be incorporated by reference in the Nonpoint Source Pollution Management Plan.

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

| VA Statewide Milestones | | Lead | 2019 Goal | 2018 Status |
|---|---|---|---|---|
| **Agriculture - GOAL: Widespread adoption of cost-effective agricultural BMPs** | | | | |
| **Active milestones were associated with Bay Reporting; Reporting** suspended for 2018 pending development of Chesapeake Bay WIP III. | | | | |
| **Nutrient Management - GOAL: Improve water quality in Virginia's streams and rivers and the Chesapeake Bay** | | | | |
| Active milestones were associated with Bay Reporting; Reporting suspended for 2018 pending development of Chesapeake Bay WIP III. | | | | |
| **Agricultural Stewardship Act - GOAL: Provide a commonsense solution to water pollution problems caused by agricultural operations** | | | | |
| Active milestones were associated with Bay Reporting; Reporting suspended for 2018 pending development of Chesapeake Bay WIP III. | | | | |
| **Virginia Resource Management Program (RMP) - GOAL: Encourage the implementation of additional agricultural BMPs and increase the reporting and verification of voluntary BMPs** | | | | |
| Active milestones were associated with Bay Reporting; Reporting suspended for 2018 pending development of Chesapeake Bay WIP III. | | | | |
| **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** | | | | |
| Active milestones were associated with Bay Reporting; Reporting suspended for 2018 pending development of Chesapeake Bay WIP III. | | | | |
| **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.** | | | | |
| Active milestones were associated with Bay Reporting; Reporting suspended for 2018 pending development of Chesapeake Bay WIP III. | | | | |
| **On-site Septic Systems** | | | | |
| Active milestones were associated with Bay Reporting; Reporting suspended for 2018 pending development of Chesapeake Bay WIP III. | | | | |
| 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 In March of 2018, VDH began a yearlong database transition to a proprietary cloud-based system. This new system, scheduled to be fully deployed by April 2019, will replace VENIS, facilitate better data collection, and provide advanced environmental health informatics capabilities. VDH will continue working towards a complete inventory of all onsite sewage systems in the Commonwealth using the new system. However, even with the new database, this project has limitations, such as the ability to collect data due to regulatory authority. |

| VA Statewide Milestones | | Lead | 2019 Goal | 2018 Status |
|---|---|---|---|---|
| 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.<br>From July 1, 2017 through July 1, 2018, at least 551 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 and abandoned and orphaned mines. (CB E.1) | DMME/ DEQ | Ongoing long-term goal thru 12/31/2018 | CONTINUING |
| 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 – At the end of 2018, DMME's Division of Mineral Mining had 35,097 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 | CONTINUING - Through 2018, DMME's Division of Mineral Mining documented the completion of reclamation on a total of 3,027 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 2018, a total of 3,156 orphaned mined land sites have been inventoried in 576 of Virginia's 1247 watersheds, or 46.2% 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 2018, there were 4 violations issued to mine permit holders for conditions which might have adversely impacted water quality offsite. As of the end of 2018, there were 439 active permits in place. In all cases, conditions were investigated, violations were issued, and the problems were corrected. |
| **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** | | | | |
| Active milestones were associated with Bay Reporting; Reporting suspended for 2018 pending development of Chesapeake Bay WIP III. | | | | |
| **Urban Nutrient Management** | | | | |
| Active milestones were associated with Bay Reporting; Reporting suspended for 2018 pending development of Chesapeake Bay WIP III. | | | | |
| **Chesapeake Bay and Coastal Zone Management Programs** | | | | |
| Active milestones were associated with Bay Reporting; Reporting suspended for 2018 pending development of Chesapeake Bay WIP III. | | | | |

| VA Statewide Milestones | | Lead | 2019 Goal | 2018 Status |
|---|---|---|---|---|
| **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 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 - The Source Water Protection strategy will continue to focus on education, empowerment, and financing initiatives through its various programs and partnerships with continued implementation of strategy as the goal. |
| **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, 44 TMDL equations (28 new, 16 revised), each representing a watershed area draining to impaired surface waters, have been approved by EPA. |
| W5 | Number of TMDL Implementation Plans or Watershed Based Plans completed and EPA-approved. | DEQ | 30 new Plans by 2019 (Goal 102 total) | IN PROGRESS - The 2018 goal is 95% complete with 18 with new plans completed since 2014, a total of 90 plans completed through June 2018. This activity is 95% of 2018 goal (of 95 plans) and 88% of 2019 goal of 30 new plans (102 total plans). |
| W6 | Number of waterbody impaired segments that have TMDL Implementation Plans or Watershed Based Plans (cumulative). | DEQ | 36 new impaired segments by 2019 (Goal 390 total) | IN PROGRESS - 122 impaired segments addressed in plans since 2014 baseline (total 476 segments as of June 2018) addressed; 124% of 2018 goal (of 383 segments) and 123% 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.<br>In 2018: 17 active 319(h)-funded projects; 627 BMPs installed in 56 implementation watersheds. 72 total active implementation plans statewide; 2,003 BMPS installed in 185 watersheds. Includes 446,568 linear feet of stream access fenced from livestock access, excluding over 2,303 animals from streams, and 131 acres of riparian buffer established. |
| **W9** | Update DEQ TMDL BMP Cost-share Guidelines by June of every year. | DEQ | 5 guidelines developed annually | IN PROGRESS - 2015, 2016, 2017, 2018, and 2019 guidelines developed and approved. |

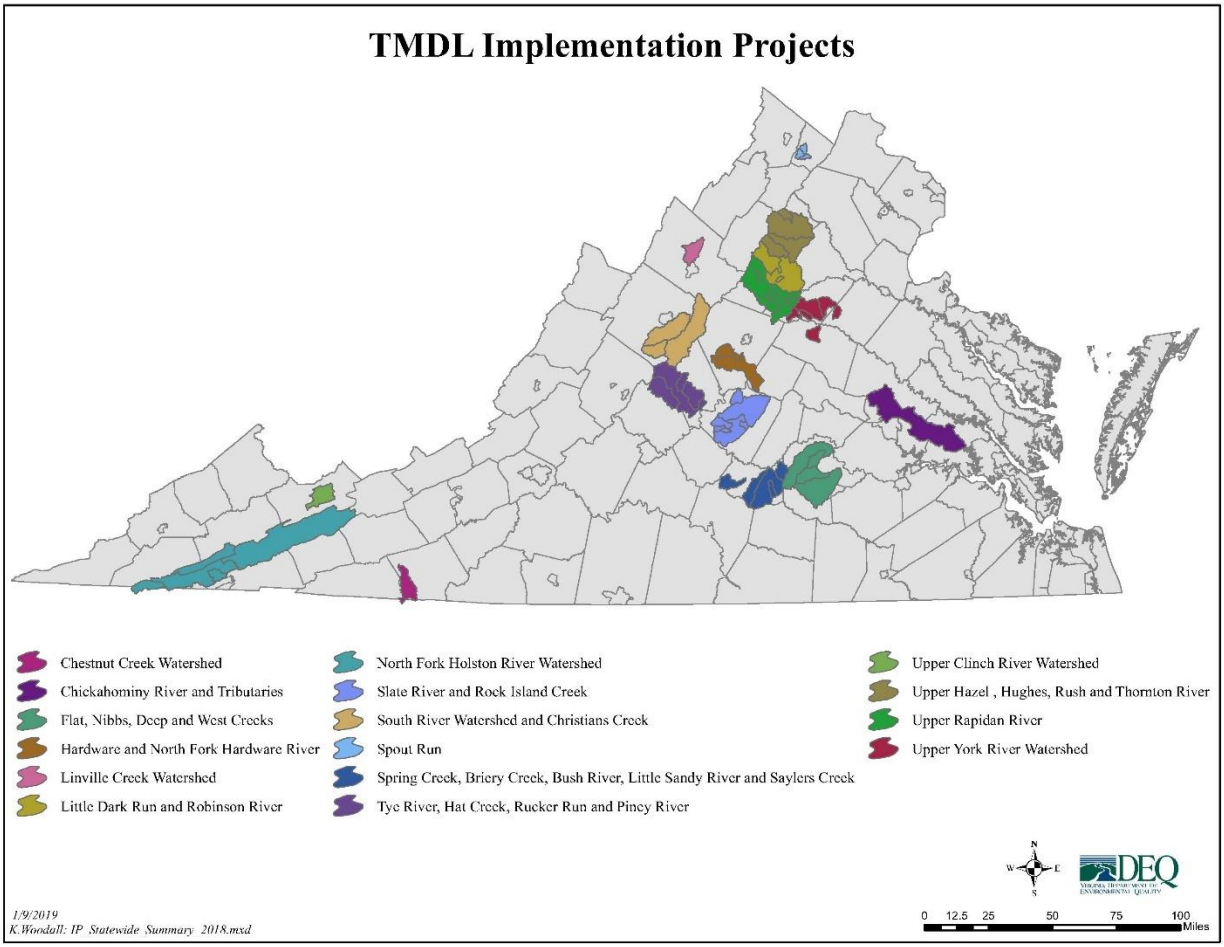
| VA Statewide Milestones | | Lead | 2019 Goal | 2018 Status |
|---|---|---|---|---|
| **W14** | Enhance DEQ's Comprehensive Environmental Data System (CEDS) to integrate Implementation Plan spatial data into existing DEQ datasets. | DEQ | Enhance data system. | COMPLETE - Phase 1 of the TMDL Implementation Plan module for CEDS, which includes tracking implementation, completed in June 2017. Phase 2 started in March 2018 and ended in August 2018 which enhanced the mechanism of BMP tracking against IP goals. |
| **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 2019. |
| **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 - 2 Type-1, addressing 3 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, one additional Type 1 published instead. |
| **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 pounds N; 78,529 pounds P; 462,520 tons sediment; 4.83E+16 CFU bacteria.<br>2018: 2,351,260 pounds N, 71,903 pounds P, 58,365 tons of sediment, and 9.37E+15 colony forming units (CFU) of fecal coliform bacteria |
| **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 and 15 are included in the 2018 annual report (see Appendix 1). |
| **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. Phase 2 was not 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 started 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 March 2019, and a final will be submitted to EPA by 9/30/2019. |

| VA Statewide Milestones | | Lead | 2019 Goal | 2018 Status |
|---|---|---|---|---|
| **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 monitored in 2016 and 2017 –186 stations monitored in 2018. In the fall of 2017, DEQ developed a monitoring plan for calendar year 2018. The plan monitors 186 stations in 110 streams located within 58 TMDL implementation plan areas for water conditions during or after TMDL implementation activities. Monthly or bimonthly (every 2 months) monitoring occurs for E. coli, a few for nutrients, and a limited number of biological monitoring stations are monitored in spring and/or fall. Of these Section 319(h) will fund monitoring at 55 stations in 37 watersheds within 19 implementation plan areas. |
| **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 and 2018 that will continue for 2019. |
| **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. Six roundtables in the Bay area and 3 roundtables in the Southern Rivers were active in 2018. Three roundtables did not seek funding during this reporting cycle. |

# Appendix 1 - 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 Completed or Under Development, FY 2018**




Summaries of two (2) closeout reports and 15 progress reports are provided in this appendix. Seven (7) 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 two (2) closeout reports are provided, including hyperlinks to online versions of the reports.

- **Middle Fork Holston River and Wolf Creek – Middle Fork Holston River**
  The Middle Fork Holston River watershed is located in the Tennessee River Basin in Smyth, Washington, and Wythe Counties, Virginia. This watershed is part Middle Fork Holston and Wolf Creek TMDL Implementation Plan. The implementation project to address their bacteria impairments began with a 319(h)-funded implementation project that was initiated in April 2014 with New River Highlands Resource Conservation & Development Council (RC&D). However, few BMPs were implemented under the RC&D, and Evergreen Soil and Water Conservation District (ESWCD) assumed project responsibilities in May 2016. At that time, the project timeline was extended and project area was expanded to include other areas in Smyth County where potential participants had shown interest. ESWCD's grant award was directed at residential septic, agricultural, and pet waste BMP implementation in the three watersheds in Smyth County and ended June 30, 2017. In total, the project expended $844,997 from both state and federal funding and a total $1,410,074 including landowner contributions. Federal 319 funds provided $246,399.68 in cost-share and an estimate of $100,000 in technical assistance funds for the ESWCD staff to administer agricultural and residential programs in the Upper Middle Fork Holston River project area. The project supported the implementation of 3,390 acres of pasture management and 85 acres of permanent vegetative cover on cropland, over 1,200% of the implementation goal. In addition, 37 livestock stream exclusion projects were installed during this period totaling 70,199 linear feet of fencing. The residential program supported 63 septic tank pump-outs, three connections to public sewer (50% of the implementation goal), and the repair or installation of waste treatment systems at six other homes. Additionally, the pet waste educational program installed 16 pet waste stations in a partnership with the Town of Marion and Town of Chilhowie. Despite the early challenges faced in the project's first two years, ESWCD made great strides in working with key partners to achieve project goals. At the end of this grant, ESWCD reported that they had to turn down interested participants due to lack of funding. VADEQ water quality data collected in Middle Fork Holston River for the period of 2011 through 2018 indicate possible water quality improvement, but monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes.

- **Middle River**
  In the Augusta County portion of the Shenandoah River Basin, Middle River, Jennings Branch, Moffett Creek, Polecat Draft and its tributaries are listed as impaired for violating water quality standards for bacteria and the General Standard (benthic) due to the presence of excessive sediment. Started in 2016, the implementation project targeting agricultural activity was administered by Headwaters Soil and Water Conservation District (HSWSCD) and other partners. Altogether, $4,689,264 of federal and state cost-share funds and local or landowner match were administered from DCR and DEQ to HSWSCD to complete 1,225 BMPS between July 2006 and June 2018. DEQ contributed $70,355 of Section 319(h) cost-share funds. Stream exclusion fencing (linear feet) and the number of systems installed met 57% and 34% of the IP goals, respectively. The project also implemented 94 % of the goal for riparian buffers. One of the innovative ideas that resulted from this project was the work performed by the contracted agronomist who attempted to work with farmers on a holistic approach to pasture management. The work completed led to significant changes in management, though much of it could not be quantified. Water quality data collected by DEQ for the period of 2002 through 2018 were analyzed to determine the impact of BMPs implemented in the project area on *E. coli* violation rates and aquatic life. The linear regression fitted to the bacteria violation data for Upper Middle River shows a decreasing trend in

violation rates over the sampling period. VSCI data collected in the Upper Middle River are below the threshold value of 60 but do show an upward trend, possibly indicating improvements in benthic macroinvertebrate communities. In fact, BMPs installed in the watershed have helped measurably in reducing sediment transport and improving benthic macroinvertebrate communities and biological health of the Middle River. This improvement led the impaired a 23.15-mile long segment to be removed from the state's impaired waters list in the Virginia's *2016 305(b)/303(d) Water Quality Assessment Integrated Report*. A draft NPS success story has been submitted for EPA approval and publication.

## 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.

- **Buffalo, Colliers, and Cedar Creeks**

  The Buffalo, Colliers, and Cedar Creeks implementation watersheds in the James River Basin in Rockbridge County were listed as impaired due to violations of water quality standards for bacteria and the General Standard (benthic). Since September 2017, the Natural Bridge Soil and Water Conservation District (NBSWCD) has administered the TMDL implementation project, which supports both agricultural and residential septic BMP implementation. Since the project started, eight stream fencing BMPs have been implemented, excluding livestock from 12,454 feet of stream, and 344 acres of improved pasture management BMPs were implemented. There have not yet been any residential or urban BMPs implemented, but NBSWCD staff are working to generate interest and participation in the implementation cost-share program using flyers, press releases to the local newspaper, a field day, and site visits to discuss potential BMPs. Water quality data collected by DEQ in Buffalo Creek for the period of 2011 through 2018 were analyzed to demonstrate a starting baseline water quality condition for the project. The data suggest possible water quality improvements; however, monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes.

- **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 in this project area 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 132 stream exclusion practices have been installed, fencing livestock from 344,483 feet of stream. Additionally, 72,116 feet of stream fencing was maintained for an additional period, 467% of the implementation goal. Also notable, 185 acres of buffers were established – nine times the implementation plan 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 28 septic tank pump-outs, two septic system repairs, nine septic system installations, and two alternative waste treatment systems. Water quality data collected by DEQ for the period of 2007 through 2018 suggest relatively unchanged water quality conditions in Flat and Nibbs Creeks. 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, and newsletters, staff continue to draw interest in the agricultural program. Since the project started, 15 stream fencing BMPs have been implemented, excluding livestock from 74,720 feet of stream, and 458 acres of cover crops (898% of the total implementation goal) were implemented. Comparatively, the residential implementation program has progressed slowly, though interest is increasing: 34 pump-outs and three septic system repairs were performed, and two new septic systems have been installed. Water quality data collected by DEQ for the period of 2010 through 2018 were analyzed to demonstrate a starting baseline water quality condition for the project. The data suggest possible water quality improvements; however, monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes.

- **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. The SVSWCD also continues to administer an agricultural BMP program; which notably have completed, 1,483 acres of cover crops, 94% of the implementation goal, , as have 47 acres of permanent vegetative cover on cropland and 36,577 linear feet of stream exclusion fencing. The residential septic program continues to be well-received: in total, 59 septic tank pump-outs have been performed, six septic systems repaired, nine septic systems installed, and one alternative waste treatment system installed. Extensive efforts have also been made to reach out to pet owners in the watershed, leading to significant progress in achieving pet waste BMP goals including 3 pet waste stations (75% of the goal) and 20 pet waste composters. SVWCD has continued to explore the watershed for suitable locations for stormwater BMPs. Planning and designs are currently underway for two bioretention practices. In addition, SVSWCD completed a riparian buffer planting at a residential property in the watershed. Water quality data collected by DEQ for the period of 2006 through 2018 suggest possible water quality improvements in Linville Creek; however, monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes.

- **North Fork Holston River**

  The North Fork Holston watershed is in the Tennessee/Big Sandy River Basins in Scott, Washington, Smyth, Russell, Bland, and Tazewell Counties. Thirty-five (35) segments of the North Fork Holston River and its tributaries including segments of 23 different streams are listed as impaired due to violations of the State's Water Quality Standards for fecal coliform. The LENOWISCO Planning District (Scott County), Holston River Soil and Water Conservation District (Washington County), and Evergreen Soil and Water Conservation District (Smyth County) administer the BMP implementation projects in this expansive 464,840-acre watershed. There are three implementation projects underway in Scott County (residential septic only, started in July 2017), Washington County (agricultural and residential, started in September 2017) and Smyth County (agricultural and residential, started in November 2018). Cumulatively, over 166,000 feet of stream exclusion fencing were installed and 3,836 feet were maintained. Additionally, 890 acres of cover crops and two waste control facilities were implemented. Unfortunately, the residential septic programs in Scott and Washington Counties were delayed due to lack of qualified contractors with proper licenses to perform the work, but the issue has recently been

resolved. As implementation has started only recently, any effect 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 initiated in 2015 have both been administered by the Culpeper SWCD. Between July 2016 and June 2018, 312 septic tank pump-outs (86% of the implementation goal), 21 septic system repairs, 14 septic system replacements, and two alternative waste treatment system installations were completed in the watersheds. Also during that time, 70 stream exclusion fencing systems were installed, protecting 242,193 feet of stream. Other agricultural projects completed during this period include 2,414 acres of small grain cover crop and 1,560 acres of harvestable cover crop. Despite a rise in violation rates in 2018, the overall trend observed in water quality data since 2003 indicates possible improvement; however, monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes**.** 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.

- **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 water quality standards for bacteria. Through the joint efforts of the DEQ, 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. Since that time, 31 systems including 79,457 linear feet of livestock exclusion fencing were installed, and 47 acres of erodible cover crop were reforested (157% of the implementation goal). Also, 134 septic tank pump-outs, three septic system repairs, 19 septic system installations, and two alternative waste treatment systems have been implemented. Water quality data collected by DEQ for the period of 2009 through 2018 indicate potential decline in water quality in Slate River; however, monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes. Data collected at station 2-RKI003.40 in Rock Island Creek show a decline in violation rates, indicating improvement in water quality. In fact, an 8.88-mile segment of Rock Island Creek was delisted, and a success story has been submitted for EPA publication**.**

- **Smith River and Blackberry Creek**

  The Smith River watershed is located in the Dan River Basin in Henry and Patrick Counties, Virginia. This project focuses on the Smith River #1 area of the watershed encompassing northwest Henry County as well as Blackberry creek, both of which were listed for violations of the water quality standards for fecal coliform bacteria. Administered by Blue Ridge Soil and Water Conservation District (BRSWCD) in partnership with Henry County, the Dan River Basin Association (DRBA) and the Virginia Department of Health (VDH), this project focuses specifically on implementing residential septic BMPs and a citizen water quality monitoring program administered by DRBA. Thus far, six septic pump-outs have been performed, and one septic system has been installed. The rural nature of the watershed makes outreach difficult; however, BRSWCD continues to work to generate interest through local outreach events, a project flyer, and press releases in local newspapers. Water quality data collected by DEQ for the period of 2008 through 2018 suggest possible water quality decline in Smith River, but none of the samples taken in 2018 exceeded the water quality standard. Monitoring over a longer period of time with consistent improvement is needed to corroborate water quality improvements.

- **South River and Christians Creek**

  The South River and Christians Creek watersheds located in the Shenandoah River Basin in Augusta County were listed as impaired due to violations of the water quality standards for fecal coliform bacteria and the General Standard (benthic). The South River and Christians Creek implementation project has been administered in two phases. The first phase was led by the Headwaters Soil and Water Conservation District (HWSWCD) using state funding provided by the DCR. The second phase started in 2017 and has been administered by the Chesapeake Bay Foundation in collaboration with HWSWCD with Federal Section 319(h) funding provided by DEQ. Since the project started in 2009, a total of 1,156 agricultural BMPS have been installed; resulting in a total of 60 miles of stream fenced from livestock access (over 55% of the IP goal) and 21,586 acres of cover crop installed. Additionally, many urban and residential septic projects have been completed by partners identified in the IP. Stormwater projects implemented include 3,000 feet streambank stabilization, 1.6 acres riparian buffer, bioretention and detention basin retrofits. Additionally, Augusta County received a Water Quality Improvement Fund grant that addressed failing or failed septic systems by connecting 41 septic systems to public sewer system within the South River Watershed. Water quality data collected by DEQ for the period of 2008 through 2018 in South River and the same period in Christians Creek indicate a possible improvement in water quality in the former and possible decline in the latter. More consistent monitoring over a longer period of time with is needed to assess 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 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 residential septic program in these watersheds. In total, septic issues have been addressed in 69 homes. PSWCD also continues to apply other funding sources to agricultural implementation in these watersheds including a total of over 56 miles of stream exclusion fencing installed, which exceeds the implementation goal by 50%. Additionally, over 36,000 feet of stream fencing have been maintained, 339% of the implementation goal. Water quality data collected by DEQ for the period of 2007 through 2018 in Briery Creek and 2009 through 2018 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. However, measured improvements 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.

- **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 149,279 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 588 acres of cover crops and 207 acres of riparian buffers. The residential septic BMP program is on track to meet implementation goals as well, with septic issues addressed in 48 homes and continued interest from landowners in the watershed. VADEQ water quality data collected between

2006 and 2018 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 Clinch River**

  The Upper Clinch River watershed is part of the Tennessee/Big Sandy River Basins in Tazewell County; it was listed as impaired on due to violations of the state's General Standard (benthic), which have been attributed to excessive sediment. The Upper Clinch River TMDL implementation project, initiated in 2016, is administered by the Upper Tennessee River Roundtable (UTRR) in partnership with the Tazewell Soil and Water Conservation District (TSWCD) and U.S Fish and Wildlife Service Partners Program. Both the agricultural and urban BMP programs have been successful during two years of implementation. The first of two agricultural BMPs was completed by TSWCD, and the second is in its final stages at the time of this report. An urban streambank stabilization project completed 1,200 linear feet at the Dunford Park, Youth-Only Stocked Trout Waters in Tazewell, Virginia. This is also the site of the State Endangered Tennessee Heelsplitter Mussel. Additional stabilization at this site will be completed in 2019. A second site was completed at the Tazewell Waste Water Treatment Plant stabilizing 400 linear feet. Outreach events have been aimed not only at landowners, but also local contractors to inform them of project opportunities and to expose them to streambank stabilization BMPs. As implementation efforts have only just gained momentum, any effect of on water quality cannot yet be observed in this watershed. Biological water quality data will be collected in the Upper Clinch watershed starting in 2020.

- **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. In total, CSWCD has installed 87 livestock stream exclusion practices resulting in a total of 48 miles of stream exclusion fencing. In addition, 2,448 acres of pasture have been put under pasture management BMPs. In the residential septic program, 397 homeowners have implemented BMPs including 280 septic system pump-outs, 78 septic system repairs, 37 septic system installations, and two alternative waste system installations. Bacteria data analyzed by DEQ for the period of 2007 through 2018 suggest a possible decline in water quality over the sampling period, mainly due to an unusually high violation rate in 2018. However, monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes**.**

- **Upper Rapidan River**

  The Upper Rapidan River watershed spans portions of Virginia's Albemarle, Greene, Madison, and Orange counties in the Rappahannock River Basin. The ten 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 142% of the necessary cover crop acreage has also been implemented. Additionally, a total of 29 stream exclusion practices have been installed, fencing livestock from over 40 miles of stream. Staff are steadily making progress toward residential septic goals outlined in the grant with 101 septic tank pump-outs, eight septic system repairs, and installation of seven 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. The analysis of data collected between 2013 and 2018 shows a fairly constant trend in violation rates. However, because

the implementation project only started in 2016, monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes.

- **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. A total of 42 livestock stream exclusion systems have been established, totaling over 48 miles of fencing. In addition, maintenance work was completed on 130,640 feet of stream fencing and 2,855 acres (825% of the implementation goal) were planted under small grain and mixed cover crop for nutrient and residue management. Under the residential BMP program, 159 septic tank pump-outs, 22 septic system repairs, and 24 septic system installations 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 2018, 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**
- **Copper and Moll Creek (Clinch Cove IP)**
- **Tinker & Glade Creeks – Roanoke River 1 IP**
- **Mudlick and Glade Creeks – Roanoke River 1 IP**
- **Upper Goose Creek**
- **Lower Banister River and Terrible Creek**
- **Gulf, Barlow, Mattawoman, Jacobus and Hungars Creeks IP**