Virginia Nonpoint Source Pollution Management Program

2019 Annual Nonpoint Source Report

July 1, 2018 through June 30, 2019

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2019 Virginia Nonpoint Source Annual Report

Table of Contents

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.

2019 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 2019 (FY19), which covers a period from July 1, 2018 through June 30, 2019. 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, 30 TMDL equations (27 new, 3 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 under a single statewide contract

Further, DEQ employs a statewide strategy to prioritize watersheds for TMDL development or TMDL alternative development for the six-year window (2016-2022) under the 303(d) Vision. Watersheds are prioritized based on types of impairment, public interest, available monitoring, regional input, and available funding.

During this program year, Virginia developed two (2) implementation plans (IPs) addressing 95 impaired segments; in addition, five (5) IPs addressing 36 impairments were under development but were not completed or approved by the end of the fiscal year. Since 2001, Virginia has developed 92 implementation plans addressing 571 impairments, thereby exceeding the 2019 NPS goal for number of impairments addressed in IPs by 46%.

DEQ and its partners also jointly funded implementation in 76 implementation plan areas comprising 196 watersheds, resulting in the installation of 2,517 agricultural and residential septic BMPS that excluded livestock from 213 miles of stream and addressed straight pipes and failing septic systems from 533 homes. Expenditures for these projects totaled $15,190,532, consisting of $10,192,536 of federal and state funds and $4,997,996 in landowner contributions. Collectively, these efforts achieved pollutant reductions of 310,370 pounds of nitrogen, 33,824 pounds of phosphorus, 18,297 tons of sediment, and 3.70E+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 of partial or full restoration of watershed segments associated with NPS implementation actions. The VA nonpoint program has met its FY19 goal for total number of Success Stories and has exceeded by 8% its FY19 goal for number of segments discussed in those reports; three (3) Success Stories were submitted for three (3) impaired watershed segments with water quality improvements attributable

to TMDL implementation actions. The three Success Stories developed in Virginia in FY19 were, *Agricultural and Residential Pollution Control Measures Reduce Bacteria Loading in Rock Island Creek*, *Implementation of Best Management Practices Reduced Bacteria Loading and Improved Biological Health of Middle River Watershed, Virginia,* and *Installation of Best Management Practices Reduce Bacteria Exceedance Rates in Deep Creek, Virginia*. In addition to developing these Success Stories, DEQ has maintained its Virginia's Nonpoint Source Pollution Program Success Stories website and developed a story map exhibiting the Commonwealth's Success Stories.

Agriculture and Nutrient Management Programs

Through June 30, 2015, DCR offered 100% funding for the SL-6 practice (Stream Exclusion with Grazing Land Management) to cost-share applicants. All participant applications received as part of this initiative, between January 2013 through June 30, 2015 have now been funded. As of June 2019, partially due to a supplemental appropriation by the Virginia General Assembly of $5.2 million, a total of approximately $100 million has been provided by the Commonwealth for this initiative. It is anticipated that this focus on livestock exclusion from surface waters will result in dramatic reductions in nutrient and bacteriologic contamination as these practices are implemented. The result of this funding will be over 1,858 stream miles fenced and approximately 119,000 animal units excluded.

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, 2019, there were 466 plans covering 110,016 acres statewide. Additionally, 93 plans covering just over 23,271 acres have been certified in the last 12 months, and 24 new RMPs were developed on more than 4,000 acres.

As part of DCR's nutrient management program, there are currently over 353,762 active nutrient management planned acres in the Commonwealth that were developed by DCR staff. To improve data collection and reporting, DCR has developed a new module, NutMan 4. NutMan 4 is being implemented with DCR-certified nutrient management planners and DCR private sector contractors and is anticipated to be utilized by additional private nutrient management planners by FY 2021

Progress is being made on the milestone target of 75% of unpermitted dairy facilities having nutrient management plans by the end of calendar year 2025. Of the 512 dairies in Virginia, 77 permitted and 245 unpermitted dairies have nutrient management plans. Funding appropriated by the 2019 General Assembly will provide $900,000 for certified nutrient management planners to develop, revise, and verify implementation of plans, particularly in counties with fewer existing plans.

The 2019 General Assembly also provided funding for the poultry litter transport incentive program, which ships poultry litter out of the Chesapeake Bay watershed. With it, DCR has expanded the transport program to include Accomack County while still maintaining programs in Page and Rockingham counties. As a strategy in the Chesapeake Bay Watershed Implementation Plan (WIP III), poultry litter transported from these three key counties needs to increase from 5,000 – 6,000 tons annually to approximately 89,000 tons annually by year 2025.

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, 2018 through March 31, 2019, VDACS-ASA program staff responded to 63 official water quality complaints. In 19 of the complaints (30%), there was sufficient evidence that the agricultural activities were causing or would cause water pollution; Agricultural Stewardship Plans were required for those cases. No corrective orders were issued for failure to maintain the measures included in approved stewardship plans.

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 FY19, VDOF field personnel inspected 3,786 timber harvest sites across Virginia on 194,120 acres. Another focus of the VDOF water quality program is training harvesting contractors in water quality protection techniques. For FY19, there were 22 training programs offered with a total of 441 attendees present.

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 FY19, VDOF was involved with 164 water quality actions initiated under the Silvicultural Law. Of these actions, one resulted in a Special Order and two resulted in Emergency Special Orders being issued for violations of the law. In addition, there were 37 failure to notify violations by timber harvesting contractors.

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

- In FY19, the conservation easement program permanently protected 8,729 acres of open space and more than 53 miles of water courses through 15 conservation easements.
- In its Riparian Forest Buffer tax credit program from Tax Year 2018, VDOF issued Riparian Forest Buffer tax credits on 83 applications covering 1,205 acres of retained forested buffers. The tax benefit to forest landowners was $489,281.09 on timber valued at $2,016,626.87.
- The Forest Stewardship Program assists non-industrial private landowners in improving the management of private non-industrial forestlands for multiple resources. In FY 2018-19, VDOF recorded over 1500 forest management projects on nearly 54,000 acres in the Bay Watershed. More specifically, VDOF reported tree planting on nearly 600 sites for almost 23,000 acres. Of this, over 700 acres were established on previously non-forested land.
- Through its "Virginia Trees for Clean Water" initiative, VDOF has assisted with, to-date, 165 projects resulting in more than 52,000 trees being planted in Virginia communities.

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 industries 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, 2018 through June 30, 2019, VDH issued 7,394 new construction permits; 1,064 were for installation of alternative onsite sewage systems (AOSS). During the same period, VDH issued 2,158 repair permits statewide; 350 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 FY19, DEQ provided funding to pump out septic systems, repair or replace failing septic systems, or remove straight pipes from at least 533 homes using $859,292 from grant funding sources and landowner contributions. Grant funds active in FY19 were distributed throughout ten river basins.

To assist in the repair of failing onsite sewage systems, VDH was awarded $300,000 from the Virginia Environmental Endowment (VEE) with an additional $200,000 from the Smithfield Foundation, the philanthropic arm of Smithfield Foods, Inc. These funds will be used to repair failing septic systems and remediate illicit sewage discharges (straight pipes) from homes in the Yarmouth Creek and Morris Creek watersheds in James City County, the Pagan River, and Lawnes Creek watersheds in Isle of Wight County and the Lawnes Creek watershed in Surry County. VDH's primary objective is to help homeowners in these watersheds bring their systems into current regulatory compliance, thereby reducing total nitrogen and fecal coliform loads from each system.

VDH also worked with their internal communications office and an advertising agency to create a social media campaign to remind septic system owners to have their system pumped regularly. The video ads reached citizens in the rural areas of Virginia and helped to increase the number of pump-outs occurring.

VDH has been involved with a variety of legislative initiatives aimed at decreasing pollution from onsite sewage systems across the Commonwealth. HB 2322 (2019 Va. Acts Ch. 429) directs VDH to develop a plan for the oversight and enforcement by VDH of requirements related to the inspection and pump-out of onsite sewage treatment systems, specifically in the Northern Neck, Middle Peninsula, and Eastern Shore. The anticipated goals of the plan are to facilitate a more consistent approach to enforcing pump-out requirements, increase the number of septic pump-outs occurring, reduce groundwater pollution, and extend the life of citizens' onsite systems.

Another piece of legislation, HB 2811 (2019 Va. Acts Ch. 441), amended § 58.1-3660 of the *Code of Virginia* to designate VDH as a "state certifying authority." This designation means VDH can exempt from state and local taxation equipment for onsite sewage systems serving 10 or more households that use nitrogen-reduction processes and technology and that are constructed, wholly or partially, with public funds. This bill encourages the use of community onsite systems over individual system installations, which provides more pollution reduction.

In 2019, the Secretaries of Natural Resources, Health and Human Resources, and Commerce and Trade worked together to form the Wastewater Infrastructure Work Group consisting of representatives of DEQ, VDH, Virginia Department of Housing and Community Development, and Virginia Resources Authority. The goal of the Work Group is to coordinate and maximize grants to landowners and localities to protect water quality, human health, and economically disadvantaged communities from inadequate, failing, or failed wastewater systems.

Resource Extraction Programs

Virginia Department of Mines Minerals and Energy (DMME), 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 19, 2019, a total of 3,171 sites have been inventoried in 580 of Virginia's 1,247 watersheds, or 46.5% the state's total watersheds.

URBAN PROGRAMS

With regard to nutrient management, more than 35,000 recorded acres of urban areas now have nutrient management practices in place; however, due to data collection limitations, DCR estimates the total acres statewide to be more than 150,000. This total includes all golf courses and a total of 118 nutrient management plans on 2,674 acres of state-owned lands.

CHESAPEAKE BAY INITIATIVES AND POLLUTION REDUCTIONS

Virginia submitted its Chesapeake Bay TMDL Phase III Watershed Implementation Plan to EPA on August 23, 2019. Virginia agencies are wrapping up the 2018-2019 WIP milestones period and drafting the 2020-2021 WIP milestones. 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 WIP and Chesapeake Bay TMDL.

During FY19, the DEQ Local Government Assistance Program staff worked on Chesapeake Bay Preservation act (CBPA) compliance reviews for a number of CBPA localities. A total of 66 of the Bay Act localities have gone through the compliance review process and were found fully compliant or are working to resolve conditions under a Corrective Action Agreement, while 18 localities remain scheduled to undergo a compliance review in the near future. 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 2018 annual report cycle (July 1, 2017 – December 31, 2018), 136 soil and water quality conservation assessments on agricultural land were conducted and 35,542 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, improper animal waste, mining, and forestry practices. Pollutants from these sources, including nutrients, sediment, and bacteria, typically accumulate on land and 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 oversight 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 prioritization 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 2014 Plan can be found on the DEQ website. DEQ submitted a draft of the 2019-2024 plan on June 30, 2019 and received comments from EPA on October 31, 2019. The final version was submitted in January 2020 and approved by EPA in March 2020.

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 that involves 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 2019 (FY19) goals for each step in the process to identify and restore impaired waters in Virginia.

TMDL Development

- Complete plans to address priority impaired waters so that all of our priority areas for 2016-2022 have been met by the end of 2022.

Implementation Plan Development

- Develop five (5) implementation plans (IPs) that address ten (10) total impaired waterbody segments.
- Develop prioritized list of existing TMDLs to be addressed by IPs.

Watershed Implementation Projects

- Continually fund 10-15 implementation projects.
- Update DEQ TMDL BMP Cost-share Guidelines by June of every year.
- Estimate annual reductions in nitrogen, phosphorous, sediment, and bacteria achieved via BMP implementation.

Water Quality Improvements

- Identify waterbodies in state's 303(d) list and integrated report that are primarily impaired by NPS pollutants and demonstrate a significant trend of improved water quality.
- Identify partially or fully restored waterbodies in state's 303(d) list or Integrated Report that are/were primarily impaired by NPS pollutants.
- Develop three (3) Success Stories per year that address either delisting of a restored waterbody (Type 1) or water quality improvements in waterbodies (Type 2).

Figure 2-1: General goals of the TMDL development, planning, and implementation program for FY19

TMDL Development and Implementation Progress

TMDL Development Progress

Based on the 2018 Integrated Report, Virginia estimates that 8,460 miles of rivers, 81,744 acres of lake, and 2,044 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 under a single state-wide contract

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 2019, 30 TMDL equations (27 new, 3 revised), each representing a watershed area draining to impaired surface waters, have been approved by EPA since July 2018 (FY19).

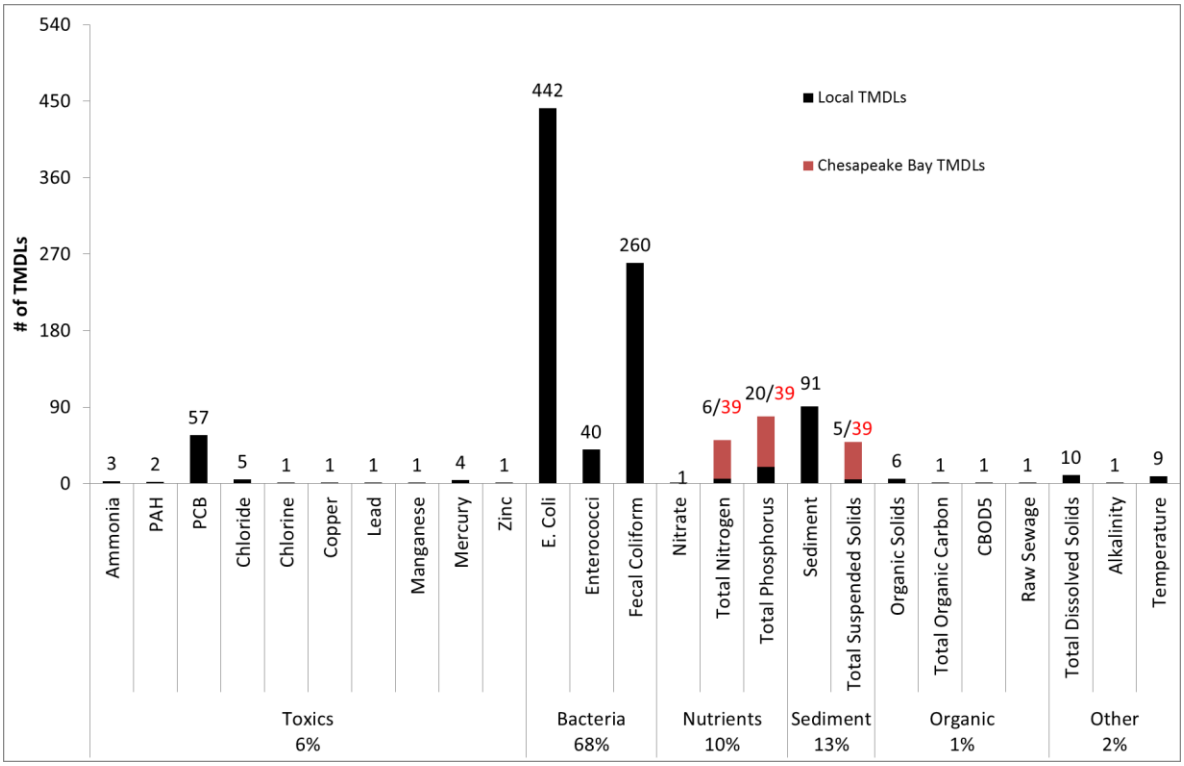

Figure 2-2: TMDL equations developed since 2001, classified by pollutant[1]

[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 or TMDL alternative development for the six-year window (2016-2022) under the 303(d) Vision. 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. In 2018 and again in 2019, EPA gave states the opportunity to adjust their priorities lists to adapt to changes in program resources. The priority watersheds through 2022 include 3,710 river and stream miles, 4,699 acres of lakes and reservoirs, and 268 square miles of 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 FY19, DEQ and other partners developed two (2) IPs addressing 95 impaired segments; these have been approved by EPA. In addition, five (5) IPs addressing 36 impairments were under development at the end of the fiscal year. Table 2-1 summarizes TMDL implementation plans completed or under development during FY19.

Table 2-1: TMDL implementation plans completed or under development during FY19

Watershed (# of impairments / # of impaired segments)	Location (county or city)	Impairment	Status
Dan River- Birch Creek, Byrds Branch, Doubles Creek, Fall Creek, Sandy Creek (94/94)	Carroll, Floyd, Halifax, Henry, Patrick, Pittsylvania	Bc	C
Woods Creek IP (1/1)	Lexington, Rockbridge	Bc	C
Yeocomico River (13/13)	Northumberland, Westmoreland	Bc	UD
Accotink Creek (3/3)	Fairfax, Fairfax County	Chloride	UD
Mattaponi River IP (14/14)	Caroline, King and Queen, Spotsylvania	Bc	UD
North Fork Catoctin IP (2/2)	Loudon	Be (sed)	UD
McClure River IP (6/6)	Dickenson	Bc	UD

Impairment types: Bc = bacteria, Be = Benthic, Sed = sediment
Status "C" = IP complete in FY19; Status "UD" =IP under development
*IP has been completed and submitted to EPA, but not yet approved at the time this report was written.

Since 2001, Virginia has completed 92 IPs that address 571 impairments. Figure 2-3 below shows the location of the Commonwealth's TMDL implementation plan development since the program's inception.

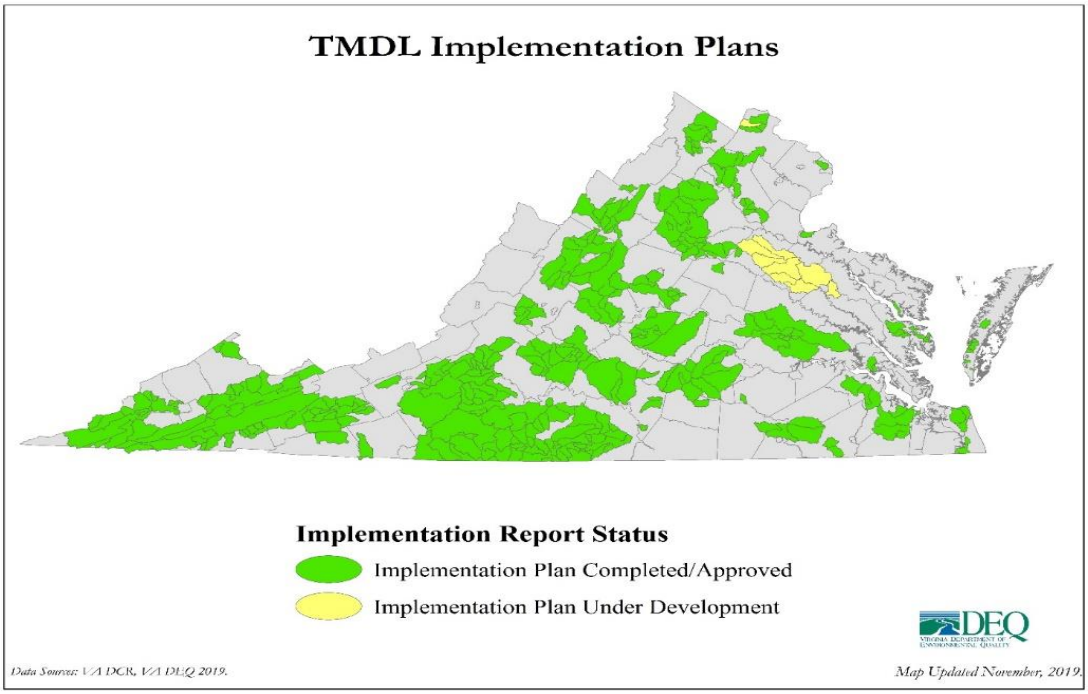

Figure 2-3: Status of implementation plan report development through November 2019

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 2019, the ratio of plans to impairments was six-to-one. Figure 2-4 below demonstrates the overall trend in numbers of IPs and impairments addressed.

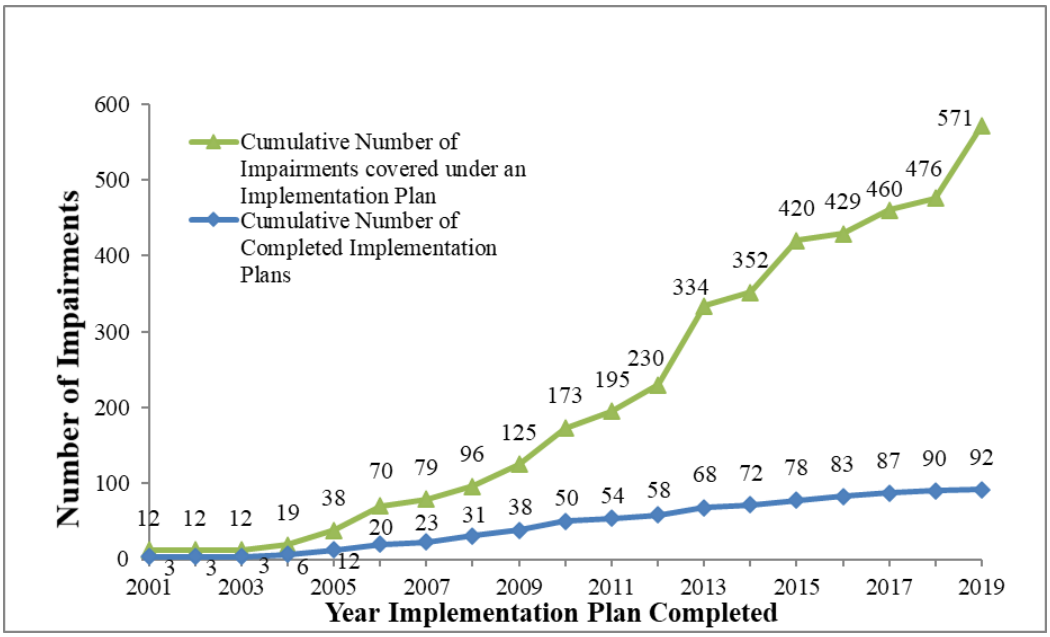

Figure 2-4: Cumulative summary of TMDL IP development and number of impairments addressed by each IP

The rate of TMDL IP development exceeds the current goals stated in the 2014 Nonpoint Source Program Management Plan. As of 2019, Virginia has exceeded the goal for number of impairments addressed in IPs by 46%. After the 2014 goals were established, Virginia began developing larger implementation plans that addressed more impaired segments than the original goal of two per plan, and these larger plans generally take more time to develop. As a result, Virginia may produce fewer approved plans per year (e.g., two plans in FY19), but Virginia is greatly exceeding its goal of addressing 10 impaired segments per year (e.g., 95 for FY19).

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

Goal	FY14 Baseline	FY18 Goal	FY19 Goal	FY18 Actual	FY19 Actual	% Progress of FY18 Goal	% Progress of FY19 Goal
# of Implementation and Watershed Plans Completed	72	95	102	90	92	94.7%	90.2%
# of Impairments Addressed by Implementation Plans	354	383	390	476	571	124% (exceeds)	146% (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. Figure 2-5 shows the status of implementation. Each watershed has an IP in various stages of implementation, from planning to implementation to water quality Success Story.

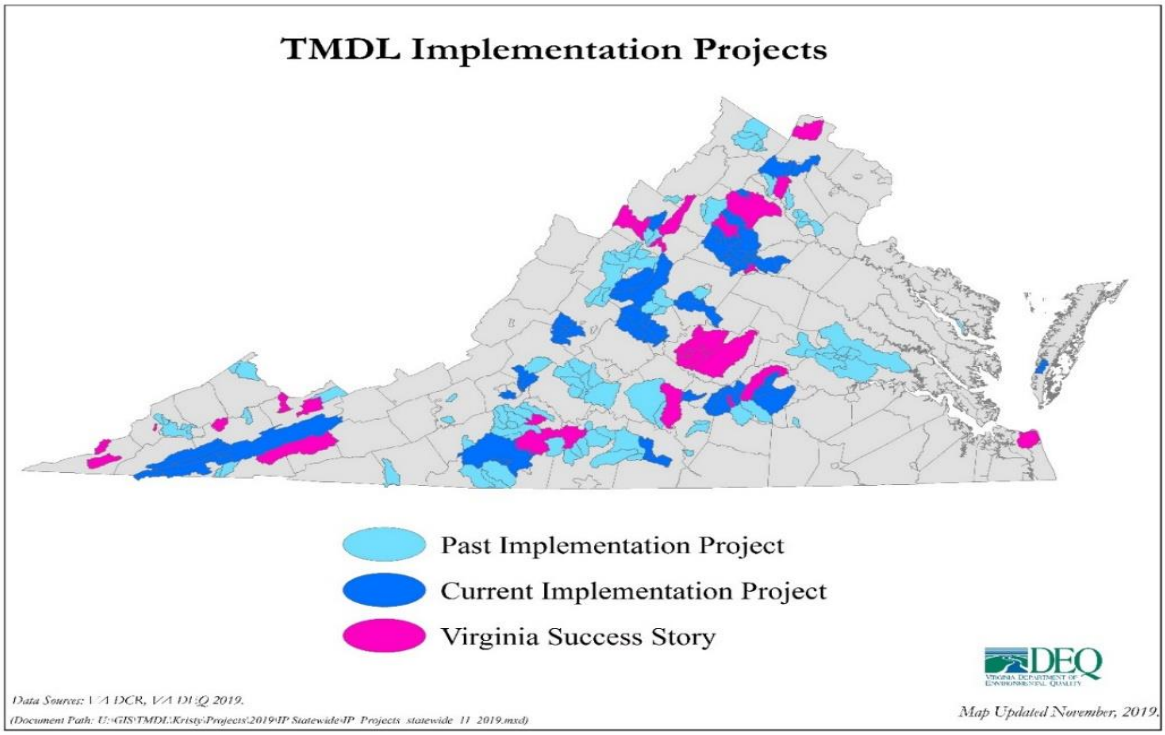

Figure 2-5: Status of IP implementation through November 2019

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 active projects coordinated by DEQ in FY19 including the years and sources of implementation funding.

Table 2-3: 319(h)-funded TMDL implementation plan projects active in Virginia, FY19

Implementation Plan	Years of Implementation and Funding[2]
Banister and Winn Creeks IP: Lower Banister River and Terrible Creek	§319(h): 2018-2021
Buffalo Creek, Colliers Creek and Cedar Creek	§319(h):2017-2020
Clinch Cove and Tributaries: Copper and Moll Creeks	§319(h): 2018-2021
Flat, Nibbs, Deep and West Creeks	§319(h): 2015-2021 (septic only); WQIF/VNRCF: 2007-2015
Gulf, Barlow, Mattawoman, Jacobus and Hungars Creeks	§319(h): 2019-2021 (septic only)
Hardware River and North Hardware River	§319(h): 2015-2019
Linville Creek	§319(h): 2015-2019
Little Dark Run and Robinson River	§319(h): 2015-2021
North Fork Holston River – Scott County	§319(h): 2017-2020 (septic only)
North Fork Holston River – Smyth County	§319(h): 2018-2021
North Fork Holston River – Washington County	§319(h): 2017-2021
Slate River and Rock Island Creek	§319(h): 2010-2021
Smith and Mayo Rivers IP: Smith River and Blackberry Creek	§319(h): 2017-2020 (septic Only)
South River and Christians Creek	§319(h): 2017-2020 (agriculture Only)
Spring, Briery, Little Sandy, Saylers Creeks and Bush River	§319(h): 2016-2021 (septic only); WQIF/VNRCF: 2007-2015
Tye River, Hat Creek, Rucker Run and Piney River	§319(h): 2015-2021
Upper Clinch River	§319(h): 2016-2021
Upper Goose Creek	§319(h): 2018-2021 (agriculture only)
Upper Hazel, Hughes, Rush and Thornton Rivers	§319(h):2009-2021, VNRCF: 2011-2015, WQIF RFP: 2007-2009, 2016-2020
Upper Rapidan River	§319(h): 2016-2021
Upper Roanoke River Part 1 IP: Glade and Tinker Creeks	§319(h): 2018-2021 (septic Only)
Upper Roanoke River Part 1 IP: Mudlick and Glade Creeks	§319(h): 2018-2021 (septic Only)
Upper York River (Orange County)	§319(h): 2012-2021, VNRCF: 2012-2015, WQIF RFP: 2016-2019

319(h) = Federal EPA Nonpoint Source Implementation Grant; WQIF = Watershed Improvement Fund (agriculture only); VNRCF = State Virginia Natural Resources Commitment Fund (agriculture only), WQIF-RFP (septic only).

The 23 implementation projects listed above were supported in part by federal EPA §319(h) grants; however; this was not the only funding source. In FY19, DEQ coordinated projects in some of the above-listed IP areas that collectively spent $7,068,667 in state, federal and private funds to successfully install 954 BMPs in 20 IP areas encompasing 82 Implementation watersheds. In addition, other sources of agricultural and residential septic BMPs within additional implementation plan areas were reported. In FY19, a total of 1,563 agricultural and residential septic BMPs were installed within 57 IP areas encompassing 120 implementation watersheds, utilizing $8,121,865.24 in state, federal (non-319(h)), private funds and landowner contributions.

[2] Federal EPA Nonpoint Source Implementation Grant (319h); Watershed Improvement Fund Request for Proposals (WQIF RFP), State Virginia Natural Resources Commitment Fund (VNRCF), Virginia Natural Resources Commitment Fund - Chesapeake Bay Livestock Exclusion Initiative (VNRCF-CBLEI)

A total of 2,517 BMPs were installed in 76[3] IP areas encompassing 196[3] IP watershed areas. Table 2-4 below summarizes the BMP installation in implementation plan areas, distinguishing between implementation that was and was not coordinated by DEQ.

Table 2-4: Summary of BMP installation by coordination of work (DEQ or otherwise), FY19

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	82	954	$7,068,667	38%	47%	41%
Not Coordinated by DEQ	57	120	1,563	$8,121,865	62%	53%	59%
Total	**76[3]**	**196[3]**	**2,517**	**$15,190,532**	**N/A**	**N/A**	**N/A**

Implementation was almost evenly split between work within and outside of the Chesapeake Bay drainage. Of the BMPs installed, 47% were outside of the Chesapeake Bay in 46% of the implementation plan watersheds, accounting for 49% of the total BMP funding. 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, FY19

Watershed Drainage Basin	# of IP Reports	# of IP Watersheds	# of BMPs	Total BMP Cost	% of BMP	% of Funding	% # of IP Watersheds
Chesapeake Bay	41	109	**1,327**	**$7,796,186**	**53%**	51%	56%
Outside Chesapeake Bay	35	91	**1,190**	**$7,394,346**	**47%**	49%	46%
Total	**76**	**196**	**2,517**	**$15,190,532**	**N/A**	**N/A**	**N/A**

In FY19, a total of 2517 BMPs were installed at a total cost of $10,192,536 in federal,state, and other funds and $4,997,996 of landowner contributions for an overall total of $15,190,532 spent on BMPs in watersheds with TMDL implementation plans. A total of 486 BMPs were installed with partial or full funding from EPA Federal Section 319(h) funding. A summary of FY19 funding for BMP implementation in TMDL watershed areas is provided in Table 2-6 below.

[3] Some IPs include BMP installations both coordinated and not coordinated by DEQ.

Table 2-6: Summary of BMP installation by funding source within IP watersheds, FY19

Funding Source(s)	# of BMPs	$ of Cost-share Paid	$ of Landowner contribution	Total BMP Cost
Federal-319H	479	$952,441	$402,608	$1,355,049
Federal-319H & State Funding	7	$163,368	$104,725	$268,093
Federal-NRCS_RCPP	2	$16,200	$50,377	$66,577
Local Funding	304	$20,804	$1,313,038	$1,333,842
Local Settlement	5	$176,858	$2,927	$179,785
State-CREP	53	$168,149	$481,827	$649,977
State-VACS	1,591	$8, 548,799	$2,556,316	$11,105,114
State-VACS & Remediation Funds	2	$66,715	$0	$66,715
State-WQIF	74	$79,203	$86,177	$165,380
Grand Total	**2, 5172**	**$10,192,536**	**$4,997,996**	**$15,190,532**

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 196 implementation watersheds that received cost-share funds in FY19.

Table 2-7: Cost-share funds spent on implementation in FY19 classified by TMDL Implementation Plan

TMDL Implementation Plan & TMDL Implementation Watershed	# of Watersheds	# BMPs	Cost-Share Paid	Landowner Contribution	Total Cost
Back Bay Watershed	1	11	$26,298	$0	$26,298
Back Creek	1	1	$2,260	$447	$2,706
Banister River, Winn Creek, and Terrible Creek	2	3	$15,456	$4,911	$20,367
Beaver Creek and Little Creek	1	11	$5,789	$225	$6,014
Big Otter River Watershed	5	11	$419,130	$57,585	$476,715
Blackwater River (Upper, Middle, North Fork and South Fork)	2	7	$87,407	$40,236	$127,644
Buffalo Creek, Colliers Creek and Cedar Creek	5	10	$103,016	$40,391	$143,407
Carter, Great, Deep and Thumb Runs	4	6	$50,417	$13,633	$64,050
Catoctin Creek	2	8	$38,448	$5,039	$43,487
Cedar Creek, Hall Creek, Byers Creek and Hutton Creek	3	29	$30,153	$21,500	$51,652
Chestnut Creek Watershed	1	18	$9,876	$1,864	$11,740
Chickahominy River and Tributaries	1	33	$82,864	$0	$82,864
Chowan River Watershed	7	211	$250,485	$58,692	$309,177
Chuckatuck and Brewers Creek	1	26	$38,711	$0	$38,711
Clinch River and Cove Creek	4	20	$432,518	$134,354	$566,872
Cooks Creek and Blacks Run	2	20	$98,892	$27,517	$126,409
Craig, Browns and Marsh Runs	1	7	$30,154	$10,342	$40,496
Cripple Creek and Elk Creek	3	25	$138,802	$192,375	$331,177
Crooked, Stephens and West Runs and Willow Brook	2	2	$63,453	$36,028	$99,481
Cub Creek, Turnip Creek, Buffalo Creek and UT to Buffalo Creek	2	8	$371,293	$10,903	$382,196
Cunningham Creek Watershed Plan	1	1	$5,200	$3,972	$9,172
Dan River and Birch Creek	5	21	$75,298	$42,727	$118,024

TMDL Implementation Plan & TMDL Implementation Watershed	# of Watersheds	# BMPs	Cost-Share Paid	Landowner Contribution	Total Cost
Dodd Creek	1	1	$30,662	$7,665	$38,327
Fairview Beach	1	1	$708	$0	$708
Falling River	1	1	$0	21,196	21,196
Flat, Nibbs, Deep and West Creeks	4	58	$202,526	$260,606	$463,132
Greenvale, Paynes and Beach Creeks	1	9	$11,661	$0	$11,661
Guest River	2	2	$27,342	$9,114	$36,456
Hardware and North Fork Hardware River	2	30	$125,239	$148,416	$273,654
Hawksbill Creek and Mill Creek	2	10	$17,983	$66,167	$84,150
Hays, Moffatts, Walker and Otts Creeks	2	12	$82,217	$102,160	$184,378
Holmans Creek	1	5	$588	$1,638	$2,225
James River - Lynchburg	3	58	$128,886	$837	$129,723
James River and Tributaries - City of Richmond	1	2	$1,742	$0	$1,742
Kings Creek	1	1	$1,584	$0	$1,584
Linville Creek Watershed	1	50	$64,247	$275,188	$339,434
Little Dark Run and Robinson River	3	99	$627,980	$183,045	$811,026
Little River Watershed	1	6	$160,807	$66,827	$227,634
Long Meadow Run and Turley Creek	1	10	$2,653	$72,277	$74,930
Lower Banister River	1	9	$38,195	$4,023	$42,217
Lower Blackwater River, Maggodee and Gills Creek	3	8	$159,285	$43,543	$202,829
Middle Clinch River	3	10	$174,364	$88,105	$262,469
Middle Fork Holston River and Wolf Creek	4	17	$20,989	$17,452	$38,441
Middle River Watershed	4	49	$206,111	$45,270	$251,381
Mill Creek, Montgomery County	1	1	$0	$9,663	$9,663
Mill Creek, Northampton County	1	3	$4,009	$0	$4,009
Moores Creek	1	1	$1,600	$874	$2,474
Mossy Creek, Long Glade Run and Naked Creek	3	24	$119,343	$270,936	$390,279
North Fork Holston River Watershed	4	149	$793,512	$238,635	$1,032,147
North Landing Watershed (including Milldam, Middle, West Neck and Nanney Creeks)	2	21	$43,975	$0	$43,975
North River	4	60	$41,397	$191,520	$232,917
Occohannock Creek	1	20	$27,275	$0	$27,275
Opequon Creek Watershed	1	3	$26,533	$31,630	$58,164
Piankatank River, Gwynns Island, Milford Haven	5	38	$36,423	$0	$36,423
Pigg River and Old Womans Creek Watersheds	3	10	$331,134	$79,092	$410,227
Powell River and Tributaries	3	17	$507,801	$43,424	$551,225
Reed Creek Watershed	8	28	$439,260	$197,480	$636,740
Rockfish River Watershed	1	1	$225	$75	$300
Slate River and Rock Island Creek	6	54	$71,278	$36,422	$107,700
Smith Creek Watershed	1	39	$56,599	$689,145	$745,744
Smith River and Mayo River Watersheds	8	36	$362,293	$81,819	$444,111
South River Watershed and Christians Creek	3	93	$286,381	$83,080	$369,462
Spring, Briery, Saylers Creeks, and Bush and Little Sandy Rivers	4	34	$75,982	$87,713	$163,695
The Gulf, Barlow, Mattawoman, Jacobus and Hungars Creeks	6	19	$22,853	$0	$22,853

TMDL Implementation Plan & TMDL Implementation Watershed	# of Watersheds	# BMPs	Cost-Share Paid	Landowner Contribution	Total Cost
Three Creek, Mill Swamp, Darden Mill Run	5	473	$355,866	$158,348	$514,214
Tye River, Hat Creek, Rucker Run and Piney River	4	37	$250,864	$263,514	$514,379
Upper Banister River and Tributaries	1	1	$28,346	$59,811	$88,156
Upper Clinch River Watershed	1	1	$58,747	$10,367	$69,114
Upper Goose Creek, Cromwells Run and Little River	3	22	$303,995	$36,192	$340,187
Upper Hazel River, Hughes River, Rush River and Thornton River	4	76	$72,173	$34,672	$106,845
Upper Nansemond River	3	144	$183,957	$2,383	$186,341
Upper Rapidan River	9	106	$768,433	$104,965	$873,398
Upper Roanoke River - Part 1	3	18	$209,212	$36,160	$245,372
Upper Roanoke River - Part 2	1	1	$43,659	$0	$43,659
Upper York River Watershed	6	42	$149,717	$55,170	$204,887
Willis River Watershed	1	8	$58,009	$78,636	$136,645
Grand Total	**196**	**2,517**	**$10,192,536**	**$4,997,996**	**$15,190,532**

BMP Implementation Progress and Pollutant Reductions

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

TMDL BMP installations in FY19 resulted in the reduction of 310,370 pounds of nitrogen, 33,824 pounds of phosphorous, 18,297 tons of sediment, and 3.70E+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 FY19

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	486	2,031	2,517
Total Pounds Nitrogen Reduced	6,440	303,930	310,370
Total Pounds Phosphorus Reduced	1,487	32,338	33,824
Total Tons Sediment Reduced	1,667	16,631	18,297
Total of Bacteria Reduced (cfu)	4.29E+15	3.27E+16	3.70E+16

Table 2-9: Summary of BMP implementation for TMDL projects in FY19

Practice	Practice Description	# of BMPs	Extent of BMP Installed	Units	Acres Riparian Buffer	Linear Ft. Streambank protected	Animal Units Excluded
CCI-FRB-1	Forested Riparian Buffer - Maintenance Practice	3	19	Acres	N/A	N/A	N/A
CCI-SE-1	Stream Exclusion - Maintenance Practice	67	445,786	Lin. Feet	N/A	445,786	N/A

Practice	Practice Description	# of BMPs	Extent of BMP Installed	Units	Acres Riparian Buffer	Linear Ft. Streambank protected	Animal Units Excluded
CRFR-3	CREP Woodland Buffer Filter Area	25	77	Acres	N/A	N/A	N/A
CRSL-6	CREP Stream Exclusion with Grazing Land Management	26	49,234	Lin. Feet	42	49,234	753
CRWP-2	CREP Stream Protection	1	890	Lin. Feet	2	890	N/A
CRWQ-1	CREP Herbaceous Riparian Buffers	1	0	Acres	1	N/A	N/A
FR-1	Afforestation of Crop, Hay and Pasture Land	10	112	Acres	N/A	N/A	N/A
FR-3	Woodland buffer filter area	7	27	Acres	N/A	N/A	N/A
LE-1T	Livestock Exclusion with Riparian Buffers for TMDL Imp.	21	73,114	Lin. Feet	65	73,114	913
LE-2	Livestock Exclusion with Reduced Setback	7	20,379	Lin. Feet	N/A	20,379	222
LE-2T	Livestock Exclusion with Reduced Setback for TMDL Imp.	2	5,300	Lin. Feet	N/A	5,300	22
RB-1	Septic Tank Pumpout	422	422	Count	N/A	N/A	N/A
RB-2	Connection to Public Sewer	1	1	Count	N/A	N/A	N/A
RB-3	Septic Tank System Repair	28	28	Count	N/A	N/A	N/A
RB-3R	Conventional Onsite Sewage Systems Full Inspection and Non-permitted Repair	26	26	Count	N/A	N/A	N/A
RB-4	Septic Tank System Replacement	32	32	Count	N/A	N/A	N/A
RB-4P	Septic Tank System Installation/Replacement with Pump	14	14	Count	N/A	N/A	N/A
RB-5	Installation of Alternative Waste Treatment System	10	10	Count	N/A	N/A	N/A
SL-1	Long Term Vegetative Cover on Cropland	35	1,137	Acres	N/A	N/A	N/A
SL-10T	Pasture Management	1	166	Acres	N/A	N/A	N/A
SL-11	Permanent vegetative cover on critical areas	6	8	Acres	N/A	N/A	N/A
SL-15A	Continuous High Residue Minimal Soil Disturbance Tillage System	5	252	Acres	N/A	N/A	N/A
SL-6	Stream Exclusion With Grazing Land Management	150	500,943	Lin. Feet	541	500,943	7,222
SL-6T	Stream Exclusion with Grazing Land Management for TMDL Imp.	2	10,850	Lin. Feet	12	10,850	240
SL-7	Extension of CREP Watering Systems	8	621	Acres	N/A	N/A	N/A
SL-8	Protective cover for specialty crops	21	1,137	Acres	N/A	N/A	N/A
SL-8B	Small Grain and Mixed Cover Crop for Nutrient Management and Residue Management	1,192	42,339	Acres	N/A	N/A	N/A
SL-8H	Harvestable Cover Crop	331	15,456	Acres	N/A	N/A	N/A
SL-9	Grazing Land Management	11	541	Acres	N/A	N/A	N/A
VSE-5	Voluntary Stream Exclusion	1	10,000	Lin. Feet	8	10,000	50

Practice	Practice Description	# of BMPs	Extent of BMP Installed	Units	Acres Riparian Buffer	Linear Ft. Streambank protected	Animal Units Excluded
VSL-6	Voluntary Stream Exclusion with Grazing Land Management	1	4,930	Lin. Feet	4	4,930	50
VSL-8	Voluntary Protective cover for specialty crops	2	25	Acres	N/A	N/A	N/A
VSL-8H	Voluntary Harvestable Cover Crop	4	194	Acres	N/A	N/A	N/A
WP-2	Streambank protection (fencing)	2	1,330	Lin. Feet	1	1,330	54
WP-4	Animal waste control facilities	24	24	Count	N/A	N/A	N/A
WP-4B	Loafing lot management system	2	2	Count	N/A	N/A	N/A
WP-4C	Composter Facilities	7	7	Count	N/A	N/A	N/A
WQ-4	Legume-Based Cover Crops	9	917	Acres	N/A	N/A	N/A
	Grand Total	**2,517**	**N/A**	**N/A**	**675**	**1,122,756**	**9,525**

BMP installation efforts in FY19 resulted in the implementation of:
2,517 BMPs,
675 acres of riparian buffer, and
213 miles (1,122,756 linear feet) of stream protected from livestock access, excluding 9,525 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.

Cases where impaired waters have been restored or exhibit great improvements in water quality due to the implementation of pollution controls are identified as 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 FY19 goal for number of Success Stories and has exceeded by 8% its FY19 goal for number of segments discussed in those reports (see Table 2-10); three (3) Success Stories were submitted for three (3) impaired watershed segments with water quality improvements attributable to TMDL implementation actions. Table 2-11 lists all 39 Success Stories published since 2001 about Virginia watershed segments that have been partially or fully restored (Type 1 Stories – 29 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, FY19

Type of Success Story	Goal Unit	FY14 Baseline	FY18 Goal	FY18 Actual	FY19 Goal	FY19 Actual	% Progress of FY18 Goal	% Progress of 2019 Goal
Partial or Full Restoration (Type 1)	Stories	7	11	15	12	18	136%	150%
Partial or Full Restoration (Type 1)	Segments	12	16	26	17	29	163%	171%
Significant Water Quality Improvement (Type 2)	Stories	8	16	9	18	9	56%	50%
Significant Water Quality Improvement (Type 2)	Segments	9	17	10	19	10	53%	53%
Major Goal: Total Stories	**Stories**	**15**	**27**	**24**	**30**	**27**	**89%**	**90%**
Major Goal: Total Stories	**Segments**	**21**	**33**	**36**	**36**	**39**	**109%**	**108%**

Table 2-11: Published Success Stories through FY19

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
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

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	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[1]	TMDL Implementation
1	1	0	Slate River – Rock Island Creek	2018[2]	TMDL Implementation
1	1	0	Dumps Creek	2018[2]	TMDL Implementation
1	1	0	Deep Creek	2019[3]	TMDL Implementation
1	1	0	Middle River	2019[3]	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 and approved and published by EPA in 2019.

[3] These stories were submitted to EPA by 6/30/19 but were not yet approved or published by EPA.

DEQ completed three Success Stories in 2018/2019:

1. *Slate River – Rock Island Creek*
   Bacteria impaired water quality in Rock Island Creek causing violations of the state's designated recreation (swimming) use. Consequently, an 8.88-mile segment of Rock Island Creek was listed as impaired on Virginia's 2004 *Section 303(d) Total Maximum Daily Load Priority List and Report*. Installing residential and agricultural BMPs in the watershed helped reduce bacteria loadings, allowing Virginia to remove the impaired segment from the state's impaired waters list in 2016.

2. *Deep Creek*
   Bacteria from nonpoint sources including livestock, pets, humans, and wildlife impaired water quality in the Deep Creek watershed, causing violations of the state's water quality standard for bacteria. A 11.55-mile long segment of Deep Creek was listed as impaired on Virginia's 2002 *Section 303(d) Total Maximum Daily Load Priority List and Report*. Following agricultural BMP implementation, water quality monitoring in Deep Creek showed a decrease in bacteria violation rates. The impaired segment was removed from the state's impaired waters list in 2016.

3. *Middle River*
   Sediment pollution in the Middle River Watershed caused violations of the state's General Standard for aquatic life. Consequently, a 23.15-mile segment of Middle River was listed as impaired on Virginia's 2010 *Section 303(d) Total Maximum Daily Load Priority List and Report*. Agricultural BMPs installed in the watershed reduced sediment transport and helped improve benthic macroinvertebrate communities in Middle River. These water quality improvements allowed Virginia to remove the segment from the state's impaired waters list in 2016.

Figure 2-6 shows the geographic location of Virginia watersheds with Success Stories published since 2002. Please refer to the NPS Implementation progress reports included in Appendix 1 at the end of this report for examples of watersheds where water quality conditions may be improving as a result of implementation efforts.

Figure 2-6: Geographic location of Virginia watersheds with Success Stories (outlined in red), 2002-2019

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 FY19 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 (Table 2-12). The program continues the trend established in 2016 of exceeding its annual and five-year goals and has met and exceeded the five-year goal for the number of impairments covered by an IP that would be addressed by FY19.

Table 2-12: Comparative summary of TMDL IP development accomplishments in 2016 - 2019[4]

Program Area	Metric of Progress	Status: VAFY16	Status: VAFY17	Status: VAFY18	Status: VAFY19
TMDL IP Development	Total # of impairments included in IPs (completed or under development)	429	460	476	571
TMDL IP Development	% of annual goal for impairments addressed by a completed IP	110%	118%	122%	146%
TMDL IP Development	% of 2019 goal for impairments addressed by a completed IP	110%	118%	123%	146%

A comparison of the implementation rates from 2017 through 2019 is summarized in Table 2-13 below. All values reflect what has occurred per year and are not cumulative.

Table 2-13: Comparative summary of NPS implementation program accomplishments in 2016 - 2019

Metric of Progress	Status: VAFY16	Status: VAFY17	Status: VAFY18	Status: VAFY19
# of IPs with BMP installation	58	72	76	76
% of completed IPs with BMP Implementation	70%	83%	84%	83%
# of BMPs installed in IP watershed areas	881	2,759	2,321	2, 517
# of BMPs in IP areas funded with 319(h)	391	377	345	479
Total state/federal $ for BMPs in IP areas	$8,105,583	$13,316,377	$11,902,176	$15,190,532
Miles of streams excluded from livestock access	177	218	237	213
# of impaired segments addressed by a Success Story	27	33	36	39
% annual goal of # of segments addressed by Success Stories	100%	110%	100%	108%

In 2019, the TMDL Implementation Program saw an 8% increase in BMP installation within completed implementation plan areas compared to 2018 (see Table 2-13 above). This can be mainly attributed to an increase in funding spent on agricultural BMP installation from the state-funded Virginia Agricultural Cost-share Program in 2019 versus 2018. The 2019 program was able to protect 213 miles of stream from livestock access.

[4] During the development of the 2019 NPS report, it was determined that the numbers referenced in Table 2-12 for previous years (2016-2018) were in error in 2018; although, the tables and other data in the rest of the report were accurate. Therefore this analysis was updated in 2019 to accurately reflect the information for 2016-2019.

Challenges have been identified, which can assist DEQ in finding ways to overcome these issues 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 in 2019 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. Started in 2018 and continued in 2019, DEQ continued 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. Started new in 2019 were collaborations with the Virginia Department of Emergency Management.
- 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 in accomplishing 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.

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 (VACS) Program administered by DCR.

- DEQ continues to explore ways to ensure efficient design and approval of BMPs that are not included in DCR's manual. Started in 2018 and continued in 2019, DEQ staff have participated in DCR-lead agricultural BMPs technical advisory committees (TAC). DEQ also worked to strengthening its own BMP development and review process by engaging a contractor to review DEQ BMP manual materials and suggest changes and 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.
- 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 Pollution 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. SWCD then rank cost-share applications and fund those applications that will provide the greatest local water quality benefit.

Agricultural BMP Implementation

During 2019, DCR oversaw the completion and installation of over $17.4 million in agricultural BMPs, including over $12.3 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 FY19*

Costs and Funding Category	Amount
Actual BMP Cost	$17,424,839
Total Cost-Share Paid	$12,618,469
State Cost-Share Paid	$12,304,710
Non-State Cost-Share Paid	$313,759
Other Funding Amount	$665,695
Farmer Cost Before Tax Credit	$4,140,676
Tax Credit Amount Issued	$599,665

*Figures do not include approved BMPs carried forward into FY20 that are awaiting completion.

Table 3-2: Edge of field nutrient and sediment reductions resulting from state-funded agricultural BMP implementation in FY19*

Total Nitrogen Reduction (pounds/year) **	Total Phosphorus Reduction (pounds/year)**	Total Sediment Loss Reduction (tons/year)
10,162,924.94	3,625,401.82	784,438.51

*Figures do not include approved BMPs carried forward into FY20 that are awaiting completion.

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

Through June 30, 2015, DCR offered 100% grants for the SL-6 (Stream Exclusion with Grazing Land Management) practice to cost-share applicants. All participant applications received as part of this initiative since January 2013 (a 2.5-year period) have now been funded. As of June 2019, partially due to a supplemental appropriation by the Virginia General Assembly of $5.2 million, a total of approximately $100 million has been provided by the Commonwealth for this initiative. It is anticipated that this focus on livestock exclusion from surface waters will result in dramatic reductions in nutrient and bacteriologic contamination as these practices are implemented. The result of this funding will be over 1,858 stream miles of fencing and approximately 119,000 animal units excluded.

The United States Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS) state office staff are 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 reduce 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 in Agricultural Stewardship Act (ASA) and Total Maximum Daily Load (TMDL) programs, respectively. During the last fiscal year, DCR continued to upgrade this application. This Conservation Data Suite now has integrated modules with the added capacity to interface with those state agencies that protect cultural and historic resources as well as threatened and endangered species.

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, 2019, there were 466 plans covering 110,016 acres statewide. Additionally, 93 plans covering just over 23,271 acres have been certified in the last 12 months, and 24 new RMPs were developed on more than 4,000 acres.

Table 3-3: FY2019 Resource Management Plan (RMP) goal and progress

Goal	2019 Goal	2019 Actual	% Progress of 2019 Goal
Acres of RMPs developed in the Chesapeake Bay Watershed	10,000	23,271	272%

Nutrient Management

DCR administers a comprehensive nutrient management program. Currently, there are over 353,762 active nutrient management planned acres in the Commonwealth that were developed by DCR staff.

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. Seventy-seven permitted and 245 unpermitted dairies have nutrient management plans. Sixty-six of these permitted operations have current nutrient management plans, although 22 have expiring plans that are being renewed. Funding appropriated by the 2019 General Assembly will provide $900,000 for direct-pay grant opportunities for certified nutrient management planners. These funds will pay for the development, revision, and verified implementation of nutrient management plans, particularly in counties with fewer plans.

DCR has developed a new module, NutMan 4, which is completely integrated with the existing Conservation Application Suite. This new module collects data in a more systematic and thorough manner and allows for more accurate reporting and data collection. NutMan 4 is being implemented with DCR-certified nutrient management planners and DCR private sector contractors and is anticipated to be utilized by additional private nutrient management planners by FY 2021.

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. During the 2019 General Assembly Session, funding was provided for the poultry litter transport incentive program. With that funding, DCR has expanded the transport program to include Accomack County while still maintaining programs in Page and Rockingham counties. An agreement with the Virginia Poultry Federation allows DCR to leverage the state funding provided. As a strategy in WIP III, poultry litter transported from these three key counties needs to increase from 5,000 – 6,000 tons annually to approximately 89,000 tons annually by year 2025.

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 SWCD 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, 2018 through March 31, 2019, VDACS-ASA program staff responded to 63 official water quality complaints. In 19 of the complaints (30%), 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. In general, farmers involved in the complaint and correction process were cooperative in meeting the deadlines set up by the ASA, and it was not necessary

to assess any civil penalties. There were no corrective orders issued during the 2018 - 2019 program year for failure to maintain the measures included in approved stewardship plans.

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-1980s. 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 FY19, VDOF field personnel inspected 3,786 timber harvest sites across Virginia on 194,120 acres – a slight decrease from the number of acres harvested in FY18 (Figure 3-1).

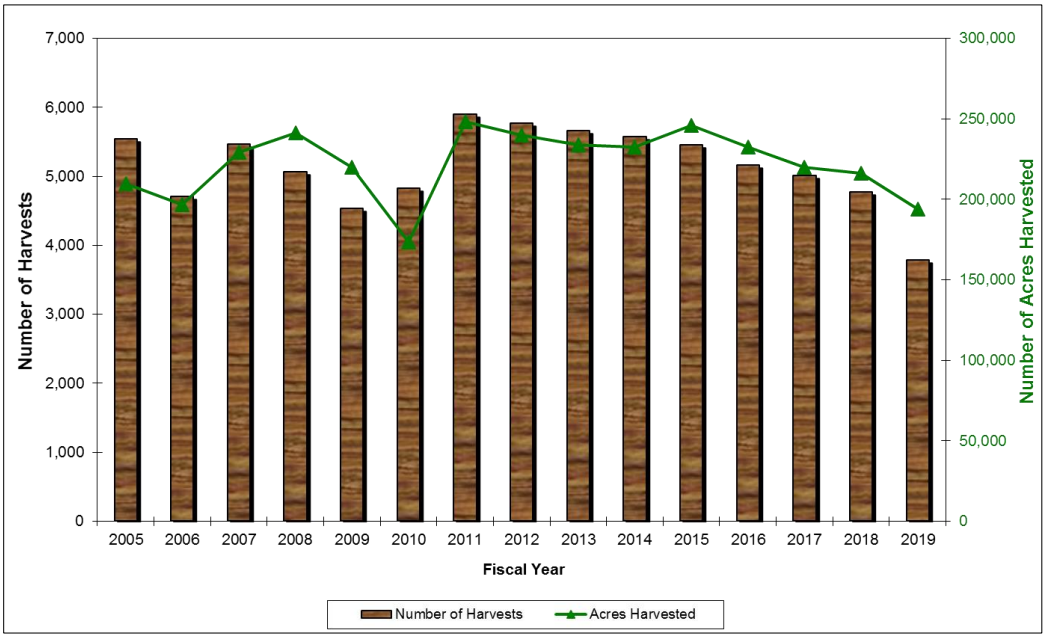

Figure 3-1: Number of harvests inspected and total number of acres harvested: 2005 through 2019

Logger Education

VDOF was involved in 22 Logger education programs in FY19, educating 441 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 9,713 harvesting professionals in 326 programs relating to water quality protection since its inception. Figure 3-2 exhibits historical levels of participation in VDOF logger education programs since 2005.

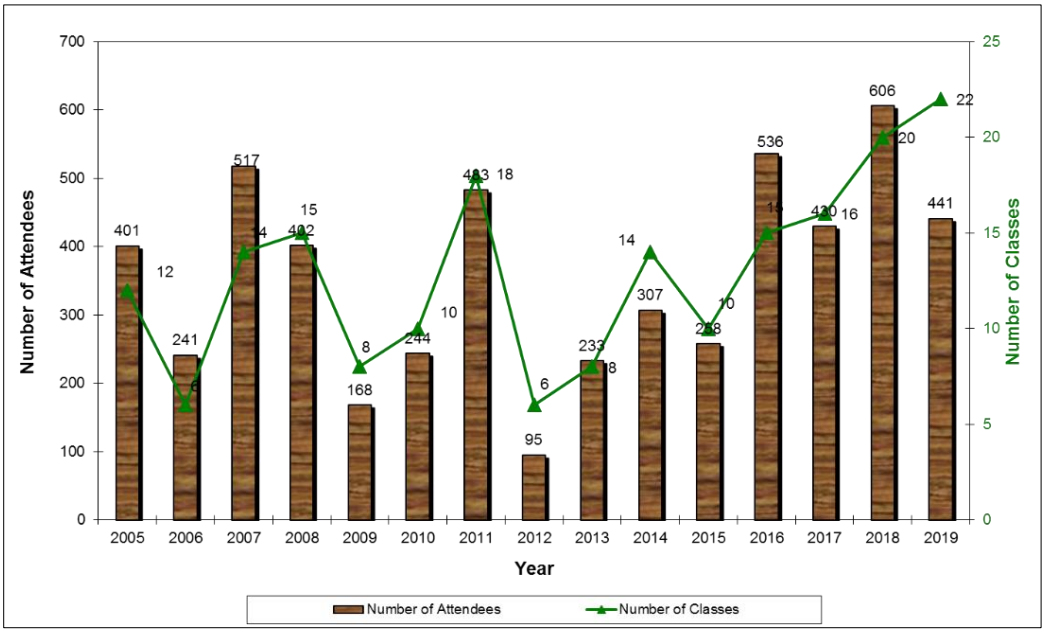

Figure 3-2: VDOF logger education: 2005 through 2019

Riparian Forest Buffers Technical Assistance

VDOF provides technical forestry expertise in the planning and creation of riparian buffers. In FY19, VDOF reported 59 riparian buffer establishment projects for 300 acres within the Chesapeake Bay watershed. These are projects where the VDOF was directly involved by providing technical forestry expertise in planning and creation of riparian forest buffers.

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 2018 (ending December 2018), VDOF issued Riparian Forest Buffer tax credits on 83 applications covering 1,205 acres of retained forested buffers. The tax benefit to forest landowners was $489,281.09 on timber valued at $2,016,626.87.

Flexible Riparian Buffer Program

VDOF is specifically tasked under § 10.1-1105 of the *Code of Virginia* with the "...prevention of erosion and sedimentation, and maintenance of buffers for water quality." The implementation of forested, vegetated riparian buffers is therefore a priority. Efforts in Virginia to retain forest land and promote riparian forest buffers must rely on an array of alternatives that assist and encourage landowners to retain their forests rather than convert them to other uses and to restore forest cover where it has been lost. However, the FSA

Conservation Reserve Enhancement Program (CREP) riparian forest buffer criteria do not work for all landowners; therefore, the Commonwealth is not reaching all potential RFB candidate landowners.

Using its strength as a statewide agency with professional field personnel, VDOF has begun working with partners to identify areas of high potential where trees can provide a solution to nutrient, sediment, and physical stream challenges. The initiative will target currently unengaged landowners that have not participated or who do not qualify for existing programs. Partners, like SWCD, other agencies, and nonprofits have often already identified some of these areas of need. VDOF would provide technical assistance and leverage funding to implement the buffer practices.

The effort is funded by two grants from the Virginia Environmental Endowment (VEE) and The National Fish and Wildlife Foundation (NFWF), respectively. One program is focused on the middle portion of the James River, and the second is focused on the Shenandoah/Potomac watershed. The goal in each will be to deliver tangible, measurable, and meaningful results, at substantial cost savings, on lands that have been difficult to reach through existing programs (gaps). The effort will help meet the special WIP III challenges associated with the James River and the Shenandoah/Potomac watersheds. VDOF has long and extensive experience in tree planting and has found that costs to establish trees are typically less than $250/ac. versus over $1000/ac for some federal forest buffer programs. Planning for and affecting the establishment of naturally regenerated forests cost even less. Further, VDOF will serve in the role of the general contractor, which will help control costs even further. A project goal is that sites selected should not compete with existing federal or state buffer programs.

Easement Program

The conservation easement program aims to maintain large, unfragmented blocks of forestland to ensure the land is available for forest management in perpetuity. Today, VDOF holds 184 conservation easements in 60 counties and the City of Suffolk that permanently protect over 58,000 acres of vital forestland, making the Department the second-largest holder of conservation easements in Virginia. In FY19, the easement program permanently protected 8,729 acres of open space and more than 53 miles of water courses through 15 conservation easements.

Forest Management Planning

VDOF has a strong role in forest management planning for Virginia landowners. Forest management plans are a foundational element in meeting the needs of landowners and meeting the broader resource objectives of the Commonwealth. Because forests are long-term by nature, proper planning and implementation of plans will help meet a variety of goals including water quality. Specifically, VDOF professional foresters prepare multi-resource forest management plans that address forests, timber, wildlife habitat, water quality, soils, and recreation. One of the flagship programs for these plans is the Forest Stewardship Program, a cooperative effort with the U. S. Forest Service, Cooperative Forestry section. It is delivered by VDOF to non-industrial private landowners who own the majority of Virginia's forests. Similar, equivalent plans like the American Tree Farm Program certification, or plans assisted by USDA, Natural Resources Conservation Service, are prepared by private consulting foresters. All of these multi-resource management plans address forests and water quality as a required element. Additionally, VDOF and private foresters prepare forest stand-level practice plans for more direct landowner needs in specific forest management projects and land-use plans that meet county and state requirements for the use-value taxation program. VDOF field staff also prepare pre-harvest plans to assist loggers in planning and strategies for specific areas to be harvested. These all aid in comprehensive resource and watershed management. In FY 2018-19 VDOF foresters recorded over 1,100 plans for over 65,000 acres in the Bay Watershed.

Forest management plans lead to implementation of forest management practices. These practices are the very essence of forestry and natural resource management in Virginia. They are action-based, designed to meet landowner and resource needs, and include harvesting, tree planting, preparing sites, improving forests, controlling erosion and sedimentation, establishing new forests, controlling invasive species, and helping to heal streams and watersheds. VDOF field staff provide technical assistance and administer financial assistance programs in implementing these practices. In FY 2018-19, VDOF recorded over 1500 forest management projects on nearly 54,000 acres in the Bay Watershed. More specifically, VDOF reported tree planting on nearly 600 sites for almost 23,000 acres. Of this, over 700 acres were established on previously non-forested land.

Urban Tree Canopy Program

The Virginia Urban Tree Canopy program assists communities by providing both cost-share funding and technical assistance to plant and maintain more trees on both public and private land. These trees will provide green infrastructure/stormwater benefits, thereby improving water quality across Virginia and specifically in the Chesapeake Bay. USFS Urban and Community Forestry Program (U&CF) will also support Urban Tree Canopy (UTC) analyses, tree inventories, and urban forest management plans for communities to give them better data and encourage better management of existing canopy. With the newly added Tree Planting – Canopy BMPs for the WIP III, a tracking platform for both communities and private citizens is being developed to help with reporting new tree plantings using ESRI® software. Funding will also be used to educate communities on how to use the platform for tracking and reporting.

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 calendar year 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 and 94.0 percent of the timber harvest acres statewide 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 99.17 percent of the sites visited had no active sedimentation present after the close-out of a harvesting operation. The BMP goal for WIP III is to achieve a 95 percent implementation rate 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 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. VDOF also collaborated with VDOT in identifying potential projects on public lands in the Shenandoah/Potomac River watershed where VDOT could undertake conservation projects to offset the TMDL impact of proposed road project construction.

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. Twenty-four additional projects were funded under "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. Funding for these programs was unavailable in FY19.

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 165 projects resulting in more than 52,000 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. Phase III has three tasks: (1) Work with two Virginia counties (Orange and Essex) to revise policies and ordinances to incentivize retention of forest and agricultural lands; (2) Create a working financial model to incentivize private sector investment ($500M+) in land conservation on a landscape scale and on a long-term sustainable basis; and (3) Coordinate with other Chesapeake Bay Program workgroups to integrate findings with those of other initiatives to institutionalize results across all Bay jurisdictions.

Carbon values have been selected as a water quality proxy to provide income streams and incentives for landowners and rural localities. Carbon offers the potential for aggregating interested landowner holdings so they can be offered at scale and with the market convenience required to attract large-scale private

capital investments. Further, the project is focusing on Virginia's Economic Development Authorities (EDAs) as an aggregating mechanism. Adapting the EDA structure to carbon as a proxy for water quality enables a role for counties, combined by choice, into a regional (watershed basin) entity to exercise the authorities granted within the EDA. The General Assembly passed legislation signed by the Governor in the 2019 legislative session to enable EDA's to serve such an aggregating role.

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.

Project Learning Tree

During FY19, VDOF Project Learning Tree (PLT) has provided 43 professional development trainings, of which 14 had strong foci supporting Meaningful Watershed Educational Experiences (MWEE) and watershed education. Annual PLT Facilitator Training now includes the Chesapeake Bay Agreement, the Mid-Atlantic Environmental Literacy Strategy, and a Guide to MWEE, so that the new facilitators will all be adding these components to their workshops.

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 FY19, VDOF was involved with 164 water quality actions initiated under the Silvicultural Law. Of these actions, one resulted in a Special Order, and two resulted in Emergency Special Orders being issued for violations of the law. In addition, there were 37 failure-to-notify violations by timber harvesting contractors during the fiscal year.

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. The Commonwealth of Virginia defines ecologically healthy watersheds as those that maintain high ecological integrity when viewed in a holistic assessment approach that addresses in-stream habitat, stormwater inputs, invasive species, and natural flows. 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 role of DNH is the identification, monitoring, and protection of unique aquatic and terrestrial communities and rare plant and animal species that contribute important ecosystem services or represent significant ecological resources or rare biodiversity from plant and animal species, populations, and

exemplary natural communities. Virginia is a member of the NatureServe Natural Heritage Network, which draws upon resources throughout the Western Hemisphere to advance biodiversity conservation and shares Virginia conservation information and successes throughout the Hemisphere.

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. While the Chesapeake Bay Basin has been and continues to be a priority, statewide data collection is necessary for the Program to make a long-lasting impact on the natural resources of the Commonwealth.

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 industries 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 in-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 (NGO) 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, Rappahannock, Chickahominy, or 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.
- Develop a watershed-based planning approach to conserve ecologically healthy waters utilizing both aquatic and terrestrial integrity to achieve the 2025 goal of 100% of state-identified currently healthy water and watersheds remain healthy (2014 Chesapeake Bay Watershed Agreement Goal).
- Evaluate the effectiveness of land protection and conservation actions from both State and NGO partners, including an analysis of those WQ BMPs applied by VDOF to determine if HW status remains and the land protection efforts from Nature Conservancy resulting in the maintenance of HW status.
- Evaluate land use changes and protection efforts in the Chesapeake Bay watershed in such locations of the Middle and Upper James River basin (Tuckahoe Watershed, confluence of the Jackson and Cowpasture), York River (Polecat Creek), and Lower Rappahannock River basin.
- Evaluate and define the steps to complete detailed INSTAR assessments in the Southern River Basins including the Clinch, Powell, New, Big Sandy, Yadkin, and Roanoke basins.

- Improve Healthy Waters Program capacity by developing consistent funding to support the acquisition of new data and support a full-time Healthy Waters Program Manager at DNH and additional staff at DNH, as necessary.

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, 2018 through June 30, 2019, VDH issued 7,394 new construction permits; 1,064 were for installation of alternative onsite sewage systems (AOSS). During the same period, VDH issued 2,158 repair permits statewide; 350 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.

The VDH Office of Environmental Health Services, including 35 local health districts, implements and oversees the state onsite wastewater program to protect public health and ground water quality. Across the state, there are approximately 1.1 million onsite sewage systems including approximately 30,000 AOSS. Roughly 550,000 of the total onsite sewage systems in Virginia are located in the Chesapeake Bay Watershed.

VDH has been involved with a variety of legislative initiatives aimed at decreasing pollution from onsite sewage systems across the Commonwealth. HB 2322 (2019 Va. Acts Ch. 429) passed in the General Assembly and was signed by Governor Northam. The bill directs VDH to develop a plan for the oversight and enforcement by VDH of requirements related to the inspection and pump-out of onsite sewage treatment systems. The bill specifies that the plan address localities in the Northern Neck, Middle Peninsula, and Eastern Shore. VDH is working with stakeholders in the identified areas to develop a plan to transfer the oversight and enforcement of pump-out requirements from localities to VDH. The anticipated goals of the plan are to facilitate a more consistent approach to enforcing pump-out requirements, increase the number of septic pump-outs occurring, reduce groundwater pollution, and extend the life of citizens' onsite systems.

Another piece of legislation, HB 2811 (2019 Va. Acts Ch. 441), passed in the General Assembly and was signed by Governor Northam with an immediate enactment clause. The bill amended § 58.1-3660 of the *Code of Virginia* to designate VDH as a "state certifying authority." This designation means VDH can certify certain equipment as "pollution control equipment," exempting it from state and local taxation. The exemption applies to equipment for onsite sewage systems serving 10 or more households that use nitrogen-reduction processes and technology and that are constructed, wholly or partially, with public funds. This bill encourages the use of community onsite systems over individual system installations, which provides more pollution reduction.

In 2019, the Secretaries of Natural Resources, Health and Human Resources, and Commerce and Trade worked together to form the Wastewater Infrastructure Work Group (Work Group) consisting of representatives of DEQ, VDH, Virginia Department of Housing and Community Development, and Virginia Resources Authority. The goal of the Work Group is to coordinate and maximize grants to landowners and localities to protect water quality, human health, and economically disadvantaged communities from inadequate, failing, or failed wastewater systems. The Work Group will be advised by the Center for Coastal

Resources Management at the College of William & Mary Virginia Institute of Marine Science on the presence of communities that do not have access to affordable wastewater solutions within the Chesapeake Bay watershed.

To assist in the repair of failing onsite sewage systems, VDH was awarded $300,000 from the Virginia Environmental Endowment (VEE) with an additional $200,000 from the Smithfield Foundation, the philanthropic arm of Smithfield Foods, Inc., for a total of $500,000. These funds will be used to repair failing septic systems and remediate illicit sewage discharges (straight pipes) from homes in the Yarmouth Creek and Morris Creek watersheds in James City County, the Pagan River, and Lawnes Creek watersheds in Isle of Wight County and the Lawnes Creek watershed in Surry County. VDH's primary objective is to help homeowners in these watersheds bring their systems into current regulatory compliance, thereby reducing total nitrogen and fecal coliform loads from each system.

The grant provides homeowners with failing septic systems a financial incentive to upgrade to an advanced treatment system with nitrogen reduction or connect to public sewer. VDH will base cost-share amounts on total household income level. The grant period runs for no more than three years (January 1, 2019 to December 31, 2021). During the first year of the grant, funding is available to homeowners in the four targeted watersheds with a household income of 200 percent or less of the Federal Poverty Guidelines (FPG) and a failing septic system. In October and November of 2018, VDH sent approximately 8,000 reminder letters to AOSS owners who were out of compliance with annual maintenance. The maintenance helps to ensure that AOSS are operating correctly and not polluting groundwater. The letter campaign was largely successful with health districts reporting up to a 60% increase in received reports compared to the same time in 2017.

VDH also worked with their internal communications office and an advertising agency to create a social media campaign to remind septic system owners to have their system pumped regularly. The video ads reached citizens in the rural areas of Virginia and helped to increase the number of pump-outs occurring.

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 FY19, DEQ provided funding to pump out septic systems, repair or replace failing septic systems, or remove straight pipes from at least 533 homes using $859,292 from grant funding sources and landowner contributions (Table 3-4). Grant funds active in FY19 were distributed throughout ten river basins (Table 3-5). DEQ generally disbursed funds through SWCD; 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, FY19

Name of BMP	BMP Practice Code	Number of BMPs Installed	Pounds of Nitrogen Reduced	CFU of Bacteria Reduced	Total Cost-share	Landowner Contributions	Total Cost of Practice
Septic Tank Pump-out	RB-1	422	1,182	2.10E+12	$79,836	$64,313	$144,149
Connection to Public Sewer	RB-2	1	31	4.98E+10	$4,684	$4,684	$9,368
Septic Tank Repair	RB-3	28	647	1.04E+12	$42,434	$36,690	$79,125
Conventional Onsite Sewage Systems Full Inspection and Non-permitted Repair	RB-3R	26	601	9.70E+11	$12,212	$10,083	$22,295
Septic Tank Replacement/Installation	RB-4	32	739	1.19E+12	$121,522	$97,748	$219,270

Name of BMP	BMP Practice Code	Number of BMPs Installed	Pounds of Nitrogen Reduced	CFU of Bacteria Reduced	Total Cost-share	Landowner Contributions	Total Cost of Practice
Septic Tank Replacement or Installation with Pump	RB-4P	14	324	5.22E+11	$93,643	$78,357	$171,999
Alternative Septic System	RB-5	10	231	3.73E+11	$120,064	$93,022	$213,086
Total	N/A	533	3,755	6.25E+12	$474,395	$384,897	$859,292

Table 3-5: 319(h)-funded residential septic BMPs by basin, FY19

Watershed Location	River Basin	# of BMPs	Federal 319(h) and State WQIF Funds	Total Cost of Practice	Bacteria Reductions CFU	Nitrogen Reduced Lbs./Year
Outside Chesapeake Bay	New River	0	$0	$0	0.00E+00	N/A
Outside Chesapeake Bay	Roanoke-Dan	14	$19,759	$30,422	5.15E+11	292
Outside Chesapeake Bay	Tennessee-Clinch	0	$0	$0	0.00E+00	N/A
Outside Chesapeake Bay	Tennessee-Holston	97	$34,665	$45,154	2.16E+11	132
Outside Chesapeake Bay	Upper Roanoke	11	$35,242	$52,703	6.25E+12	3,755
Outside Chesapeake Bay	All Basins Sub-Total	122	$89,666	$128,279	6.99E+12	4,179
Within Chesapeake Bay	James-Appomattox	46	$61,443	$107,248	5.20E+11	312
Within Chesapeake Bay	James-Rivanna	2	$6,800	$11,646	7.46E+10	46
Within Chesapeake Bay	Middle James	97	$127,478	$227,195	1.26E+12	759
Within Chesapeake Bay	Potomac-Shenandoah	45	$51,169	$105,612	5.15E+11	309
Within Chesapeake Bay	Rappahannock	197	$120,155	$247,784	2.63E+12	1,588
Within Chesapeake Bay	York	24	$17,685	$31,530	2.49E+11	148
Within Chesapeake Bay	All Basins Sub-Total	411	$384,730	$731,014	5.25E+12	3,162
Outside and Within Chesapeake Bay	**TOTAL**	**533**	**$474,395**	**$859,292**	**1.22E+13**	**7,341**

During FY19, 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.

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.

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 19, 2019, 3,171 sites have been inventoried in 580 of Virginia's 1,247 watersheds, or 46.5% the state's total watersheds. Of the inventoried sites, 1,047 sites (33.5%) were identified as safety hazards, and 156 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. During 2019, a total of 830.4 acres of mined land were 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.

Total recorded urban areas with nutrient management now exceed 35,235 acres through June 30, 2019 and is not reflective of acres reported in 2018 that may have expired. This total does not reflect of the actual urban acreage with nutrient management; the actual acreage may be higher. DCR estimates the additional acreage is roughly 115,000 acres. The VDACS acreage combined with the acreage reported through DCR nutrient management planner annual activity reports for required nutrient management plans on golf courses, localities with DEQ municipal separate storm sewer system (MS4s) permits, and state-owned land, covers the majority of fertilization of nonagricultural land in the state that is managed by professionals. As required by § 10.1-104.5 of the *Code of Virginia*, this includes all golf courses, which have obtained and are

implementing nutrient management plans. DCR continues to work with golf courses to ensure nutrient management plans are updated and revised as required by law.

An urban nutrient management target included in the 2014-2019 Virginia Nonpoint Source Pollution Management Plan 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. A total of 118 nutrient management plans have been developed for state-owned lands. These plans cover approximately 2,674 acres.

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. Master Gardener plans have been written for 1,611 homeowners totaling 637 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.

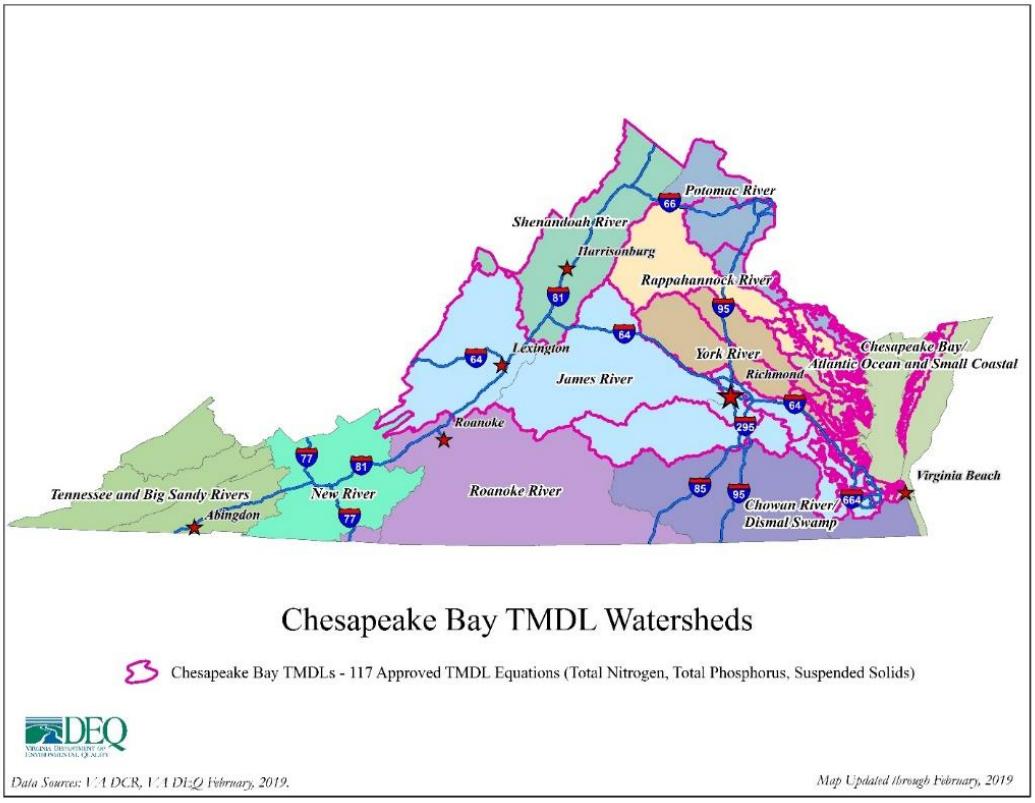

Figure 3-3: Chesapeake Bay TMDL watershed boundary

Virginia submitted its draft Chesapeake Bay TMDL Phase III Watershed Implementation Plan to EPA on April 5, 2019. The final plan was submitted to EPA on August 23, 2019. Virginia agencies are wrapping up the 2018-2019 WIP milestones period and drafting the 2020-2021 WIP milestones. 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.

2019 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

During FY19, the DEQ Local Government Assistance Program staff worked on Chesapeake Bay Preservation act (CBPA) compliance reviews for a number of CBPA localities. A total of 66 of the Bay Act localities have gone through the compliance review process and were found fully compliant or are working to resolve conditions under a Corrective Action Agreement; 18 localities remain scheduled to undergo a compliance review in the near future. 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.

If a locality does not meet the conditions by the deadline, additional compliance and enforcement is identified.

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 2018 annual report cycle (July 1, 2017 – December 31, 2018), 136 soil and water quality conservation assessments on agricultural land were conducted and 35,542 septic systems were pumped out.

Chapter 4 – Nonpoint Source Program 2019 Implementation Goal and Milestones

This chapter summarizes the accomplishments of the NPS Implementation Goals and Milestones for 2019, tracking back to the original milestones from 2014. As part of the Virginia Chesapeake Bay Watershed Implementation Plan II milestone processes (2018-2019 Milestones Closeout Report, 2016-2017 Milestones Closeout Report, 2014-2015 Milestones Closeout Report) activities, some milestone tracking originally committed in the 2014 NPS Management plan (associated with the WIP milestones at the time) have been suspended and potentially replaced with appropriate milestones from the current two-year milestone period. Key NPS Milestones for each major plan component are summarized in Tables 4-1 through 4-15.

Table 4-1: Agriculture - GOAL: Widespread adoption of cost-effective agricultural BMPs

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
A1	Determine resource needs for agricultural BMP implementation through SWCD. Conduct an annual agricultural needs assessment for General Assembly by November 1 of every year. CB A.4	DCR-DSWC	1 report per year	Complete - Updates to the agricultural needs assessment were prepared in August 2015, 2016, 2017, 2018 and 2019. The 2019 Agricultural Needs Assessment was included in the 2019 Chesapeake Bay and Virginia Waters Clean-Up Plan Report. The assessment was significantly updated this year to incorporate Virginia's Chesapeake Bay WIP III targets for the agricultural sector.
A2	Enhanced funding for livestock exclusion. Fund qualified stream exclusion practices at 100% with state funds. Changed to CBA1 as of 2016: Track and report the progress of livestock stream exclusion initiative.	DCR-DSWC	100% of SL-6 signed up by 6/30/2015. Report number of acres of vegetative buffers established, linear feet of stream-banks protected, and number of animal units excluded.	Original commitment NO LONGER TRACKED - Replaced with CBA1. COMPLETE: During the FY18-19 timeframe 457 stream exclusion BMPs were installed resulting in 1,959,907 linear feet of stream bank protection, 2,051 acres of buffer created and 23,085 animal units excluded. Note that these figures include all stream exclusion practices that were installed, not just those that were a part of the 100% reimbursement initiative.
A3	Track voluntary BMP collection statewide through development of BMP dataset for input to EPA-CBPO Watershed Model.	DCR-DSWC	Ongoing	COMPLETE: All Soil and Water Conservation Districts have the ability to enter voluntary BMPs through the Agricultural BMP Tracking Program and this information is reported along with all other BMP information. Specific information no longer tracked.
A4	Develop agricultural NPS assessment data. Data developed, analyzed, and reported to DEQ.	DCR/ DEQ	1 report every 2 years	COMPLETE - NPS Assessment developed for 2014, -16, and -18; 2020 data under development.

Table 4-2: Nutrient Management - GOAL: Improve water quality in Virginia's streams and rivers and the Chesapeake Bay

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
A16	Follow up with small AFO owners that are implementing remedies as initiated under the Small AFO Strategy.	DEQ/ VDACS	Track and report program results annually.	PREVIOUSLY COMPLETE -
A17	Provide outreach opportunities related to the Small AFO Strategy.	DEQ/ VDACS	Outreach opportunities (e.g., meetings with farmers and agency	COMPLETE - This milestone is an ongoing effort. Continue to provide opportunities for education related to the Small AFO Strategy as well as

			personnel, farm field days, farmer trainings, etc.)	promote the program. DEQ provided one outreach opportunity during this calendar year. Replaces NM8.
NM3	Increase the number of nutrient management plans on unpermitted dairies; 75% of facilities will have a NM plan by 12/31/2016. Changed to: Increase the number of nutrient management plans on unpermitted dairies. (Phase I WIP, pg. 76)	DCR-DSWC	75% of all facilities	COMPLETE - As of December 2017, 242 unpermitted dairies have active nutrient management plans, 69 of which did not have plans in 2016. There are only 287 remaining dairies that are unpermitted in the Bay region of Virginia. DCR shall continue to strive for 20 additional plans on unpermitted dairies each year; however, changes in Bay Grant Guidance (Local Funding) will prevent funding this milestone in the 2018 grant cycle and beyond.
NM5	Increase nutrient management planning to include 85% of all applicable state-owned land. Each year, 780,000 cumulative acres of agricultural nutrient management plans.	DCR-DSWC	780K ac NMP, cumulative	COMPLETE: see 2014-2015 Milestones Closeout Report
NM7	Complete evaluations of the remaining small AFOs in Virginia's portion of the Chesapeake Bay watershed in accordance with the Small AFO Strategy developed in cooperation with VDACS. Approximately 460 small AFOs remain to be evaluated out of the 800 identified in the WIP.	DEQ/ VDACS	460 AFOs evaluated by 12/31/19	COMPLETE - DEQ continues to work to complete the evaluations on the remaining 95 poultry operations in the Bay.
Unassigned	Increase the number of nutrient management plans on unpermitted beef operations.	DCR	Survey to determine the number of unpermitted beef operations.	COMPLETE: As of 12/31/2019 reporting, there are 18 unpermitted confined beef operations with current plans.
Unassigned	Issue/re-issue contracts to develop nutrient management plans on unpermitted dairies.	DCR	$265,000 in contracts with private nutrient management planners	COMPLETE - As of December 2017, 242 unpermitted dairies have active nutrient management plans, 69 of which did not have plans in 2016. There are 287 remaining dairies that are unpermitted in the Bay region of Virginia; DCR is still hopeful nutrient management plans can be written for 20 unpermitted dairies each year. Approximately $173,420 was spent over the two-year milestone period on contracts with private nutrient management planners; however, only approximately $30,420 was spent for unpermitted dairies. It was anticipated that the average unpermitted dairy would be about 300 acres; the average dairy has been less than 100 acres in size. Changes in Bay Grant Guidance (Local Funding) will prevent funding this milestone in the 2018 grant cycle and beyond.
Unassigned	Increase nutrient management plans on small farms.	DCR	15,000 new acres on small farms under nutrient management. This was changed in 2018 to 25 new small farm plans each year	COMPLETE: - As of December 31, 2017, there are 694 farms that are under 75 acres in size with plans. There have been 43 nutrient management plans written covering 5,245.1 acres. A total of 77 new nutrient management plans have been written on small farms during the FY18-19 period.

Unassigned	Project the number of additional/expanded poultry houses and assess any resulting increase in nutrients based on trends in permitting.	DEQ/ DCR	Annually report additional or expanded poultry houses and evaluate impacts to WIP allocations based on site-specific factors.	COMPLETE - This milestone is an ongoing effort. Information is collected when permit applications are processed and permits are approved. DEQ received and processed applications for 28 new poultry operations in 2016 and 34 in 2017. DEQ received and processed applications for expansions of eight existing poultry operations in 2016 and 16 in 2017.
Unassigned	Conduct continuing education classes and administer nutrient management certification examinations.	DCR	6 classes and 2 exams each year	COMPLETE - Four exams have been held during the FY18-19 period for both the Urban and Agricultural Nutrient Management. Six training sessions have been held and five continuing education classes have also been held during these two years.
Unassigned	Renew relationship with fertilizer companies to encourage and track precision agricultural application Small AFO Strategy.	DCR	45,000 acres of precision agriculture each year	COMPLETE - For 2019, DCR reports a total of 76,535 Enhanced Nitrogen and Phosphorus acres in Virginia's Chesapeake Bay watershed. There were 77,194 acres captured in 2018.

Table 4-3: Agricultural Stewardship Act - GOAL: Provide a commonsense solution to water pollution problems caused by agricultural operations

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
AS 8	Respond to all water quality complaints in a timely fashion.	VDACS		COMPLETE: All complaints were responded to, and this milestone is complete
Unassigned	Report BMPs installed to resolve Agricultural Stewardship Act (ASA) complaints.	VDACS/ DCR		COMPLETE: From state FY18-19, one stream exclusion BMP was installed as part of the resolution of an ASA complaint. Currently tracked in the ASA module of the Agricultural BMP Tracking Program whenever the proper resource improvement practice exists.

Table 4-4: Virginia Resource Management Program (RMP) - GOAL: Encourage the implementation of additional agricultural BMPs and increase the reporting and verification of voluntary BMPs

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
RM1	Achieve widespread implementation of the RMP by agricultural producers. Continue promotion and development of the Resource Management Program. Develop RMP on at least 40 agricultural operations annually by 12/31/2015. (CB A.6)	DCR-DSWC	40 RMPs annually	COMPLETE: DCR entered into contracts to develop Resource Management Plans.. As of August 31, 2019, there were 466 plans covering 110,016 acres statewide.
Unassigned	Continue development and certification of the Resource Management Plan (RMP) Program and promote adoption in coordination with industry partners. (Phase I WIP pg. 59, Phase II WIP pg. 19)	DCR	RMPs developed or certified on at least 10,000 acres of agricultural operations per year.	COMPLETE - In state fiscal year 2018 (7/1/17-6/30/18), DCR reported development of new RMPs on more than 14,000 acres. Completed as of 6/30/2019: 24 new RMPs were developed on more than 4,000 acres, and 93 plans covering more than 23,271 acres of land were included in RMPs that were certified as having completed implementation in the CB watershed from 7/1/18 - 6/30/19.
Unassigned	Tabulate the number of cost-shared and voluntary agricultural BMPs both existing and planned in RMPs.	DCR	Produce an annual RMP report that tabulates existing	COMPLETE - Annual reports were produced and distributed in December of 2017, 2018 and 2019. In fiscal year 2019, a running total of 2,972 BMPs were either implemented or proposed in RMPs. (367 implemented, 2,605 proposed)

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
			and scheduled BMPs.	

Table 4-5: 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

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
F1 (F3)	Continue with BMP training sessions for forest harvesting contractors, Professional Foresters and forest landowners.	VDOF	4 training sessions each year	Complete: Over the past two-year period (2018-2019), VDOF in conjunction with the SHARP Logger Program conducted 44 classes with 1,047 loggers, foresters and forest practitioners in attendance on harvest planning, and BMP implementation.
F2	Develop new online BMP training program for harvest contractors through Virginia Tech's Sustainable Harvesting and Resource Professional (SHARP) Logger Program focusing on underutilized harvesting BMPs and considerations for biomass harvesting practices.	VDOF	1 online training program each year	COMPLETE: VDOF has created four new programs over the past two years for the SHARP Logger Program which includes two mandatory face-to-face programs on forestry updates where the instructor goes over the BMP monitoring program results and focuses on those BMPs that show up as needing improvement on those results. Each of these programs is an hour and a half in length.
F3	Continue BMP implementation monitoring to determine BMP rates being applied to forest harvest sites within the Bay Watershed through funding provided by a CBRAP Grant.	VDOF	Annual Monitoring Report due in February of each year	COMPLETE: Continuous BMP Implementation monitoring has continued over the past two years with Annual BMP Monitoring Reports being produced in February 2018 and February 2019. Results have been posted to the VDOF website. BMP results for the Bay Watershed for calendar year 2018 was 93.3% and for the preceding year was 96.6%.
F4	Provide cost-share to forest harvesting contractors to implement BMPs. (Phase I WIP, pg. 110), provided funding is available.	VDOF	Individual Stream crossings and approaches treated, 30 projects funded annually if funding from the Water Quality Improvement Fund (WQIF) is available	COMPLETE: Two projects were completed from the 2016 WQIF funding provided in 2018 and a new allocation from WQIF was received in late-2019 with 22 projects approved for funding from this allocation and two of those projects having already been completed. VDOF only received half of the proposed WQIF funding; 22 additional projects will be funded when the second half of the funding is received.
F5	Continue enhanced enforcement of the Virginia Silvicultural Water Quality Law in the Chesapeake Bay Watershed utilizing CBRAP grant funding.	VDOF	Enforcement on 100% of harvest sites based upon established procedures and harvest inspection	COMPLETE: Over the past two calendar years, VDOF has taken enforcement action on 74 sites within the Chesapeake Bay Watershed under the Commonwealth's Silvicultural Water Quality Law. In FY19, VDOF was involved with 164 water quality actions initiated under the Silvicultural Law. Of these actions, one resulted in a Special Order, and two resulted in Emergency Special Orders being issued for violations of the law. In

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
			of each harvest site	addition, there were 37 failure-to-notify violations by timber harvesting contractors during the fiscal year. Please note that the DOF only reported actions and not sites.
F6	Provide cost-share funding to landowners to establish riparian forest buffers that would not otherwise qualify for cost-share funding through federal programs. (Phase I WIP, pg. 62)	VDOF	90% of harvested area treated updated to 15 projects annually when WQIF is available	COMPLETE: Over the past two planting seasons (Spring 2018 / Spring 2019) there have been 134 projects in the Bay watershed that have planted over 53,421 trees on riparian and urban projects throughout the Virginia portion of the Bay watershed under the Virginia trees for Clean Water Program, which is funded though WQIF as well as U. S. Forest Service Chesapeake Bay Grant funding.
F7	Slow the loss of forestland conversion and associated water quality benefits resulting from necessary municipal infrastructure development.	VDOF	Integrate VDOF-proposed forestland loss mitigation assessments into environmental impact review (EIR) processes.	COMPLETE: VDOF reviews all state Environmental Impact Statements on proposed projects and provides feedback on the incorporation of trees into those projects.
F8	Continue to focus riparian forest buffer establishment efforts in Potomac River Watershed and expand these efforts to the northern piedmont through the hiring of Buffer Specialists to work with NRCS, FSA, DCR, VDOF, SWCD and other partners though a focused riparian forest buffer - GIS targeting and CREP initiative.	VDOF	Special project areas	COMPLETE: Over the past two years, VDOF has worked through a U.S. Forest Service Grant with funding provided by the USDA Farm Service Agency to enhance forested buffers in the Shenandoah / Potomac River Watershed and the James River Watershed though the hiring of 3 Riparian Forest Buffer Specialists. In addition, the agency contracts with J&J Okay Consulting to provide targeted information to those specialists to enhance RFB Plantings with landowners who have a targeted need for buffers. The funding has continued into 2019 as the funds have not been fully utilized. The project has identified over 2,500 individuals that have been directly contacted through direct mailings and personal contacts.
F9	Permanently conserve forestland through permanent conservation easements or acquisition.	VDOF	Conserve 1,200 acres annually in the Bay Watershed.	COMPLETE: During the two-year milestone period, there were 8,570 Acres of Conservation easements recorded by the VDOF on 25 properties in the Chesapeake Bay Watershed. These easements protected 50 miles of watercourses associated with the conserved acres.
F10	Identification of incentives and drivers to assist communities directing growth away from key forestland assets such as groundwater recharge areas, intact and productive forests, and wildlife corridors to ensure forestland economic and ecosystem values are considered and weighed against competing land use options in land development decisions.	VDOF	Discussions with pilot area localities to encourage adoption of policies directing growth away from key forestland assets.	COMPLETE - not continued in 2018-2019 milestone commitments

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
F11	Initiate dialogue with EPA, Bay jurisdictions, and others to determine the feasibility of achieving credited TMDL nutrient or sediment reductions from conserving existing forestland in the context of the Chesapeake Bay model.	DEQ/ VDOF	Convene a group	COMPLETE - not continued in 2018-2019 milestone commitments

Table 4-6: 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.

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
LC1	By December 31, 2014, develop priorities and goals for Land Conservation in Virginia to be accomplished by 12/31/2017.	DCR-OLC/ DCR-DNH	Goals established	COMPLETED prior to 2019
HW1	By 2020, Virginia will conclude an assessment that will result in a statewide ecologically healthy watersheds list.	DCR-DNH	Assessment concluded by 2020	COMPLETE- The Department of Conservation and Recreation, Division of Natural Heritage (DNH) has completed a statewide resource threat and vulnerability assessment that permits prioritizing resources for conservation based on future potential changes. The DNH is completing a revision to the Watershed Integrity Model, now referred to as the Conservation Vision Watershed Model, that will improve watershed planning and conservation efforts in the Commonwealth. Updates to 10-year-old data in Bay Watershed portions of the state have been completed. Ecologically Healthy Water Natural Heritage Element Occurrences have been added to DCR Natural Heritage Biotics Database.

Table 4-7: On-site Septic Systems - GOAL: Protect public health and groundwater quality

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
S1	Develop and implement operation and maintenance (O&M) portions of final *Alternative Onsite Sewage Systems (AOSS) Regulations* (12VAC5-613). Issue manual and track implementation through 12/31/2014. (CB OSS.1)	VDH	Completed 12/31/2014	COMPLETE prior to 2019
S4	Work with DEQ and local governments to capture and report the number of septic tank pump-outs that occur as a result of the Chesapeake Bay Preservation Act requirements (local ordinances), voluntary efforts, and repairs throughout the Bay watershed.	VDH/ DEQ	36,000 septic tanks pumped annually	COMPLETE: DEQ continues to work with VDH on septic tank issues and anticipates a working meeting in spring of 2020 to discuss tracking and reporting of septic pump-outs in localities subject to the Chesapeake Preservation Act. In addition, DEQ continues to utilize EPA 319 funding to fund the installation of septic BMPs across the Chesapeake Bay watershed and is working with planning district commissions and localities on BMP reporting. Based on the 2018 annual report cycle (July 1, 2017 – December 31, 2018), 35,542 septic systems were pumped out.

S5	Work with DEQ and local governments to capture and report the number of connections to public sewer throughout the Bay watershed.	VDH/ DEQ	600 sewer connections by 12/31/15	COMPLETE : This milestone is no longer tracked; it was associated with the 2014-2015 Chesapeake Bay WIP II. VDH determined there were not sufficient tracking and reporting mechanisms to support this. In previous years VDH ran a pilot project to determine the feasibility of using online county information to update data on septic systems, including data on public sewer connections. VDH is in the process of hiring a new team member to continue the pilot project. The plan is to have the new team member use an approach VDH developed with another locality to evaluate the effectiveness of the pilot project approach.
S6	Report the number of alternative onsite sewage systems (AOSS) meeting the current BMPs for 20%, 38%, 50%, and 69% reduction.	VDH	13,500 lbs TN load reduction over baseline conditions at the edge of drainfield during the milestone period	COMPLETE systems were installed in 2018 and 2019 that provided a 20% reduction; 17 were installed that provided a 38% reduction; 630 were installed that provided a 50% reduction; and 263 were installed that provided a 69% reduction, equaling 21,727 lbs. of TN reduction compared to conventional onsite sewage systems.
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	Complete: From July 1, 2016 through June 30, 2017, at least 651 homes with septic issues were addressed through Section 319(h) funding. From July 1, 2017 through June 30, 2018, at least 551 homes with septic issues were addressed through Section 319(h) funding. From July 1, 2018 through June 30, 2019, as least 533 homes with septic issues were addressed through Section 319(h) funding.
Unassigned	VDH continues to operate the VENIS database and look for ways to improve its functionality replaced in later years with CB-OSS8.	VDH	Update or replace VENIS database for improved functionality by December 31, 2018.	Complete: In March of 2018, VDH began a yearlong database transition to a proprietary cloud-based system. This new system, fully deployed in April 2019, replacing VENIS, facilitates better data collection, and provides advanced environmental health informatics capabilities. VDH will continue working toward a complete inventory of all onsite sewage systems in the Commonwealth using the new system. The new "Environmental Health Database" is continually improving.
Unassigned	Implement a Global Positioning System (GPS) guidance policy for VDH staff in order to assign spatial location information to onsite sewage systems in the state.	VDH	Capture location of all new AOSS installed in the Bay watershed during the milestone period.	Complete: Address information entered into new Environmental Health Database (EHD) for all new OSS is automatically geocoded using Google's API.
Unassigned	Reduce repair time for failing onsite sewage.	VDH	By 2018, repair 43% of failing onsite sewage systems statewide within 60 days of becoming aware of the failure.	Complete: VDH established a statewide goal that 43% of failing onsite sewage systems would be repaired within 60 days. This metric was tracked using the statewide environmental database and measured on a monthly basis at the Health District level. The tracking has been suspended since May 2019 due to database development, and we will start measuring again once the database has the ability to provide the information**.** Prior to May 2019, the goal for 43% was achieved for 9 straight months.

Table 4-8: Resource Extraction - GOAL: Reduce water quality impacts associated with current and abandoned/orphaned resources extraction activities

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
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	COMPLETE – DMME and DEQ continue to coordinate efforts for reporting data on BMPs. This effort is complete
RE2	Ensure compliance with permit conditions for proper site planning and BMP implementation. (CB E.2)	DMME	24,000 acres E&S each year	COMPLETE – 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	COMPLETE - During 2019, DMME's Division of Mineral Mining documented the completion of reclamation on a total of 830.4 acres of 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		COMPLETE - 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		COMPLETE - As of the end of 2018, a total of 3,171orphaned mined land sites have been inventoried in 580 of Virginia's 1,247 watersheds, or 46.5% 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		COMPLETE - 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.

Table 4-9: 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

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
U2	Implement Virginia Conservation Assistance Program (VCAP) residential scale urban BMP cost share program.	DEQ	Report installed practices in annual progress report.	COMPLETE - All VCAP practices are reported into DEQ BMP Warehouse annually.
U5	Achieve reductions from new development and redevelopment using urban BMPs through ramped-up compliance with the Virginia	DEQ	System completed by 12/31/17	NO LONGER TRACKING. In 2017, the VSMP program integrated its tracking and reporting requirement into DEQ's BMP Warehouse tool to allow for permittees to

	Stormwater Management Permit (VSMP) and the stormwater provisions of the Chesapeake Bay Preservation Act (CBPA). Consolidated BMP tracking system will capture BMPs installed for both CBPA and VSMP compliance. (CB U.7)			report their progress. This information will then be able to be reported for bay requirements.

Table 4-10: Urban Nutrient Management - GOAL: enhance overall program to increase areal coverage of nutrient plans, improve outreach

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
U11	Promote Nutrient Management (UNM) on Urban Turf.	DCR	Certify 6 new UNM planners; implement 6 new VA Grass Roots programs; increase volunteer capacity by 60 new Master Gardeners.	COMPLETE - Two urban nutrient management training sessions were held in 2017; twenty-six people attended. There has been a very slight reduction in the number of urban nutrient management planners. In February 2016, there were 134 planners; by the end of 2017, there were 132. The Virginia Grass Roots program has stalled. While meetings have been held and ideas have been discussed, no new programs have been initiated. The Master Gardener program continues to assist homeowners by developing nutrient management plans. These programs contribute to accelerating implementation of urban nutrient management. Over 1000 of these nutrient management plans were written, covering 669 acres. To date, we do not have the exact number of Master Gardeners who have been added to the program. As of 12/31/2019, no additional counties to report. Developing counties that are in need of master gardener programs are Culpepper, Chesapeake, Albemarle and Loudon counties. A new grant has been provided to 4-H program at Virginia State University in 2019 to begin assisting to in reach this goal.
U12	Complete development of online fertilizer sales data tracking system.	VDACS	Automated fertilizer sales data tracking	COMPLETE - Completed June 2016. Data reporting and tracking system was available for use for 2016 reporting year. This milestone demonstrates substantial progress in resolving EPA identified concerns about compliance with Virginia Fertilizer Law and documentation of non-farm fertilizer sales/trends.
U13	Utilize improved fertilizer sales data. Updated fertilizer sales data will be compared to historic fertilizer sales data and/or baseline as basis for continued credit for Urban Phosphorus fertilizer legislation.	VDACS	Data developed, analyzed, and reported to DEQ	COMPLETE - Fertilizer sales tonnage data collected by VDACS for July 2016 – June 2017 was submitted to DEQ on November 21, 2017.This milestone demonstrates substantial progress in resolving EPA identified concerns about compliance with Virginia Fertilizer Law and documentation of non-farm fertilizer sales/trends.
UNM1	Nutrient Management on Urban Turf – update standards and criteria per 2013 legislation. Cumulative. (CB U.9)	DCR-DSWC	110 urban nutrient management planners, 35 VT extension specialists and 600 VDACS-certified fertilizer applicators by 12/31/2015	COMPLETE - 171 urban nutrient management planners have been certified in the program and 20 VT extension personnel have been trained and certified. VDACS has reported that over 900 people have been certified through their fertilizer applicator program.

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
UNM2	Nutrient management on urban turf – residential sector. (CB U.10)	DCR-DSWC	6 urban residential turf pilot projects by 12/31/2015	COMPLETE. – This was previously reported, and the work completed several years ago
UNM3	Nutrient management on urban turf grass – golf courses. Begin development of cost-share program for golf course nutrient management. (CB U.11)	DCR-DSWC	Urban nutrient management plans completed on 11,000 acres of golf courses by 12/31/2015	COMPLETE - 181 golf courses totaling 18,961 acres have plans.
UNM4	Nutrient management on urban turf – state-owned facilities. (CB U.12)	DCR/ VDACS	85% of facilities will have active plans by 12/31/2015.	COMPLETE - 86% of state-owned facilities have current plans.

Table 4-11: Chesapeake Bay and Coastal Zone Management Programs - GOAL: implement effective local programs, promote sustainable coastal communities, and enhance local government capabilities

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
CB1	Conduct compliance reviews of local Chesapeake Bay Act programs once for each locality by 2019.	DEQ	Complete a compliance review of 84 local Bay Act programs once for each locality by 2019.	CONTINUING – As of December 31, 2019 the DEQ Local Government Assistance Program staff have been striving for all 84 CBPA localities to be in the position of completing the periodic (every five years) compliance review of their local program by the end of calendar year 2019. A total of 66 of the Bay Act localities have gone through the compliance review process and were found fully compliant or are working to resolve conditions under a Corrective Action Agreement; 18 localities remain scheduled to undergo a compliance review in the near future.
CZ1	Develop 5-year Section 309 Strategies (2016-2020) by 10/1/2015.	DEQ-CZP	Strategies developed by 10/1/2015	COMPLETE – this was completed and reported previously
CZ2	Implement Current 5-year Section 309 Strategy (2011-2016).	DEQ-CZP	Strategy implemented	COMPLETE – this was completed and reported previously
CZ3	Water quality projects implemented though regional governments: competitive process underway to determine direction for next two years of funding, 9/1/2014 - 9/1/2016.	DEQ	Water quality projects implemented	COMPLETE – this was completed and reported previously

Table 4-12: Source Water and Groundwater Protection - GOAL: manage water resources for sustainable long-term use

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
SW1	55% of the population protected by waterworks with a substantially implemented	DEQ/ VDH	55% population and 16% of systems protected	COMPLETE - These goals were exceeded at 68% and 37%, respectively.

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
	protection plan and 16% of community water systems protected.			
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	COMPLETE - 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.

Table 4-13: Watershed Planning and Implementation - GOAL: develop plans to facilitate water quality improvements and eventual delistings

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
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.	DEQ	Equivalent to 50 TMDL equations per year ~250 equations by 2019	COMPLETE - Over the past fiscal year, 30 TMDL equations (27 new, 3 revised) each representing a watershed area draining to impaired surface waters, have been approved by EPA. As of June 2019, Virginia has completed 1087 TMDL equations, which includes 142 since 2015).
W5	Number of TMDL Implementation Plans or Watershed Based Plans completed and EPA-approved.	DEQ	30 new Plans by 2019 (Goal 102 total)	COMPLETE - 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). The 2019 goal is 90.2% complete with20 with new plans completed since 2014, a total of 92 plans completed through June 2019. This activity is 90% of 2019 goal (of 102 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)	COMPLETE - 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). A Total of 571segments were addressed in implementation plans as of June 30 2019 (a total of 95segments were added in 2019); 146% of the 2019 goal of 390 segments was achieved.
W7	Number of TMDL implementation projects active annually.	DEQ	20 per year	COMPLETE - 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. 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.

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
				In 2019: 23 active 319(h)-funded projects in 21 implementation plan areas collectively installed 962 BMPs (not all funded by 319(h)) in 82 implementation watersheds. There were a total of 76 active implementation plans statewide; 2,762 BMPs installed in 196 IP watersheds. Statewide, within IP areas, 213 miles (1,123,279 linear feet) of stream was fenced from livestock access, excluding over 9,525 animals from streams, and created or protected 675 acres of riparian buffer. Statewide 533 homes in IP areas had issues with their septic systems addressed.
W9	Update DEQ TMDL BMP Cost-share Guidelines by June of every year.	DEQ	5 guidelines developed annually	COMPLETE - 2015, 2016, 2017, 2018, and 2019 guidelines developed and approved.
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. Requirements for Phases 3 and 4 were developed in Summer 2019. Phase 3 will start January 2020
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 completed August 2019; requirements for 4th and 5th phase were developed in August 2019 and will begin in 2020.
W16	Number of waterbodies identified in VA's Integrated report (IR) as being primarily NPS-impaired that are partially or fully-restored (WQ-10): Identify partially or fully restored waterbodies in Appendix C of state's IR primarily impaired by NPS pollutants in 303(d) list or integrated report.	DEQ	1 Type-1 Success Story per year, 5 by 2019	COMPLETE – EXCEEDED, 3 Type 1 addressing 3 impairments for a total of 11 Type 1 stories addressing 17 impairments since 2014
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	COMPLETE - Zero Type-2 published, two 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	COMPLETE - 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. 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 : The calculator by which pollution reductions for nutrient management plans were calculated was changed in 2019 to coincide with updated processes to related to Chesapeake Bay Model estimates for BMP loading. As a result,

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
				pollution reductions for nitrogen and phosphorous were significantly less than in years past but reflect an accurate accounting associated with new WIP III estimates. FY2019 reductions: 537,623 pounds of Nitrogen, 60,802 pounds of Phosphorous, 1,959 tons of sediment and 4.67E+15 CFU of pathogens (*E. coli* 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.	COMPLETE – reports on implementation progress of 11 plans are included in the 2017 annual report, 15 are included in the 2018 annual report, and 19 are included in the 2019 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.	COMPLETE – 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. As of June 2019, BMP warehouse was not ready to report this information.
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	COMPLETE – DEQ started in March 2018 the process of updating VA's 2014 NPS Pollution Management Plan. A draft was submitted in June 2019 and a final was submitted in January 2020.

Table 4-14: Water Quality Programs - GOAL: implement Water Quality Monitoring Strategy

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
WQ3	Maintain water quality monitoring of NPS implementation project areas to document success.	DEQ	Report number of stations monitored.	COMPLETE - 127 stations monitored in 2016 and 2017 –186 stations monitored in 2018. The 2018 plan monitors 186 stations in 110 streams located within 58 TMDL implementation plan areas for water conditions during or after TMDL implementation activities. For 2019, Virginia monitored approximately 50 stations as 2019 was a transition year while the program adjusted to changes in the bacteria standard.
WQ4	Continue water quality monitoring for watersheds associated with USDA's National Water Quality Initiative.	DEQ/ NRCS	3 projects	COMPLETE - 3 projects monitored in 2017, 2018 and 2019, two of those sites were dropped for 2019 and two additional sites were picked up, for a total of 4 NWQI sites for 2020.

Table 4-15: Watershed Prioritization - GOAL: develop and implement watershed strategies

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
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)	COMPLETE – 2014, 2016, 20118 NPS Assessments completed and part of Integrated Reports; 2020 assessment is underway.

Milestone	VA Statewide Milestone Description	Lead	2019 Goal	2019 Status
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 by 2014.	DEQ	Framework and process by 2015	COMPLETE - 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	COMPLETE- 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 the 2018 reporting cycle. In 2019 eight Bay area roundtables and three Southern River Roundtables.

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.

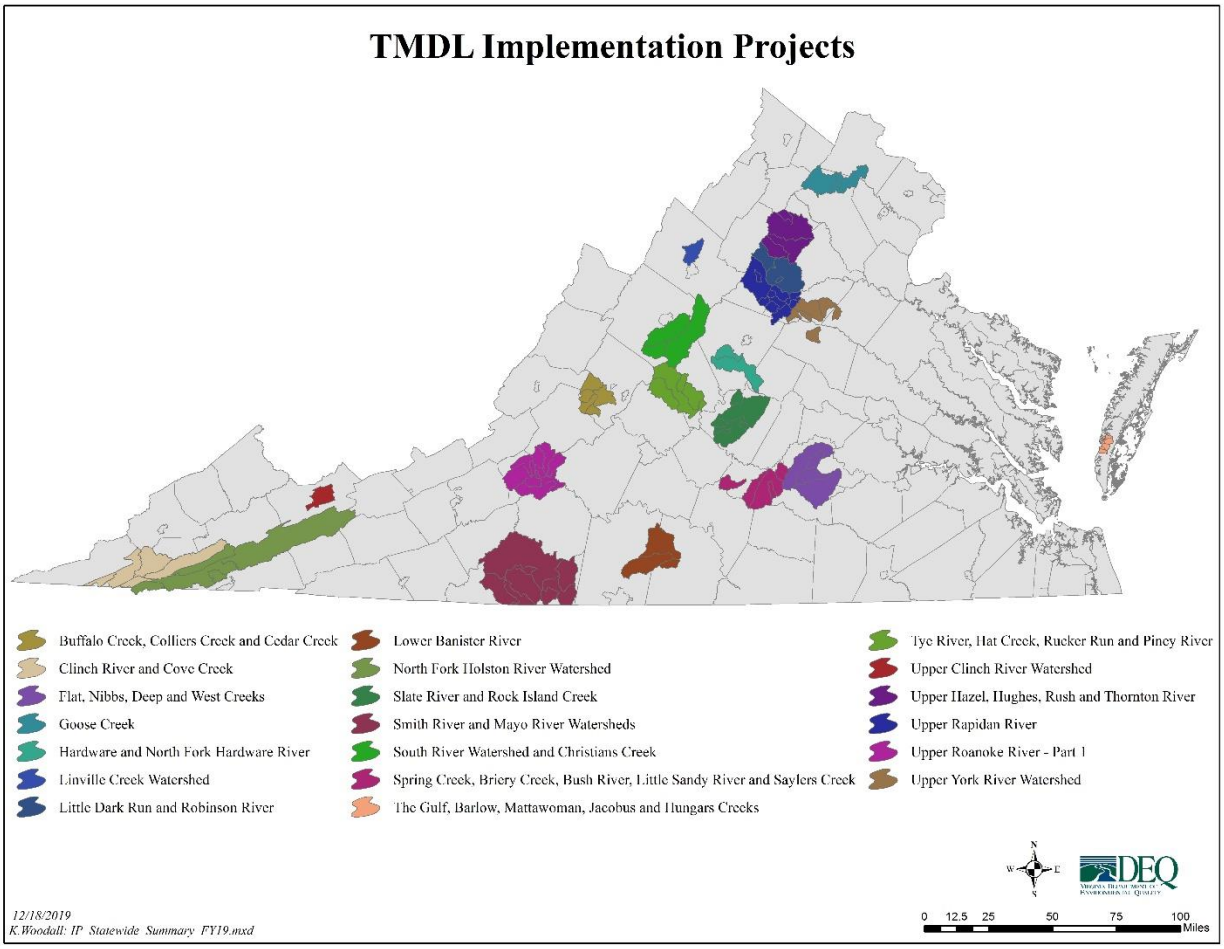

Figure A1-1: Map of implementation projects completed or under development, FY19

Summaries of 20 progress reports are provided in this appendix. All reports, including PDFs of the progress reports, can be found here.

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 primarily 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 Watershed**

  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 SWCD has administered the TMDL implementation project, which supports both agricultural and residential septic BMP implementation. Since the project started, 10 stream fencing BMPs have been implemented, excluding livestock from 14,289 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 2017 were analyzed to demonstrate a baseline in water quality conditions for the project. In 2018, DEQ shifted monitoring resources from the Buffalo, Colliers, and Cedar Creeks watersheds to support monitoring needs in other areas of the state. Monitoring will resume in 2020 with the goal of capturing the effect of recently installed BMPs.

- **Clinch River and Cove Creek Watershed**

  Waterbodies in Clinch River and Cove Creek implementation watershed located in the Clinch River Basin in Scott, Russell, and Lee Counties were listed as impaired due to violations of the state's water quality standards for *E. coli* bacteria. Administered by the Clinch Valley SWCD, the implementation project, which began in November 2018, focuses on the Moll Creek subwatershed in Russell County. Additional agricultural BMPs have been funded by the Department of Conservation and Recreation (DCR) since January 2018. Cumulatively, these projects have resulted in the implementation of over 2.6 miles of stream exclusion and 176 acres of grazing land management (352% of the implementation goal) in the watershed. Water quality data for 2018 through 2019 show a decreasing trend in violation rates, but monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes.

- **Flat, Nibbs, Deep, and West Creeks Watershed**

  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 137 stream exclusion practices have been installed, fencing livestock from 352,807 feet of stream. Additionally, 94,372 feet of stream fencing was maintained for an additional period, 611% 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 funded 47 septic tank pump-outs, two septic system repairs, 14 septic system installations, and three alternative waste treatment systems. Water quality data collected by DEQ for the period of 2007 through 2019 suggest relatively unchanged water quality conditions in Flat Creek. However, data collected in Deep Creek show a decline in violation rates in two assessment periods, indicating improvement in water quality. In fact, an 11.55-mile long segment of Deep Creek attained water quality standard and was delisted from impaired waters list.

- **The Gulf, Barlow, Mattawoman, Jacobus, and Hungars Creeks Watershed**

  The Gulf, Barlow, Mattawoman, Jacobus, and Hungars Creeks watershed located in Northampton County, Virginia, consists of five main watersheds and three subwatersheds, which are direct drainages to the Chesapeake Bay. All of the watersheds, excluding Barlow Creek, are impaired for fecal bacteria

and shellfishing designated use. Windshield surveys performed in 2014 on the Bay Side of the Eastern Shore indicate many homes are without indoor plumbing, which suggests humans are a significant source of bacteria loadings. Supported by 319(h) funds and match from Southeast Environmental Rural Community Assistance Project, Accomack-Northampton Planning District Commission (ANPDC) is leading the residential septic implementation program in the watershed. As of June 2019, none of the septic BMPs recommended in the implementation plan had yet been implemented, but ANPDC is continuing its efforts with a focus on outreach and raising awareness. As implementation has just begun, water quality data have been analyzed only to set a baseline for conditions in the watershed. Monitoring over a longer period of time following greater BMP implementation is needed to corroborate water quality changes.

- **Hardware River Watershed**

  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 SWCD 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, 19 stream fencing BMPs have been implemented, excluding livestock from 104,666 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: 51 pump-outs and six septic system repairs were performed, and six new septic systems have been installed. Water quality data collected by DEQ for the period of 2010 through 2019 were analyzed to demonstrate a 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 Watershed**

  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 administered a residential septic, pet waste, and stormwater BMP implementation project that started in July 2015 and concluded in June 2019. The SVSWCD also administered an agricultural BMP program; which notably has supported 1,548 acres of cover crops, 98% of the implementation goal, 72 acres of permanent vegetative cover on cropland, and 43,837 linear feet of stream exclusion fencing. The residential septic program was very well-received: in total, 76 septic tank pump-outs were performed, eight septic systems were repaired, 11 septic systems were installed, and one alternative waste treatment system was installed. Extensive efforts were also made to reach out to pet owners in the watershed, leading to significant progress in achieving pet waste BMP goals including three pet waste stations (75% of the goal) and 20 pet waste composters. Two bioretention practices were installed, including one at a public high school, where students learned about the water quality benefits of the project and assisted with planting. SVSWCD additionally completed a riparian buffer planting at a residential property in the watershed with an educational sign installed along a nearby walking trail. Water quality data collected by DEQ for the period of 2006 through 2019 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.

- **Lower Banister River and Terrible Creek Watershed**

  The Lower Banister River watershed is located in the Dan River Basin in Halifax County, Virginia. This project focuses on the Lower Banister River and Terrible Creek watersheds combined with Winn Creek.

The waterways were listed as impaired due to violations of the state's water quality standards for fecal coliform bacteria. Started in 2018, the implementation project (which excludes Winn Creek) is administered by Halifax SWCD. In total, seven stream exclusion fencing systems have been implemented, 31 acres of pasture have been reforested, and permanent vegetative cover has been established on 50 acres of erodible cropland/pasture and nearly six acres of critical areas. In the residential program, two septic systems have been repaired. Water quality data collected in the Lower Banister River for the period of 2009 through 2019 suggest fairly consistent trends in violations of water quality standards. Monitoring over a longer period of time with consistent improvement is needed to corroborate water quality improvements.

- **North Fork Holston River Watershed**

  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 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 192,103 feet of stream exclusion fencing were installed and 3,836 feet were maintained. Additionally, 1,135 acres of cover crops and five waste control facilities were implemented. The residential septic program in Scott and Washington Counties have overcome their initial challenge of acquiring a properly licensed contractor to perform the work. In fact, all three projects are using the same contractor to implement all of their residential septic work, and 96 septic system pump-outs have been performed. Water quality data for the period of 2014 through 2019 show an overall increasing trend in violation rates in North Fork Holston River with a slight reduction in 2019. However, monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes.

- **Robinson River and Little Dark Run Watershed**

  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. Since 2012, 363 septic tank pump-outs (100% of the implementation goal), 36 septic system repairs, 17 septic system installations, and four alternative waste treatment system installations were completed in the watersheds. Additionally, 78 stream exclusion fencing systems were installed, protecting 299,899 feet of stream. Other agricultural projects completed during this period include 3,130 acres of small grain cover crop and 1,560 acres of harvestable cover crop. After relatively stable bacteria exceedance levels in 2011-20017, higher exceedance rates occurred in 2018 and 2019; 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 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 Watershed**

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 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 and continued through 2019. In that time, 32 systems including 80,877 linear feet of livestock exclusion fencing were installed, and 47 acres of erodible cover crop were reforested (157% of the implementation goal). Also, 179 septic tank pump-outs, five septic system repairs, 23 septic system installations, and four alternative waste treatment systems have been implemented. Water quality data collected by DEQ for the period of 2009 through 2019 indicate potential decline in water quality in Slate River at monitoring station 2-SLT003.68; however, monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes. Data collected at station 2-SLT030.19 (for years 2006 and 2019) on Slate River 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 Watershed**

  The Smith River watershed is located in the Dan River Basin in Henry and Patrick Counties. 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 SWCD 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, 25 septic pump-outs have been performed, one home has been connected to public sewer, four septic systems were repaired, and eight 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 2009 through 2019 suggest possible water quality decline in Smith River. Monitoring over a longer period of time with consistent improvement is needed to corroborate water quality improvements.

- **South River and Christians Creek Watershed**

  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 SWCD 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 319(h) funding provided by DEQ. Since the project started in 2009, over 1,100 agricultural BMPs have been installed, resulting in a total of 61 miles of stream fenced from livestock access and 22,254 acres of cover crop installed. Maintenance of nearly 6 miles of previously installed stream exclusion fence has also been completed. Additionally, stormwater projects implemented include 3,000 feet streambank stabilization, 10 acres of constructed wetlands, and 1.6 acres riparian buffer, bioretention and detention basin retrofits. With a Water Quality Improvement Fund grant, Augusta County 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 2019 in South River 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 Watershed**

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 SWCD 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. Septic issues addressed include 59 septic tank pump-outs, six septic system repairs, 21 septic system installations, and four alternative waste system installations. PSWCD also continues to apply other funding sources to agricultural implementation in these watersheds, contributing to a total of over 57 miles of stream exclusion fencing installed, which exceeds the implementation goal by 52%. Additionally, over 57,278 feet of stream fencing have been maintained (532% of the implementation goal) and 327 acres of riparian buffer (50 times the implementation goal) have been established. 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 Watershed**

  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. Cumulatively, this has resulted in the implementation of over 38 miles of stream exclusion, 255 acres of riparian buffers, and 638 acres of small grain cover crops (143% of the implementation goal). TJSWCD continues to see significant demand for technical and financial assistance for livestock exclusion projects and other agricultural BMPs. The residential septic BMP program is on track to meet implementation goals as well with 34 septic tank pump-outs, eight septic system repairs, and 23 septic system installations. Water quality data collected between 2006 and 2019 in Tye River suggest possible water quality degradation. However, monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes.

- **Upper Clinch River Watershed**

  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 SWCD and U.S Fish and Wildlife Service Partners Program. The project has resulted in 15.4 miles of stream fencing and 432 acres of riparian buffer (94% of the implementation project goal) installed. An urban streambank stabilization project has completed a total of 3,000 linear feet at the Dunford Park, Youth-Only Stocked Trout Waters in Tazewell, Virginia, the site of the State Endangered Tennessee Heelsplitter Mussel. A second site was completed at the Tazewell Waste Water Treatment Plant, where 650 linear feet were stabilized. 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 Goose Creek Watershed**

  Goose Creek and six of its tributaries in Loudoun and Fauquier Counties were listed as impaired due to exceedances of the state's water quality standard for fecal coliform bacteria. Started in January 2019, the implementation project is administered by the John Marshall SWCD only within the Fauquier County portion of the IP project area. Between July 2018 and June 2019, four livestock stream exclusion systems were established, totaling 18,192 linear feet of fencing, and improvements to 160 acres of pasture were also completed. In addition, 246 acres were planted under cover crops for nutrient and residue management. Several equine grazing management and manure composting BMPs are also under design. JMSWCD proposes to expand implementation to include residential septic BMPs under a pending application for a second Section 319(h) grant for Upper Goose Creek. Project outreach efforts have been completed in partnership with the Piedmont Environmental Council and the Goose Creek Association and include newsletter and web-based communications, community meetings, and presentations. As implementation has just begun, water quality data have been analyzed only to set a baseline for conditions in the watershed. Monitoring over a longer period of time following greater BMP implementation is needed to corroborate water quality changes.

- **Upper Hazel River Watershed**

  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; an additional 22 miles of fencing was maintained. Long-term vegetative cover has also been established on 154 acres of cropland. The residential septic program has implemented 328 septic system pump-outs, 95 septic system repairs, 55 septic system installations, and two alternative waste system installations. Bacteria data analyzed by DEQ for the period of 2009 through 2019 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 Watershed**

  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 SWCD. A remarkable 233 acres of permanent cover was established on cropland, 542% of the IP goal; 176% of the necessary cover crop acreage has also been implemented. Additionally, a total of 41 stream exclusion practices have been installed, fencing livestock from nearly 49 miles of stream. Significant strides have been made in implementation of the residential septic program BMPs. The project has supported 148 septic tank pump-outs, 16 septic system repairs, and installation of 11 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 2015 and 2019 shows a fairly constant trend in violation rates until 2018 with a large increase in 2019. However, monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes.

- **Upper Roanoke River Part 1 Watershed**

  The Upper Roanoke River watershed is located in Botetourt County, Roanoke County, City of Salem, City of Roanoke, Franklin County, Floyd County and Montgomery County. Various waterways in the 443,158-acre watershed are listed as impaired for fecal coliform bacteria and/or violations of the General Standard (benthic). There are two active implementation projects in the Roanoke River watershed. The Western Virginia Water Authority is actively working in Mud Lick Creek (Phase I) and Glade Creek (Phase II) watersheds within the City of Roanoke to connect homes with failing septic systems to public sanitary sewer. The second active implementation project is administered by Mountain Castles SWCD and will address *E. coli* impairments in the Glade Creek and Tinker Creek subwatersheds through a residential septic program. Thus far, implementation includes six septic tank pump-outs, one septic system repair, three septic system installations, and one alternative waste treatment system installation. Biological data in Tinker Creek were analyzed for the spring and fall seasons of 2015 through 2019. Data show Virginia Stream Condition Index (VSCI) scores indicating impairment in the spring (though a trendline suggests improving scores), while fall scores are consistently above 60 (non-impaired). Analysis of bacteria data collected in the watershed between 2010 and 2019 suggest possible water quality degradation in the Tinker Creek and possible water quality improvement for the Roanoke River. Monitoring over a longer period of time with consistent improvement is needed to corroborate water quality improvements in both watersheds

- **Upper York River Watershed (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 46 livestock stream exclusion systems have been established, totaling over 51 miles of fencing. In addition, maintenance work was completed on 130,640 feet of stream fencing and 3,032 acres (876% of the implementation goal) were planted under small grain and mixed cover crop for nutrient and residue management. Under the residential BMP program, 179 septic tank pump-outs, 23 septic system repairs, and 28 septic system installations were completed. Water quality data collected by DEQ in Pamunkey Creek for the period of 2011 through 2019 suggest potential decline in water quality. However, monitoring over a longer period of time with consistent trends is needed to corroborate water quality changes.