**REPORT OF THE SECRETARY OF NATURAL RESOURCES**

# FY 2017 CHESAPEAKE BAY AND VIRGINIA WATERS CLEAN-UP PLAN

**TO THE GOVERNOR AND THE CHAIRMEN OF THE SENATE AGRICULTURE, CONSERVATION AND NATURAL RESOURCES COMMITTEE; THE HOUSE AGRICULTURE, CHESAPEAKE AND NATURAL RESOURCES COMMITTEE; THE SENATE COMMITTEE ON FINANCE; AND THE HOUSE COMMITTEE ON APPROPRIATIONS**

**COMMONWEALTH OF VIRGINIA**
**RICHMOND**
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# Contents

## Executive Summary

This report was developed to comply with consolidated water quality reporting requirements set forth in § 62.1-44.118 of the *Code of Virginia*. This section requires the Secretary of Natural Resources to submit a progress report on implementing the impaired waters clean-up plan as described in § 62.1-44.117 of the *Code of Virginia*. This consolidated report also includes the *"Annual Report on the Water Quality Improvement Fund"* by the Department of Conservation and Recreation (DCR) and Department of Environmental Quality (DEQ) pursuant to § 10.1-2134 of the *Code of Virginia* and incorporates the reports on "*Cooperative Nonpoint Source Pollution Programs"* required in subsection D of § 10.1-2127 and the *"Watershed Planning and Permitting Report"* required in subsection B of § 10.1-1193 of the *Code of Virginia*. The report also encompasses DCR's report of *"Annual Funding Needs for Effective Implementation of Agricultural Best Management Practices"* pursuant to subsection C of § 10.1-2128.1 of the *Code of Virginia*.

## Water Quality Improvement Fund and Cooperative Nonpoint Source Pollution Programs

For FY 2017, DCR allocated over $52.5 million in agricultural cost-share and technical assistance funds to Soil and Water Conservation Districts. This included over $800,000 in Conservation Reserve Enhancement Program (CREP) cost-share funds to be disbursed by Districts as state match for completed projects. Of the $52.5 million, approximately $46.4 million was distributed to farmers through the Virginia Agricultural Cost-Share Program (VACS) and CREP for implementation of best management practices (BMPs). An additional $7.4 million was allocated in technical assistance to Districts to provide implementation assistance to participants. The implementation of backlogged Stream Exclusion SL-6 Pending VACS cost-share applications was reduced from approximately $16 million in the Chesapeake Bay watershed to less than $4 million ($13 million statewide). Practices installed on farms during FY 2017 will result in estimated edge of field nitrogen reductions of approximately 10.4 million pounds, phosphorus reductions of approximately 3.6 million pounds, and sediment reductions of approximately 854 thousand tons.

Under the Water Quality Improvement Fund (WQIF) Point Source Program, DEQ currently has 66 signed agreements which obligated $799.8 million in state grants ranging from 35% to 90% cost-share, for design and installation of nutrient reduction technology at Bay watershed point source discharges. Within this total number of projects receiving cost-share, 59 have been completed and 7 are active in the construction stage. For calendar year 2016, facilities registered under the Chesapeake Bay Watershed Nutrient Discharge General Permit reported discharged loads that, in aggregate, were significantly below the total Waste Load Allocations for all Bay tributary basins. Tables of discharged and delivered loads for each individual facility and basin totals are available at this DEQ webpage: http://www.deq.virginia.gov/Portals/0/DEQ/Water/PollutionDischargeElimination/Watershed%20GP/Published%20Loads%20Draft%203_30_2017.pdf?ver=2017-03-31-140031-860.

As part of a WQIF Nonpoint Source Program, through a Request for Assistance (RFA) directed at local government applicants (cities, towns, counties, Soil and Water Conservation Districts, and planning district commissions) along with state agencies, DEQ awarded $3,400,000 to implement nonpoint source (NPS) pollution control implementation projects. Within the Chesapeake Bay Watershed, projects that maximize reduction of nitrogen, phosphorous or sediment were a funding priority. In addition, projects with the highest pollution reduction compared to dollars requested were given priority. These projects will implement pollution control actions that will have a significant and lasting impact on local and state water quality. Anticipated pollution reductions include approximately 2,979 pounds per year of total nitrogen, approximately 87 pounds per year of total phosphorus, and approximately 92 tons per year of total suspended solids.

## Funding Needs for Effective Implementation of Agricultural Best Management Practices

Funding projections for the Chesapeake Bay were developed in coordination with stakeholders based on a detailed analysis of practices in the Chesapeake Bay Phase II Watershed Implementation Plan (WIP). This included a review of 2014 progress in implementing the WIP and the inclusion of reductions projected from $120 million of stream exclusion practices statewide that either have been installed as of June 30, 2016 ($44 million, including $25 million in the Bay watershed), or await funding ($61 million, including $27 million in the Bay watershed). The WIP implementation schedule focuses on full implementation by 2025, recognizing that based on 2014 progress and with the exception of sediment, the existing level of effort is currently on track for achieving the Commonwealth's commitment to reducing agricultural loads.

For the fiscal years 2017 – 2025, the final scheduled year of the Chesapeake Bay Watershed Implementation Plan (WIP), a revised estimate of $1.61 billion may be required from state and federal funds as well as farmer financial contributions to meet water quality goals. Approximately 50% of this total ($807 million) could be needed from State sources, the vast majority of which is direct funding of the Virginia Agricultural Cost-Share (VACS) Program and support for Soil and Water Conservation Districts who implement the VACS program.

Actual FY 2017 allocations from state sources for implementation of agricultural best management practices had the following breakdown:

FY 2017 (Program Name – agency subprogram code – amount):

- VACS Cost-Share program funding (50323) - $58.8 million
- District Technical Assistance (50322) - $7.9 million
- District Financial Assistance (50320) - $7.1 million

FY 2017 support figures exclude engineering support via DCR staff, IT support, and training assistance (e.g. Conservation Planning Certification). These have been itemized separately.

Projected funding needs from state sources for implementation of agricultural best management practices through the FY 2017-2018 biennium are estimated in the 2017 Ag Needs Assessment Table on page 17. With the exception of sediment reductions, current funding levels will likely provide the estimated funding necessary to achieve 60% of the Chesapeake Bay agricultural implementation by 2017 as was indicated in Table 5.4-4 of Virginia's Phase I WIP. It is anticipated that progress towards the Commonwealth's 2017 Bay goals will be furthered by over-achievement in other sectors, specifically wastewater treatment plants. Improved tracking of voluntarily installed practices, technological improvements in practices, program efficiency, other cost reduction strategies, and changes to improve the Bay Model are difficult to quantify, but all are expected to further reduce overall costs and enhance progress towards the 2017 goals.

## Chesapeake Bay and Virginia Waters Clean-Up Plan Report

During FY 2017, many strategies were implemented to reduce pollutants entering the Chesapeake Bay tributaries and Southern Rivers basins. Significant progress was made in reducing point source discharges from sewage treatment plants, installing agricultural best management practices with a continuing focus on livestock exclusion practices, the reissuance of all remaining administratively continued Municipal Separate Storm Sewer System (MS4) permits, and implementing revised Stormwater Management Regulations. The implementation of Virginia's Phase II WIP continues. Virginia agencies successfully completed most of the 2014-2015 WIP milestones, and are currently evaluating progress of the 2016-2017 milestones. The 2018-2019 milestones are due to EPA in early 2018.

In FY 2017, DEQ developed 35 Total Maximum Daily Load (TMDL) equations for small watersheds and completed 4 TMDL implementation plans covering 31 impaired waterbody segments. A total of 72 small TMDL Implementation Watersheds saw BMP activity resulting in a total of 2,759 BMPs installed using a total of $17,150,875 of Federal and State funds and landowner contributions.

# Chapter 1 - Annual Report on Water Quality Improvement Fund Grants

The purpose of the Virginia Water Quality Improvement Act of 1997 (the "Act") is "to restore and improve the quality of state waters and to protect them from impairment and destruction for the benefit of current and future citizens of the Commonwealth" (§10.1-2118 of the *Code of Virginia*). The Act was amended in 2005 and 2008. The Act created the Water Quality Improvement Fund (WQIF); its purpose is "to provide Water Quality Improvement Grants to local governments, soil and water conservation districts, institutions of higher education and individuals for point and nonpoint source pollution prevention, reduction and control programs" (§10.1-2128.B. of the *Code of Virginia*). In 2008, the General Assembly created a sub-fund of the WQIF called the Virginia Natural Resources Commitment Fund (§10.1-2128.1) that is to be used for agricultural best management practices and associated technical assistance.

During the 2013 General Assembly session, legislation was passed (Chapters 756 and 793 of the 2013 Acts of Assembly) which designated, effective July 1, 2013, the Virginia Department of Environmental Quality (DEQ) as the lead agency for nonpoint source programs in the Commonwealth in addition to its responsibility for point source programs. As such, DEQ has the responsibility to provide technical and financial assistance to local governments, institutions of higher education, and individuals for point and nonpoint source pollution prevention, reduction, and control programs. The Department of Conservation and Recreation (DCR) plays a role, providing technical and financial assistance to Soil and Water Conservation Districts, institutions of higher education, and individuals for nonpoint source pollution controls. Because of the nature of nonpoint source pollution controls, DEQ sought the assistance and support of other state agencies, such as the Departments of Forestry and Mines, Minerals and Energy, to provide the necessary expertise and resources to properly implement the nonpoint source elements of the Act. DCR and DEQ continue to jointly work on nonpoint source water quality initiatives.

This report section fulfills a legislative requirement under §10.1– 2134 of the Act for DEQ and DCR to report on the WQIF. Specifically, the mandate is for an annual report to be submitted to the Governor and the General Assembly specifying the amounts and recipients of grants made from the WQIF and pollution reduction achievements from these grants. Information on WQIF grants awarded is provided in this report, along with available data on pollutant reductions achieved and estimated pollutant reductions to be achieved from recently funded grant projects.

## WQIF & VNRCF Nonpoint Source Programs

The WQIF and its sub-funds have served as the principal funding source for nonpoint source pollution control projects in Virginia. The goal of the nonpoint source grant component of the WQIF is to improve water quality throughout the Commonwealth and in the Chesapeake Bay by reducing nonpoint source pollution. Nonpoint source pollution is a significant cause of degradation of state waters throughout the Commonwealth. Within the Chesapeake Bay watershed, the immediate priority is to implement the Bay Total Maximum Daily Load (TMDL) Watershed Implementation Plans (WIP) developed by the Commonwealth and approved by the U.S. Environmental Protection Agency (EPA) in 2010 and 2012.

For watersheds outside of the Chesapeake Bay, the goal is to achieve measurable improvements in water quality, which can include nutrient and sediment reductions, as well as reduction of other pollutants including bacterial contamination. Other uses of grant funds may include providing protection or restoration of other priority waters such as those containing critical habitat, serving as water supplies, or that target acid mine drainage or other nonpoint pollution problems. As an example, the Ely Creek and Puckett Creek Sub-watersheds project involves mined land reclamation in the ecologically sensitive Powell River basin.

DCR distributes the nonpoint WQIF and VNRCF funds pursuant to § 10.1-2132 of the *Code of Virginia.* This includes managing the allocation of funding to the Agricultural Cost-Share Program and the federally-funded Conservation Reserve Enhancement Program (CREP). These funding sources also provided cost-share funds to Virginia Agricultural Cost-Share (VACS) program participants to fund 100% of the cost of implementing qualifying livestock stream exclusion BMPs. Accordingly, in 2017, DCR allocated $52.5 million in VACS cost-share with an additional $7.4 million in technical assistance to Districts for providing implementation assistance to participants. The implementation of backlogged Stream Exclusion SL-6 Pending VACS cost-share applications was reduced from approximately $16 million to less than $4 million. DEQ was responsible for soliciting applications for Water Quality Initiative grants and Cooperative Nonpoint Source Pollution Program Projects with local governments and managing the distribution of those nonpoint WQIF grants.

## Agricultural Best Management Practices Cost-Share Program

Agricultural best management practices (BMP) that are most effective in reducing excess nutrients and sediment from agricultural lands are implemented through the VACS program managed by DCR under the Virginia Soil and Water Conservation Board's (VSWCB) allocation policy and guidance. BMPs installed through the program must be implemented in accordance with the Virginia Agricultural BMP Manual. Virginia's 47 Soil and Water Conservation Districts (SWCDs or Districts) administer the local implementation of the VACS program with funding from DCR to cover the cost-share expenditures, the technical assistance to administer the program, and essential funding for district operations. State financial support for fiscal year 2017 reached a new high with over $52.5 million focused on implementing BMPs including substantially reducing the backlog of livestock stream exclusion practices.

## Conservation Reserve Enhancement Program

WQIF and VNRCF funds support Virginia's commitment for participation in the U.S. Department of Agriculture's (USDA) Conservation Reserve Enhancement Program. Under the USDA-administered CREP program, which is implemented through the SWCDs, eligible landowners may receive cost-share incentives for eligible BMPs for restoration of riparian buffers and wetlands, as well as rental payments (up to 15 years) for removing environmentally sensitive land from agricultural production and planting grasses or trees that will improve water quality and waterfowl and wildlife habitat. Virginia doubled its cost-share contributions for the restoration of forested riparian buffers adjacent to both pastureland and cropland from July 1, 2015 – February 28, 2017. This enabled USDA Farm Service Agency to receive an additional $1 million with which to establish the Chesapeake Bay Incentive Payment for CREP participants within Virginia's portion of the Chesapeake Bay watershed. Due to limited CREP

appropriations DCR returned to a 25% state match of eligible cost for CREP contracts approved after March 1, 2017.

## Water Quality Initiatives

In FY 2014, DEQ became the lead nonpoint source (NPS) agency in the Commonwealth. DEQ and DCR work collaboratively to fund water quality initiatives to manage other NPS pollution priority needs. These projects focus on priority, cost effective, and innovative initiatives which further advance Virginia's NPS programs and provide for measurable water quality improvements. These include initiatives with other state agencies, Soil and Water Conservation Districts, planning district commissions, local governments, educational institutions, and individuals on nonpoint source pollution reduction, education, research, and other NPS reduction activities such as acid mine land reclamation and nutrient management.

## Nonpoint Source Pollution Program Projects with Local Governments

In accordance with § 10.1-2127.B and C of the *Code of Virginia*, DEQ works cooperatively with local governments to provide matching funds to locally administer identified solutions for nonpoint source runoff that causes or contributes to water quality problems, such as impairments of other state waters outside the local jurisdiction. Funding to localities for development of their stormwater management programs is an example of these cooperative efforts. During FY 2017, DEQ developed and managed cooperative nonpoint source pollution projects with local governments.

As part of a WQIF Nonpoint Source Program, through a Request for Assistance (RFA) directed at local government applicants (cities, towns, counties, Soil and Water Conservation Districts, and planning district commissions) along with state agencies, DEQ awarded $3,400,000 to implement nonpoint source (NPS) pollution control implementation projects. Within the Chesapeake Bay Watershed, projects that maximize reduction of nitrogen, phosphorous or sediment were a funding priority. In addition, projects with the highest pollution reduction compared to dollars requested were given priority. The following eight projects that implement shoreline erosion control, stormwater management, mine land reclamation, or septic system repair or replacement have been selected for funding.

| **Recipient** | **Project** | **WQIF-NPS Award** | **Match** |
|---|---|---|---|
| **Culpeper SWCD** | *Expanding Culpeper SWCD Residential On-Site Septic Cost Share Program* | $ 604,566 | $ 606,112 |
| **Middle Peninsula Planning District Commission** | *Middle Peninsula Septic Repair Program* | $ 200,000 | $ 200,000 |
| **Newport News (City)** | *Deep Creek Shoreline Restoration* | $ 162,000 | $ 162,000 |
| **Newport News (City)** | *Richneck Regional Water Quality Retrofit and Flood Control* | $ 568,240 | $ 568,240 |
| **Shenandoah Valley SWCD** | *Rockingham County Septic Assistance* | $ 616,972 | $ 616,973 |

| | | | |
|---|---|---|---|
| | *Program* | | |
| **Thomas Jefferson SWCD** | *Thomas Jefferson Regional Residential Septic System Management Program: Building on a Targeted Approach* | $ 154,515 | $ 154,532 |
| **Town of White Stone** | *Install Central Sewer to Replace Failing Drainfields* | $ 693,707 | $ 3,338,068 |
| **Virginia Department of Mines, Minerals and Energy** | *Elkins Branch Landslide Emergency* | $ 400,000 | $ 1,600,000 |

These projects will implement pollution control actions that will have a significant and lasting impact on local and state water quality. Anticipated pollution reductions include approximately 2,979 pounds per year of total nitrogen, approximately 87 pounds per year of total phosphorus, and approximately 92 tons per year of total suspended solids.

# 2017 WQIF & VNRCF Nonpoint Source Program Funds

## Agricultural Cost-Share Allocations

DCR's emphasis for agricultural BMP implementation focuses on efficient nutrient and sediment reduction including identified priority practices such as cover crops, conservation tillage, nutrient management, livestock exclusion from streams, and the establishment of vegetative riparian buffers. Historical, annual cost-share totals are summarized below.

Annual state cost-share allocations are based upon the Agricultural Nonpoint Source Assessment and Virginia Soil and Water Conservation Board policy. Hydrologic units with the highest potential to contribute agricultural NPS pollution to surface and ground waters receive the highest amounts of cost-share funds. SWCDs then rank cost-share applications and fund those applications that will provide the greatest amount of local water quality benefit.

## Historical Cost Data for Agricultural BMPs Completed by Fiscal Year

| Program Year | Actual BMP Cost | Total Cost-Share Paid | State Cost-Share Paid | Non-State Cost-Share Paid | Other Funding Amount | Farmer Cost Before Tax Credit | Tax Credit Amount Issued |
|---|---|---|---|---|---|---|---|
| 1998 | $6,586,058.87 | $4,092,891.91 | $3,148,831.74 | $944,060.17 | $329,583.37 | $2,163,583.59 | $416,228.26 |
| 1999 | $5,914,234.56 | $4,439,154.30 | $4,026,364.92 | $412,789.38 | $213,063.44 | $1,262,016.82 | $350,507.40 |
| 2000 | $13,663,995.61 | $8,307,891.08 | $8,247,145.15 | $60,745.93 | $906,150.61 | $4,449,953.92 | $825,714.15 |
| 2001 | $15,926,641.61 | $8,029,747.79 | $6,656,428.78 | $1,373,319.01 | $2,575,618.08 | $5,321,275.74 | $810,941.47 |
| 2002 | $23,257,431.57 | $8,374,901.24 | $6,589,274.08 | $1,785,627.16 | $6,599,511.74 | $8,283,018.59 | $903,880.05 |
| 2003 | $13,863,119.39 | $3,216,892.13 | $2,371,170.88 | $845,721.25 | $5,012,152.95 | $5,634,074.31 | $993,582.85 |
| 2004 | $10,147,004.35 | $2,793,253.99 | $2,413,801.83 | $379,452.16 | $3,400,707.92 | $3,953,042.44 | $540,697.46 |
| 2005 | $11,247,362.92 | $4,339,282.54 | $3,702,145.67 | $637,136.87 | $2,207,948.41 | $4,700,131.97 | $607,257.47 |
| 2006 | $19,425,693.38 | $9,674,609.35 | $8,932,790.24 | $741,819.11 | $2,853,713.06 | $6,897,370.97 | $862,463.47 |
| 2007 | $24,711,319.95 | $15,371,111.36 | $14,252,523.83 | $1,118,587.53 | $3,536,256.32 | $5,803,952.27 | $943,820.85 |
| 2008 | $24,581,668.65 | $13,997,070.57 | $12,951,939.71 | $1,045,130.86 | $3,166,715.66 | $7,417,882.42 | $1,068,399.68 |
| 2009 | $31,500,600.50 | $16,118,562.51 | $15,236,253.67 | $882,308.84 | $5,893,309.13 | $9,488,728.86 | $1,339,525.24 |
| 2010 | $37,178,293.38 | $23,552,655.91 | $22,569,130.21 | $983,525.70 | $4,458,722.71 | $9,166,914.76 | $1,448,796.08 |
| 2011 | $17,846,990.64 | $10,791,380.40 | $10,343,449.38 | $447,931.02 | $1,933,530.72 | $5,122,079.52 | $981,519.17 |
| 2012 | $32,425,084.82 | $21,657,008.05 | $21,446,164.68 | $210,843.37 | $2,848,798.50 | $7,919,278.27 | $1,393,557.83 |
| 2013 | $37,194,271.60 | $28,286,367.57 | $27,965,446.73 | $320,920.84 | $3,990,137.06 | $4,917,766.97 | $1,074,491.97 |
| *2014 | $40,071,064.79 | $30,942,444.68 | $28,923,516.24 | $2,018,928.44 | $3,975,330.01 | $5,153,290.10 | $970,119.67 |
| *2015 | $53,170,765.38 | $42,409,368.97 | $39,122,313.36 | $3,287,055.61 | $4,314,769.52 | $6,446,626.89 | $1,028,517.52 |
| 2016 | $16,304,540.67 | $10,006,694.76 | $9,640,812.50 | $365,882.26 | $892,529.76 | $5,405,316.15 | $866,904.68 |
| **2017 | $19,679,500.33 | $14,439,487.08 | $14,078,877.41 | $360,609.67 | $720,327.20 | $4,519,686.05 | $387,122.90 |
| State Totals | $454,695,642.97 | $280,840,776.19 | $262,618,381.01 | $18,222,395.18 | $59,828,876.17 | $114,025,990.61 | $17,814,048.17 |

*2014 and 2015 figures will be adjusted each year as SL-6(T) BMPs that were obligated under the 100% SL-6 funding program are completed. Significant funding from FYs 2016 and 2017 was transferred to these FYs to cover 100% SL-6s.

**2017 figures do not include approved BMPs carried forward into FY 2017 that are awaiting completion

## Conservation Reserve Enhancement Program (CREP)

The Virginia CREP program is divided into two regions. The Chesapeake Bay CREP targets Virginia's entire Chesapeake Bay watershed and is aiming to restore 22,000 acres of riparian buffers and filter strips as well as 3,000 acres of wetlands. The Southern Rivers CREP aims to restore 13,500 acres of riparian buffers and filter strips and 1,500 acres of wetland restoration. A summary of Virginia CREP cost-share assistance to farmers during the period from July 2000 to June 2017 is provided in the following table.

### CREP Summary FY 2001-2016 2017 by Drainage by Fiscal Year

| Drainage | Fiscal Year | Total Cost Share Payment | Area Buffer Restored (acres) | Miles Stream Bank Protected |
|---|---|---|---|---|
| Chesapeake Bay | 2001 | $321,247.50 | 1,325.90 | 50.76 |
| Chesapeake Bay | 2002 | $1,460,044.46 | 5,032.10 | 254.31 |
| Chesapeake Bay | 2003 | $603,862.88 | 1,716.10 | 162.09 |
| Chesapeake Bay | 2004 | $338,178.07 | 1,988.80 | 102.36 |
| Chesapeake Bay | 2005 | $219,240.64 | 1,130.50 | 77.93 |
| Chesapeake Bay | 2006 | $237,233.72 | 1,617.74 | 85.68 |
| Chesapeake Bay | 2007 | $227,018.64 | 545.2 | 49.43 |
| Chesapeake Bay | 2008 | $358,723.72 | 1,465.54 | 92.62 |
| Chesapeake Bay | 2009 | $467,225.79 | 1,411.70 | 97.26 |
| Chesapeake Bay | 2010 | $645,877.21 | 1,580.80 | 81.54 |
| Chesapeake Bay | 2011 | $444,625.29 | 575.5 | 50.67 |
| Chesapeake Bay | 2012 | $477,040.35 | 441 | 51.1 |
| Chesapeake Bay | 2013 | $129,214.22 | 159 | 11.65 |
| Chesapeake Bay | 2014 | $115,096.92 | 176.9 | 6.94 |
| Chesapeake Bay | 2015 | $112,736.77 | 99.2 | 12.53 |
| Chesapeake Bay | 2016 | $403,839.36 | 128.28 | 22.53 |
| Chesapeake Bay | 2017 | $225,225.39 | 59.13 | 13.73 |
| **Chesapeake Bay Totals:** | | **$6,786,430.93** | **19,453.39** | **1,223.13** |
| | | | | |
| Southern Rivers | 2001 | $276,348.84 | 606.8 | 41.98 |
| Southern Rivers | 2002 | $1,011,454.63 | 2,638.90 | 184.75 |

| | | | | |
|---|---|---|---|---|
| Southern Rivers | 2003 | $381,785.92 | 1,964.40 | 102.79 |
| Southern Rivers | 2004 | $391,919.34 | 1,666.00 | 124.33 |
| Southern Rivers | 2005 | $346,378.31 | 2,207.90 | 145.18 |
| Southern Rivers | 2006 | $226,432.45 | 1,519.36 | 121.5 |
| Southern Rivers | 2007 | $197,151.05 | 541.5 | 154.44 |
| Southern Rivers | 2008 | $268,288.17 | 846.6 | 203.61 |
| Southern Rivers | 2009 | $256,873.21 | 1,788.06 | 98.09 |
| Southern Rivers | 2010 | $389,093.99 | 444.4 | 42.59 |
| Southern Rivers | 2011 | $343,089.67 | 295.7 | 28.56 |
| Southern Rivers | 2012 | $416,070.09 | 536.1 | 33.65 |
| Southern Rivers | 2013 | $271,355.39 | 516.18 | 23.53 |
| Southern Rivers | 2014 | $247,311.69 | 152.2 | 28.06 |
| Southern Rivers | 2015 | $314,990.14 | 228.1 | 28.78 |
| Southern Rivers | 2016 | $565,720.99 | 215.31 | 26.33 |
| Southern Rivers | 2017 | $410,393.95 | 216.18 | 18.14 |
| **Southern Rivers Totals:** | | **$6,314,657.83** | **16,383.69** | **1,406.31** |
| | | | | |
| **Statewide Totals:** | | **$13,101,088.76** | **35,837.08** | **2,629.44** |

Note: Prior year figures are adjusted each year as CREP practices that were previously obligated are completed

# Strategic Water Quality Initiatives

## Nutrient Management Plan Development for Unpermitted Animal Operations in Virginia

A Request for Proposals (RFP) was issued in 2015 soliciting applications to establish agreements through competitive negotiation for the writing of nutrient management plans for both permitted and unpermitted animal operations. A permitted dairy is an operation that exceeds 200 cattle in confinement for more than 120 days, while an unpermitted dairy is below that threshold. Funding was targeted for development of nutrient management plans on unpermitted confined animal operations. Successful applicants had to be Virginia Certified Nutrient Management Planners certified in the agricultural category. Three grants were awarded for a total of $118,000, with the intent to develop plans for 27,650 acres statewide. The result was a total of 24 nutrient management plans written on unpermitted operations covering 2,779 acres. The

remaining funds were put towards another RFP which was issued in February 2016, resulting in contracts totaling $265,000 for the development of nutrient management plans on both permitted and unpermitted animal operations. An additional 23,788 planned acres on unpermitted operations, and 22,844 acres on permitted operations, are expected to result from the latest contracts. These contracts are still in effect. Substantial progress has been made. As of June 30, 2017, there are 155 unpermitted dairies with current nutrient management plans, or 47% of the total. There are 82 permitted dairies remaining in Virginia. Fifty-five of these permitted operations have current plans with 16 having updated plans near completion.

## Livestock Stream Exclusion in Virginia

Through June 30, 2015, DCR offered 100% of the cost for the SL-6 (Stream Exclusion with Grazing Land Management) practice to cost-share applicants. All participant enrollments received since January 2013 (a 2.5-year period) will be honored as cost-share funds become available to address these grant commitments. As of June 2017, approximately $93 million had been paid or obligated by SWCDs in support of the 100% reimbursement of SL-6 livestock exclusion BMPs throughout the Commonwealth. 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 funded and implemented. The result of this funding will be over 1,600 stream miles and approximately 107,000 animal units excluded.

## Virginia Land Cover Database Project

The 2014 General Assembly authorized funding from the WQIF to update the Commonwealth's statewide digital orthography, to improve land coverage data necessary to assist local governments in planning and implementing their stormwater management programs. DEQ worked jointly with the Virginia Information Technologies Agency (VITA) to issue a RFP under a Statement of Requirements for this project, and selected WorldView Solutions as the contractor. The project identified land cover for the entire state, down to a 1-meter resolution, for 13 land cover classifications (and water):

| **Land Cover** | | **Minimum Mapping Unit** | **Accuracy** |
|---|---|---|---|
| Pervious | Turf Grass | Less than 1 acre | 85% |
| Impervious | Buildings, drive-ways, parking lots, etc. | Match resolution | 95% |
| | Roads | Road centerline dependent | 95% |
| Forest | Forest | 1 acre w/ min width restrictions | 95% |
| | Tree | Less than 1 acre | 95% |
| | Harvested/Disturbed Forest | 1 acre w/ min width restrictions | 85% |
| Scrub/Shrub | Scrub/Shrub | 1 acre w/ min width restrictions | 85% |
| Agriculture | Cropland | 1 acre w/ min width restrictions | 85% |
| | Pastureland | 1 acre w/ min width restrictions | 85% |
| Wetlands | Emergent Wetlands | As defined by NWI and TMI | 85% |
| | Woody Wetlands | As defined by NWI and TMI | 85% |
| | Mudflats | As defined by NWI and TMI | 85% |
| Barren | Barren | Higher than the resolution | 85% |
| Water | Water | Higher than the resolution | 95% |

Work commenced in July 2015, with a priority for development of the land cover database for the Chesapeake Bay watershed first, followed by the remainder of the state. WorldView has completed the development of the Chesapeake Bay portion of the state, delivering the final products, which are now available on the VGIN website at: http://vgin.maps.arcgis.com/home/item.html?id=6ae731623ff847df91df767877db0eae. The final land cover dataset for the remainder of Virginia was released in December 2016.

The Bay watershed land cover data has been provided to the Chesapeake Bay Program Office to be used in upgrading of the Chesapeake Bay Program's (CBP) Watershed Model, used to estimate nutrient and sediment loads that serve as input to the CBP Time-Variable Water Quality Model. This is important for the 2017 reevaluation of the Bay TMDL, checking progress toward 60% achievement of the control actions needed under the TMDL, and drafting Virginia's Phase 3 WIP.

## WQIF Point Source Program

Since 1998, 66 point source WQIF grant agreements obligating $799.8 million have been signed. The State construction project grants range from 35% to 90% cost-share, for design and installation of nutrient reduction technology at Bay watershed point source discharges. The WQIF point source grants provide critical support for compliance with the nutrient discharge control regulations and achieving Chesapeake Bay nitrogen and phosphorus waste load allocations. Fifty-nine of the projects have been completed and are operational. A summary of active construction grant projects is accessible via the DEQ WQIF webpage at the following web address: http://www.deq.virginia.gov/Programs/Water/CleanWaterFinancingAssistance/WaterQualityImprovementFund/WaterQualityImprovementFundList.aspx.

Since its formation in 1998, the WQIF Point Source Program has received a total of $909.3 million in appropriations, bond proceeds, monetary assessments and accrued interest. Part of that total was in the General Assembly's most recent WQIF point source commitment in FY 2017; authorization was given for up to $59 million in bonds to be issued to support point source nutrient reduction projects in the Chesapeake Bay watershed. Approximately $95.3 million of the $909.5 million total funding was used for 24 grants prior to the adoption of nutrient discharge control regulations in late 2005. A total of $4.01 million was awarded for 39 technical assistance grants, including Basis of Design Reports, Interim Optimization Plans, and startup support for the Nutrient Credit Exchange Association; all have been completed. In 2011, $3 million was set aside for the James River Chlorophyll Study, which is currently ongoing, and being conducted by a consortium of universities and contractors. An additional $250,000 was awarded in 2013 through a Technical Assistance grant to Chesapeake Environmental Communications to expand the James River Modeling framework by incorporating water quality data collected from 2011 to 2013.

The balance of the WQIF grants have been awarded for the design and installation of nutrient reduction technology needed to meet the waste load allocations assigned to the significant dischargers in the Chesapeake Bay watershed under the EPA–adopted Chesapeake Bay TMDL. As of June 30, 2017, the grant amount owed under existing, signed WQIF agreements was $34,215,726. It is projected that reimbursement requests for ongoing projects will be covered with available funding.

It should be noted that all grantees are obligated to complete their projects regardless of the amount of grant funds received. The Commonwealth commits to fully fund all projects, subject to the availability of funds.

# WQIF & Virginia Natural Resources Commitment Fund Nutrient Reductions

## Estimated Nutrient Reductions from Nonpoint Source WQIF-Funded Projects

During FY 2017, WQIF and VNRCF funding supported agricultural BMPs that are expected to reduce edge of field nutrient and sediment losses by over 10.4 million pounds of nitrogen, 3.6 million pounds of phosphorus, and 854,544 tons of sediment. CREP implementation is included in the above reductions. A table of nutrient and sediment reductions resulting from the implementation of agricultural BMPs is provided below**.**

**Historic Edge of Field Nutrient/Sediment Reductions Resulting from Agricultural BMP Implementation by Fiscal Year - State Funding Only**

| Fiscal Year | Total N Reduction (lbs/year)*** | Total P Reduction (lbs/year)*** | Total Soil Loss Reduction (tons/year) |
|---|---|---|---|
| 1998 | 1,354,363.05 | 297,672.69 | 250,763.40 |
| 1999 | 765,068.08 | 144,671.63 | 145,329.12 |
| 2000 | 2,301,033.20 | 447,058.68 | 428,440.42 |
| 2001 | 1,508,693.63 | 377,804.86 | 240,794.33 |
| 2002 | 1,695,143.65 | 372,747.25 | 291,069.24 |
| 2003 | 1,163,464.58 | 271,259.92 | 187,079.64 |
| 2004 | 543,113.64 | 108,911.01 | 99,977.94 |
| 2005 | 1,192,552.17 | 269,361.86 | 201,273.97 |
| 2006 | 2,002,953.62 | 437,742.61 | 355,595.88 |
| 2007 | 4,690,787.33 | 1,506,460.28 | 474,459.92 |
| 2008 | 6,116,746.09 | 1,657,190.45 | 836,501.54 |
| 2009 | 4,515,268.56 | 1,186,010.40 | 614,179.50 |
| 2010 | 6,704,823.71 | 2,033,710.44 | 757,182.64 |
| 2011 | 5,998,245.63 | 1,779,927.51 | 837,172.24 |
| 2012 | 9,566,121.42 | 2,905,597.52 | 1,301,439.76 |

| | | | |
|---|---|---|---|
| 2013 | 10,266,666.06 | 3,087,572.61 | 1,388,236.28 |
| *2014 | 7,779,869.90 | 2,647,759.14 | 742,539.08 |
| *2015 | 8,827,629.33 | 3,225,935.38 | 643,331.81 |
| 2016 | 7,528,584.16 | 2,925,424.97 | 436,505.19 |
| **2017 | 10,491,282.44 | 3,662,449.86 | 854,544.06 |

*2014 and 2015 figures will be adjusted each year as SL-6(T) BMPs that were obligated under the 100% SL-6 funding program are completed

**2017 figures do not include approved BMPs carried forward into FY 2017 that are awaiting completion

***Total N and P Reduction numbers now include estimates for Nutrient Management BMPs

## Estimated Nutrient Reductions from Point Source WQIF-Funded Projects

To date, 59 of the 66 construction projects with signed grant agreements for the installation of nutrient reduction technology have initiated operation. With these projects coming on-line, annual nutrient loads discharged from wastewater plants in the Bay watershed have declined dramatically. From 2009 to 2016, annual nitrogen discharges were reduced by about 8,086,148 pounds; phosphorus annual loads were reduced by almost 628,875 pounds, exceeding the milestone commitments set in Virginia's WIP for both nutrients. As a result of these ongoing nutrient control upgrades, point source loads continue to be well below the allocations called for in the WIP and TMDL.

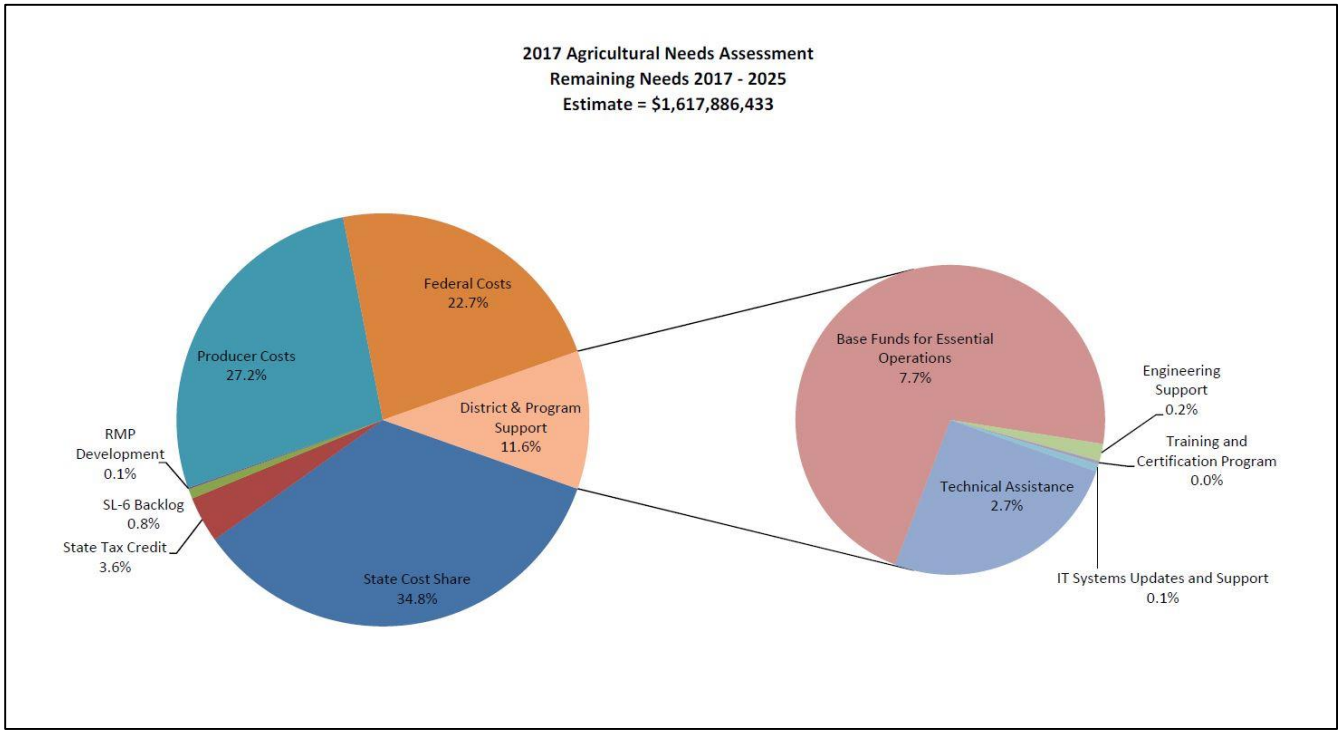
# Chapter 2 - Annual Funding Needs for Effective Implementation of Agricultural Best Management Practices

In accordance with subsection C of § 10.1-2128.1 of the Water Quality Improvement Act, the Department of Conservation and Recreation (DCR) in consultation with a stakeholder advisory group (SAG), including representatives of the agricultural community, the conservation community, and the Soil and Water Conservation Districts, determines the funding needs for effective Soil and Water Conservation District technical assistance and implementation of agricultural best management practices. Pursuant to § 2.2-1504 of the *Code of Virginia*, DCR must provide to the Governor the annual funding amount needed for each year of the ensuing biennial period. For the fiscal years 2017 – 2025, the final scheduled year of the Chesapeake Bay Watershed Implementation Plan (WIP), a revised estimate of $1.61 billion may be required from state and federal funds as well as farmer financial contributions to meet water quality goals. Approximately 50% of this total ($807 million) could be needed from State sources, the vast majority of which is direct funding of the Virginia Agricultural Cost-Share (VACS) Program and support for Soil and Water Conservation Districts who implement the VACS program.

**2017 Agricultural Needs Assessment**

**Remaining Needs 2017 – 2025**

**Estimate = $1,617,886,433**




The methodology for the Agricultural Needs Assessment was revised in 2015, due to the livestock stream exclusion initiative that DCR, the Virginia Soil and Water Conservation Board, and Soil and Water Conservation Districts began implementing. From late 2012 through June 2015, livestock producers were

guaranteed 100% funding for committing to implement SL-6 (Stream Exclusion with Grazing Land Management), requiring installation of a permanent fence, a minimum 35-foot vegetated buffer along streams, alternative watering systems, and other features. Approximately $93 million has either been expensed or obligated statewide for the SL-6 practice. As of June 30, 2017, $16 million worth of these practices were awaiting the availability of funding with $4 million worth of practices in the Chesapeake Bay watershed.

As projects are completed, or others are cancelled for various reasons, earlier cost estimates are adjusted. The $109 million livestock stream initiative includes $56 million within Virginia's Chesapeake Bay watershed. Pollution reduction towards year 2025 WIP goals will result from approximately 5.7 million linear feet of stream bank protected and 72,000 animal units in the Chesapeake Bay watershed that will be excluded (statewide, the impact would be almost 10 million linear feet of stream bank protected and 131,000 animal units excluded) once all of the pending SL-6 practices have been installed. The pollution reduction benefits for the Bay SL-6 implementation was estimated using the Virginia Assessment and Scenario Tool (VAST). The SL-6 pollution reduction benefits were then combined with 2014 WIP progress and the remaining reductions needed to reach the 2025 WIP goals were recalculated and funding needs were then revised.

SL-6 practices awaiting funding were assumed to be installed between FY 2017 – 19, then adjusted for actual installations through FY2017. As a result, there was an increased, then fairly consistent funding need year to year through 2025, despite a 2% inflation factor for cost-share. The following table shows the funding needs, including SL-6 practices currently awaiting funding. Actual funding through FY 2018 is reflected in this table and adjustments were made to the final 2025 total to reflect this funding in lieu of re-running the entire analysis until the new Bay model is available in 2018. Footnotes referenced in the table are shown on the following page.

## 2017 Agricultural Needs Assessment - Biennial Needs Summary with All Data

| Estimated Costs<br><br>FY2017 - FY2025 | Budget Code | FY17 Funding Available | FY17 Funding Obligated | FY17 Funding Remaining | FY18 Funding Available | 2017 - 2018 Biennium | | 2019 - 2020 Biennium | | 2021-2022 Biennium | | 2023-2024 Biennium | | 2025 Target Year | Adjusted Total Need[10]: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | |
| Chesapeake Bay Cost-Share[1] | 50323 | $12,007,472 | $5,468,690 | $6,538,782 | $6,401,385 | $28,457,701 | $29,026,855 | $29,607,392 | $30,199,540 | $30,803,531 | $31,419,601 | $32,047,993 | $32,688,953 | $33,342,732 | **$259,185,442** |
| Chesapeake Bay SL-6 Backlog[2] | 50323 | $17,625,395 | $16,962,160 | $663,235 | $0 | $16,962,160 | $663,235 | $3,225,493 | | | | | | | **$3,225,493** |
| Chesapeake Bay Annual BMP Cost Share[3] | 50323 | $3,586,647 | $5,869,321 | -$2,282,674 | $1,912,102 | $8,585,154 | $8,756,857 | $8,931,994 | $9,110,634 | $9,292,846 | $9,478,703 | $9,668,277 | $9,861,643 | $10,058,876 | **$78,246,235** |
| Chesapeake Bay Tax Credit | | TBD | | | TBD | $3,613,937 | $3,686,216 | $3,759,940 | $3,835,139 | $3,911,842 | $3,990,079 | $4,069,880 | $4,151,278 | $4,234,303 | **$35,252,613** |
| Chesapeake Bay Producer Portion[4] | | TBD | | | TBD | $27,104,528 | $27,646,618 | $28,199,551 | $28,763,542 | $29,338,813 | $29,925,589 | $30,524,101 | $31,134,583 | $31,757,274 | **$264,394,597** |
| Chesapeake Bay Federal Portion | | TBD | | | TBD | $22,587,106 | $23,038,849 | $23,499,626 | $23,969,618 | $24,449,010 | $24,937,991 | $25,436,750 | $25,945,485 | $26,464,395 | **$220,328,831** |
| Chesapeake Bay Technical Assistance[5] | 50322 | $4,760,086 | $4,760,086 | $0 | $1,313,324 | $4,137,662 | $4,238,688 | $4,341,734 | $2,905,933 | $3,013,142 | $3,122,496 | $3,234,037 | $3,347,809 | $3,463,856 | **$25,731,947** |
| Chesapeake Bay RMP Development[9] | 50301 | $261,479 | $147,642 | $113,837 | $120,000 | $200,000 | $200,000 | $200,000 | $200,000 | $200,000 | $200,000 | $200,000 | $200,000 | $200,000 | **$1,418,521** |
| Southern Rivers Cost-Share[1] | 50323 | $8,004,981 | $3,772,336 | $4,232,645 | $4,287,399 | $18,971,801 | $19,351,237 | $19,738,261 | $20,133,027 | $20,535,687 | $20,946,401 | $21,365,329 | $21,792,635 | $22,228,488 | **$172,770,486** |
| Southern Rivers SL-6 Backlog[2] | 50323 | $15,114,327 | $14,717,060 | $397,267 | $0 | $14,717,060 | $397,267 | $9,129,211 | | | | | | | **$9,129,211** |
| Southern Rivers Annual BMP Cost Share[3] | 50323 | $2,391,098 | $3,803,764 | -$1,412,666 | $1,280,652 | $5,723,436 | $5,837,905 | $5,954,663 | $6,073,756 | $6,195,231 | $6,319,136 | $6,445,518 | $6,574,429 | $6,705,917 | **$52,158,240** |
| Southern Rivers Tax Credit | | TBD | | | TBD | $2,409,291 | $2,457,477 | $2,506,627 | $2,556,759 | $2,607,894 | $2,660,052 | $2,713,253 | $2,767,518 | $2,822,869 | **$23,501,742** |
| Southern Rivers Producer Portion[4] | | TBD | | | TBD | $18,069,685 | $18,431,079 | $18,799,700 | $19,175,694 | $19,559,208 | $19,950,393 | $20,349,400 | $20,756,388 | $21,171,516 | **$176,263,065** |
| Southern Rivers Federal Portion | | TBD | | | TBD | $15,058,071 | $15,359,232 | $15,666,417 | $15,979,745 | $16,299,340 | $16,625,327 | $16,957,834 | $17,296,990 | $17,642,930 | **$146,885,887** |
| Southern Rivers Technical Assistance[5] | 50322 | $3,173,391 | $3,173,391 | $0 | $879,613 | $3,272,078 | $3,339,428 | $3,408,126 | $1,937,289 | $2,008,762 | $2,081,664 | $2,156,025 | $2,231,872 | $2,309,237 | **$18,691,476** |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Southern Rivers RMP Development[9] | 50323 | $161,188 | $101,930 | $59,258 | $0 | $50,000 | $50,000 | $50,000 | $50,000 | $50,000 | $50,000 | $50,000 | $50,000 | $50,000 | **$288,812** |
| Base Funds for Essential Operations[6] | 50320 | $7,191,091 | $7,191,091 | $0 | $7,191,091 | $15,520,554 | $15,520,554 | $15,520,554 | $15,520,554 | $15,520,554 | $15,520,554 | $15,520,554 | $15,520,554 | $15,520,554 | **$125,302,804** |
| Engineering Support[7] | 50301 | $297,713 | $262,190 | | $372,190 | $424,000 | $424,000 | $424,000 | $424,000 | $424,000 | $424,000 | $424,000 | $424,000 | $424,000 | **$3,181,620** |
| Training and Certification Program[8] | 50301 | $79,000 | $60,590 | | $60,590 | $60,590 | $80,000 | $80,000 | $80,000 | $80,000 | $80,000 | $80,000 | $80,000 | $80,000 | **$579,410** |
| IT Systems Updates and Support | 50301/50320 | TBD | | | TBD | $150,000 | $150,000 | $150,000 | $150,000 | $150,000 | $150,000 | $150,000 | $150,000 | $150,000 | **$1,350,000** |
| | **Totals:** | **$74,653,868** | **$66,290,251** | **$8,309,684** | **$23,818,345** | **$206,074,814** | **$178,655,496** | **$193,193,289** | **$181,065,229** | **$184,439,861** | **$187,881,985** | **$191,392,952** | **$194,974,138** | **$198,626,948** | **$1,617,886,433** |

**Footnotes:**

[1] Includes all BMPs with a lifespan greater than 1 year as well as RMP Implementation after plan development.

[2] The 2017 need figure was adjusted to the FY17 funds that were obligated. The 2018 figures represents the amount of leftover FY17 funds that can be obligated in FY18 and the FY19 figure represents the remainder of the current backlog.

[3] Amounts obligated in FY2017 for annual cover crop and nutrient management plans exceeded previous estimates.

[4] Includes producers inputs from installation of 100% voluntary BMPs and 25% or cost share BMPs.

[5] Technical assistance for FY17-FY25 reflects both the transfer of a significant portion into Base Funds for Operational Support and specific needs due to livestock stream exclusion and other structural best management practices.

[6] This amount represents SWCD budget template submissions and decoupling the majority of technical assistance from cost share.

[7] In the face of expanding program needs for engineering support, this funding builds capacity within DCR to provide engineering support to provide job approval authority to SWCD staff. These numbers were revised for the 2017 Ag Needs Assessment.

[8] Training and Certification funding to develop an internal DCR-SWCD training and certification program to further build SWCD technical capacity. These numbers were revised for the 2017 Ag Needs Assessment.

[9] FY17 Funding Available figures were revised upwards due to new funding becoming available during the FY.

[10] The Adjusted Total Need represents the previously identified Needs from 2017-2025, minus the FY17 Funding Obligated, minus the FY17 Funding Remaining, minus the FY18 Funding Available.

For the Southern Rivers areas, the needs assessment is based on the Chesapeake Bay annual cost estimates and the legislative mandate in § 10.1-2128.1 of the *Code of Virginia* for Virginia Natural Resources Commitment Fund funds to be split 60% to the Chesapeake Bay watershed and 40% to lands outside of the Bay watershed (the Southern Rivers watershed). The funding needs calculated using the 60% Chesapeake Bay/40% Southern Rivers split were compared with the estimated cost of implementing agricultural best management practices according to existing TMDL implementation plans for impaired streams in the Southern Rivers region (approximately 5,109 square miles) and extrapolating those costs to the entire Southern Rivers area (approximately 18,821 square miles). Recognizing that implementation in the Southern Rivers is not affected by the 2025 deadline associated with the Chesapeake Bay TMDL, the comparison showed that using the 60/40 split as an approximation of the long term Southern Rivers implementation needs is sufficient. As additional TMDL implementation plans are developed in the Southern Rivers area, this analysis will be reevaluated.

To complete the implementation cost estimate, an additional 5% of the total cost for each year is added to account for other BMPs that are supportive of WIP practices but not explicitly quantified. Then a 2% per year inflation factor is applied to the BMP costs for 2017 -2025. The total annual implementation costs are then divided between the various funding sources: Federal (25.5% [assumed]), State (49%) and Agricultural Producer (25.5%). The BMP unit costs, supportive BMP percentage, and funding distribution percentages are based on data captured in the VACS Tracking Database.

It should be noted that the concept was supported by the study committee established pursuant to the FY 2012 and FY 2013 Appropriation Act, that in order to provide for stable funding and program delivery by the Districts, what is currently considered “technical assistance funding” should be added to the administrative and operational funding support and the total amount should be supported by the General Fund as base funding for the Districts. Consequently, once the State Cost-Share portion was determined for each year from FY 2017 - 2025, the technical assistance needs to implement the Cost-Share program were calculated then most of it was converted into and added to existing (re-benchmarked) General Fund Operational Support levels for Districts.

This “re-benchmarked” Operational Support for Districts has been recalculated at approximately $15.5 million per year and includes funding at a level appropriate to deliver a $30 million annual cost-share program. This amount would also include Directors’ travel, resource management plan support, targeted TMDLs, dam maintenance, Technical Assistance, and DCR managed contracts. The cost of resource management plan development, using contractors, is estimated to average $200,000 per year in the Chesapeake Bay watershed and $50,000 per year in the Southern Rivers. If District Operational Support can be re-benchmarked at the recommended amount, Technical Assistance, calculated at 12%, would then only be needed for special initiatives, such as SL-6, and to implement increases in state cost-share over the $30 million per year benchmark.

The study committee established pursuant to the FY 2012 and FY 2013 Appropriation Act also identified engineering support as a factor that could limit the ability of Soil and Water Conservation Districts to deliver expanding cost share funding to farmers. In the face of expanding program needs for engineering support the study committee recognized the need to build internal capacity within DCR to provide

engineering support. DCR hired one Professional Engineer (PE) in FY 2015 and hired one Engineering Specialist in FY 2016 to assist SWCDs and farmers. A part-time Engineering Specialist was also hired in FY 2017 to assist SWCDs. Total engineering support at an annual cost of $424,000 will be needed to hire additional engineers and engineering specialists in order to ensure coverage statewide. To provide facilities, supplies, equipment, travel expenses, etc. for SWCD staff to receive both engineering and conservation training from DCR an estimated $80,000 annually will also be needed.

Another potential bottleneck in program delivery identified by the study committee is in information systems and technology. Soil and Water Conservation Districts are operating using outdated computers, old software, and a database that needs improvements to address the expanding role of districts in tracking voluntary practices and implementing Resource Management Plans. A minimum of $150,000 in additional annual support is needed. Due to data application development at DCR, operations and maintenance will increase that estimated cost.

# Chapter 3 - Chesapeake Bay and Virginia Waters Clean-up Plan Report

This chapter is submitted to fulfill the progress reporting requirements of §§ 62.1-44.117 and 62.1-44.118 of the *Code of Virginia* which calls on the Secretary of Natural Resources to plan for the cleanup of the Chesapeake Bay and Virginia's waters designated as impaired by the U.S. Environmental Protection Agency. This chapter also incorporates the reports on "*Cooperative Nonpoint Source Pollution Programs"* required in subsection D of § 10.1-2127 and the *"Watershed Planning and Permitting Report"* required in subsection B of § 10.1-1193 of the *Code of Virginia*.

## Upgrades to wastewater treatment facilities in the Chesapeake Bay watershed

### 2017 Progress Report

Nutrient load reductions from the point source sector have been the most reliable reductions achieved under the Chesapeake Bay (Total Maximum Daily Load) TMDL. Significant dischargers are regulated under the Chesapeake Bay Watershed Nutrient Discharge General Permit. The general permit includes wasteload allocations and schedules of compliance when necessary to phase in the necessary treatment facility upgrades. The general permit also allows point sources to trade nutrient credits so that facility upgrades can be phased in over a number of years while still meeting TMDL nutrient reduction goals. The permit was first issued on January 1, 2007 and reissued as of January 1, 2012 and January 1, 2017. Upgrades implemented to date have reduced the annual point source nutrient load delivered to the Bay and tidal rivers by approximately 8.5 million pounds of nitrogen (42% reduction) and 515,000 pounds of phosphorus (38% reduction) compared to the 2009 loads.

The current Chesapeake Bay Watershed General Permit includes additional nutrient reductions for significant dischargers in the James basin (nitrogen and phosphorus) as required by the Chesapeake Bay TMDL. Point source nutrient loads are dominated by the James River facilities which accounted for 73% of the point source nitrogen loads and 70% of the point source phosphorus loads in 2009. Reductions from the James River facilities are being phased in accordance with Appendix X of the TMDL (Staged Implementation Approach for Wastewater Treatment Facilities in the Virginia James River Basin). Appendix X requires two phases of nitrogen and phosphorus reductions to meet dissolved oxygen criteria in the James River followed by a third phase of reductions to meet chlorophyll-a criteria. Final, chlorophyll-a based wasteload allocations will not be developed for individual wastewater treatment facilities until the James River chlorophyll-a study is completed and chlorophyll-a criteria are proposed (currently scheduled for 2018). In all basins, with the exception of the James, wastewater facilities remain below the waste load allocations contained in the Chesapeake Bay TMDL. Point source nutrient reductions in the James basin have been significant, accounting for 65% of the statewide point source nitrogen and 51% of the statewide phosphorus reductions despite the absence of final chlorophyll-a based wasteload allocations. Additional upgrades are planned or in progress which are expected to allow the James River dischargers to meet the existing aggregate chlorophyll-a based wasteload allocation by the 2023 deadline established by the TMDL. The Commonwealth exceeded its 2015 milestone for this sector and is on track to meet the 2017 goals of the TMDL.

# TMDL development and implementation for waters impacted by toxic contamination

## 2017 Progress Report

**Bluestone River:** The Virginia portion of the Bluestone watershed has impairments for PCBs in fish tissue and violations of the total PCB water quality criterion in water. To address these impairments, Virginia and West Virginia will collaborate in the development of an interstate PCB TMDL. High PCB concentrations detected in the water column during an earlier multistate collaborative TMDL source investigation study triggered an EPA study and a cleanup effort. For example, a former Superfund site known as Lin Electric was remediated for extremely high levels of PCBs in sediment/sludge. The EPA Superfund program performed additional remedial activities within the Beaver Pond Creek tributary near Bluefield, West Virginia. The next phase for PCB TMDL development will consist of additional PCB data collection to augment the initial source investigation study.

**Elizabeth/tidal James Rivers:** A PCB fish consumption advisory extends from the fall-line in Richmond to the mouth of the James River, and includes the Elizabeth River and its tributaries. A PCB TMDL currently under development and scheduled for completion in 2017 will establish reductions needed to attain the fish consumption use within these impaired waters. A PCB source investigation study is nearly complete and will tabulate PCB loadings from several source categories, or conveyances, from which allocations and reductions will be assigned. Example categories consist of point sources such as industrial and municipal outfalls, regulated stormwater from urbanized areas as well as known PCB contaminated sites. Contaminated sediment and contributions from atmospheric deposition are also considered for this study. In order to synthesize all the information as well as link available PCB sources to the contaminated fish, a PCB fate and transport model is under development by the Virginia Institute of Marine Science (VIMS).

**Roanoke (Staunton):** This PCB TMDL was completed in early 2010. The Roanoke TMDL source investigation study identified two noteworthy PCB sources in the downstream (Staunton River) portion of the river. TMDL implementation is on-going at these two permitted sources and also includes a PCB monitoring requirement for an extensive list of Virginia Pollutant Discharge Elimination System (VPDES) permits throughout the watershed. A growing number of pollutant minimization plans (PMPs) to address identified contamination have been submitted to DEQ from known, active point sources and will be required for newly identified facilities that discharge unsafe levels of PCBs.

**Levisa Fork:** This PCB TMDL was completed in April 2010. Since TMDL monitoring had not revealed a viable source(s) of the contaminant, this particular TMDL was submitted to EPA as a phased TMDL. The Virginia Department of Mines, Minerals and Energy developed an EPA-approved monitoring plan to evaluate PCBs, total suspended solids (TSS) and total dissolved solids (TDS). Funding to support monitoring was limited and PCB monitoring was de-prioritized to concentrate efforts on monitoring of TSS and TDS for completion of the phased TMDL. Existing monitoring results for instream concentrations suggest focusing future PCB monitoring on Dismal Creek and Slate Creek will aid in TMDL implementation. More recently certain VPDES facilities have been identified as possible contributors for which Pollutant Minimization Plans may be required.

**Mountain Run:** The Mountain Run PCB impairment extends from Rt. 15/29 bridge crossing near Culpeper City approximately 19 miles to the confluence with the Rappahannock River. This waterbody was listed in 2004 although PCB contamination was originally identified during studies performed back in the 1970's. PCB monitoring was initiated in 2013 as part of the source investigation study for TMDL development. Additional rounds of monitoring have also occurred during 2014 and 2015 with the results pointing toward the identification of prospective source areas in the Culpeper area. A PCB TMDL is slated for development and completion within the 2018-2019 timeframe.

**New River:** The New River, beginning at the I-77 Bridge and extending to the West Virginia line, has been the focus of an extensive PCB source investigation study due to fish consumption use impairments. The study was initiated in 2010 and has included several iterations of ambient river PCB monitoring within the impairment. Large tributaries such as Peak Creek have also been investigated. In addition, PCB monitoring of permitted VPDES facilities has occurred along with the identification of other prospective sources such as contaminated sites, atmospheric deposition and contaminated sediment. Biological Systems Engineering (BSE) faculty and staff from Virginia Tech are developing the PCB fate and transport model from which loading allocations and reductions will be established. A PCB TMDL is scheduled for completion in 2017.

**North Fork Holston River:** This mercury TMDL was completed in 2011. A fish consumption advisory for mercury extends approximately 81 miles from Saltville, Virginia to the Tennessee state line. While most of the mercury in the river originated from the Olin plant site, this contaminant has been distributed throughout the floodplain downstream. The TMDL identified that most of the current mercury loadings come from the watershed and floodplain with lesser amounts from the former plant site. In order to meet the TMDL loadings, mercury reductions will be needed from all contributors.

**Potomac River:** A multi-jurisdictional PCB TMDL was completed in 2007. TMDL implementation activities have been on-going within the Virginia embayments. The VPDES municipal wastewater treatment facilities that discharge to the embayments have been monitored for the presence of PCBs. Reductions will be necessary in those situations where the assigned TMDL loads are exceeded.

**South and Shenandoah Rivers:** This mercury TMDL was completed in 2010. The South River has a fish consumption advisory that extends about 150 miles from Waynesboro to the West Virginia state line via the South River, the South Fork Shenandoah River, and the mainstem Shenandoah River. The primary source of mercury deposited in the river and floodplain was from releases that occurred during the 21 years that DuPont used mercury at the facility (1929-1950) in Waynesboro. Atmospheric deposition was not identified as a significant mercury source. Fish tissue data from a reference site upstream of the former DuPont plant site shows safe mercury levels, while fish tissue samples below the plant contain elevated amounts of mercury. Unfortunately, mercury levels in fish tissue from this portion of the river have not shown a decline since the mercury was discovered in the river in 1976. Remediation and restoration efforts continue through DEQ's TMDL and Resource Conservation and Recovery Act and Natural Resource Damage Assessment regulatory programs, and a significant non-regulatory science-based initiative through the South River Science Team has been in place since 2000. In addition, under a consent decree approved by a federal court in August 2017, DuPont has agreed to an approximately $50 million settlement that will be used to mitigate the environmental harm, including water quality, caused by the mercury contamination.

## Dan River Coal Ash Spill and State Response

On February 2, 2014, about 39,000 tons of coal ash and 25 million gallons of ash storage pond water were released into the Dan River from the Duke Energy facility in Eden, North Carolina. Coal ash is the residue generated from burning coal, and is typically stored at power plants or placed in landfills. Coal ash has a large variety of ingredients – mostly silicon oxide, iron oxide and aluminum oxide, with trace amounts of arsenic, selenium, mercury, boron, thallium, cadmium, chlorides, bromine, magnesium, chromium, copper, nickel, and other metals.

Emergency response and environmental monitoring was conducted over the next 10-12 months by EPA, DEQ, U.S. Fish and Wildlife Service (USFWS), North Carolina Department of Environment and Natural Resources (NCDENR, now reorganized and called the North Carolina Department of Environmental Quality) and Duke Energy. Analytical results for water samples taken by DEQ staff at four river and two reservoir stations located in Virginia's portion of the Dan River showed no violations of water quality standards for the protection of aquatic life. Sediment taken from the same locations showed some relatively elevated levels of trace metals, but not above any freshwater ecological screening levels that DEQ uses to indicate potential concerns. In addition to the emergency response environmental monitoring, to protect human health the Virginia Department of Health was involved in finished drinking water testing with the localities that draw their water from the Dan River (Danville, South Boston and Clarksville). All finished water met state and federal drinking water standards throughout the emergency.

Following the release, the ash was distributed by river flow over the entire length of the Dan River and into Kerr Reservoir, a distance of about 70 miles. State and federal agencies, along with Duke Energy, continue to monitor the Dan River for potential ecological impacts. DEQ is in the fourth year of its three to five year monitoring plan composed of several elements (see map below):

- Monthly water column and sediment sampling at four river stations and two Kerr Reservoir stations.
- Fish tissue collection at eight sites, once at each location annually, during the period September - October.
- "Boatable Probabilistic" monitoring (habitat, macroinvertebrates, fish community structure, and expanded chemical testing) at two stations; sampling done annually in late summer.

Results to-date indicate:

- Sediment metals levels remain low, below thresholds of potential concern, and the ash is becoming mixed and covered by native sediment to non-detectable levels in the biologically active layer throughout the river.
- Water column dissolved metals levels remain below water quality standards for both aquatic life and human health protection.
- Fish tissue collection and analysis has been completed for all samples taken (480 total) in 2014, 2015 and 2016. Lab results indicate that uptake by fish does not appear to be a concern for metals associated with the coal ash. There were no major differences or significant variations across the three years of monitoring; all reported concentrations of metal analytes were below DEQ's screening values for levels of concern. However, for fish taken in the region of the river where there is an existing consumption advisory due to legacy mercury contamination not associated with the Duke Energy release, the need for the advisory is confirmed.

The monitoring data is being used as part of a basinwide Natural Resources Damage Assessment and Restoration (NRDAR) process being led by the Dan River Natural Resource Trustee Council, a group composed of state and federal natural resources trustees. The Council has finalized an early-restoration plan and solicited public input on specific projects that Duke Energy can undertake for environmental improvement and enhancement in the Dan River basin. At its June 25, 2015 meeting, the State Water Control Board approved an enforcement Consent Order negotiated with Duke Energy that included a $2.5 million settlement. Under the Order, Duke Energy has agreed to undertake $2.25 million in environmental projects that benefit Virginia localities affected by the spill. The remaining $250,000 will be placed in a

fund DEQ uses to respond to environmental emergencies. Duke Energy has proposed several "early restoration" projects to be implemented before the NRDAR process is completed, including some within Virginia. Among the projects being considered or underway are:

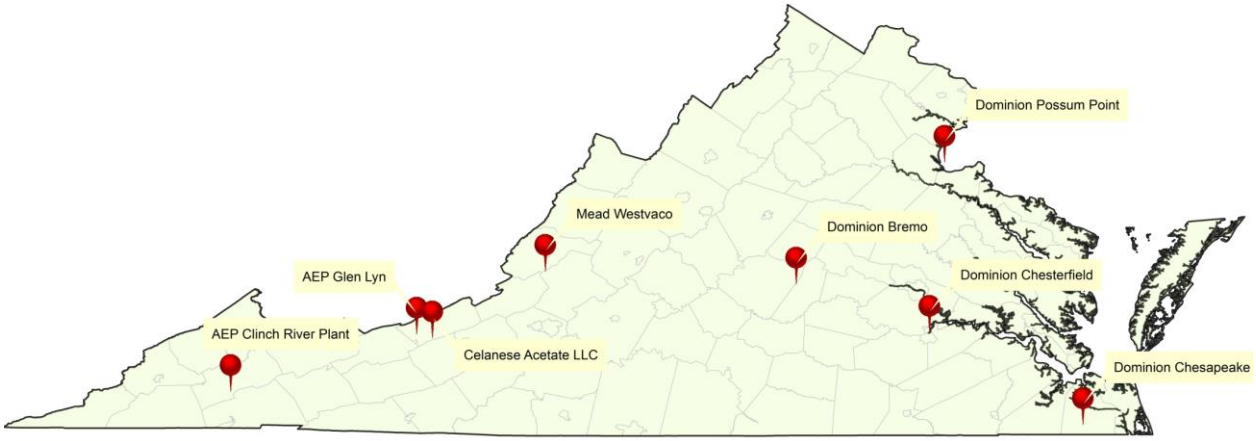
- Mayo River Park Expansion and Land Protection – depending on parcel availability, purchase approximately 175 acres adjacent to Mayo Park and the Mayo River to protect a number of trust resources, including water quality, habitat and recreation.
- Pigg River Power Dam Removal – defunct dam would be removed and reopen 75 miles of river to protect federal, state and local trust resources, including the Roanoke Logperch (a threatened/endangered species), the Trout Heritage Waterway, and a historic dam powerhouse. The dam removal is the last obstacle to complete Franklin County's Pigg River Blueway.
- Roanoke Logperch Restoration – fund genetic research and restoration of Roanoke Logperch population at Goose Creek over seven years; promote restoration of gene flow between previously connected fish populations.
- Freshwater Mussel Restoration & Conservation Fund – maintain and expand Virginia Department of Game and Inland Fisheries (VDGIF) and USFWS operations to improve freshwater mussel restoration activities for select species, including federal/state listed endangered and threatened species.
- Several riverwalk, river access and park/trail projects in the City of Danville.
- Several projects related to early warning detection of drinking water supply problems, annual water quality testing and reporting, and a "state-of-the-Dan" annual report card showing baselines and changes in water quality, recreation, drinking water and agricultural use.
- Drinking Water Taste and Odor Study – investigate the causes and extent of recent drinking water problems such as algae impacts on taste and odor; evaluate other potential biological causes.
- Abreu-Grogan Park Improvements – add a bathroom, deck, handicap access pier, bank stabilization and other enhancements.
- Rte. 880 (North Carolina/Virginia State Line) Boat Ramp – improve recreational access to the Dan River for motor boats, canoes and kayaks.

## Regulation and Management of Coal Ash Impoundments in Virginia

In response to the Eden, North Carolina coal ash release into the Dan River, DEQ conducted a review of coal ash impoundment operations along Virginia's waterways. The EPA had previously concluded a review of the structural integrity of Virginia's coal ash impoundments in 2013. None of the units were found to have an unsatisfactory rating. For additional information: http://www3.epa.gov/epawaste/nonhaz/industrial/special/fossil/surveys2/.

There are currently 13 active coal ash impoundments located at 8 facilities. The map below identifies the locations and owner/operators of these units. DEQ shares regulatory oversight with the Virginia Department of Conservation and Recreation (DCR), with DCR having statutory authority over the permitting, operation, maintenance and decommissioning of impoundment berms under its Dam Safety Program.

## Coal Ash Impoundments in Virginia




EPA's final rule on the Disposal of Coal Combustion Residuals from Electric Utilities became effective on April 17, 2015. The federal requirements were adopted into Virginia's Solid Waste Management Regulations effective January 27, 2016. The state and federal rules require closure of existing wet ash handling ponds at five electric generating utilities in Virginia (AEP's Clinch River Plant and Dominion's Bremo, Possum Point, Chesterfield and Chesapeake Plants). VPDES permits have been issued for the drawdown and dewatering of the AEP Clinch River, Dominion Bremo, Dominion Chesterfield and Dominion Possum Point facilities. The VPDES permits include monitoring requirements; limitations for whole effluent toxicity and metals associated with coal combustion residuals; and other necessary conditions. Wastewater treatment systems have been installed and dewatering has commenced at the Bremo, Possum Point and AEP Clinch River facilities. The wastewater treatment system for the Chesterfield facility is still under construction. A VPDES permit application is pending for the Chesapeake facility.

Closure of the ash impoundments will also include DEQ oversight through waste permitting requirements including plan reviews, groundwater and surface water monitoring, post-closure care requirements, and other necessary conditions. Facilities have begun submitting the closure plans for these impoundments to the Department. Senate Bill 1398 adopted by the 2017 General Assembly, requires every owner or operator of coal combustion residual (CCR) surface impoundments located in the Chesapeake Bay Watershed to conduct an assessment regarding the closure of the unit. These assessments are to be provided no later than December 1, 2017. The bill also requires that DEQ suspend, delay, or defer the issuance of solid waste permits regarding the closure of these surface impoundments until at least May 1, 2018. Specifically, SB 1398 requires that the assessments be conducted for the CCR surface impoundments at: Bremo Power Station, Chesapeake Energy Center, Chesterfield Power Station, and Possum Point Power Station. The legislation also delays the solid waste permitting for closure of these surface impoundments. Consistent with SB 1398, no solid waste permits for closure of the CCR surface impoundments at these four sites will be issued until at least May 1, 2018, the date established in the bill. A solid waste permit for the AEP Clinch River facility for closure has been issued.

# No Discharge Zone (NDZ) designations

## 2017 Progress Report

Federal Law prohibits the discharge of untreated sewage from vessels within all navigable waters. A "No Discharge Zone" (NDZ) is an area in which both treated and untreated sewage discharges from vessels are prohibited. In 2014, DEQ transmitted four NDZ applications for Virginia's Northern Neck (the peninsula of land separating the tidal Potomac and Rappahannock Rivers) to Virginia's Secretary of Natural Resources (SNR) for review. The SNR concurred with the applications and submitted them to EPA - the federal agency with the authority to designate NDZs per §312 of the Clean Water Act and enabling regulations at 40 CFR Part 140. EPA has since completed a review of the applications and provided DEQ with preliminary comments. DEQ and the Northern Neck Planning District Commission are working together to address these by the end of 2017. Once EPA receives Virginia's responses, its determination process will continue. Two other initiatives to address boating discharges are in progress. The Go-Green Committee of Gloucester County, the Virginia Institute of Marine Science and DEQ have worked together to develop a NDZ application for the Sarah and Perrin creeks in Gloucester County. A public meeting was held on July 27, 2016. All comments received were in support of the NDZ application. DEQ presented the application to the State Water Control Board after which it was sent to the SNR for review and transmittal to EPA. EPA will be evaluating the application for final determination. The Elizabeth River Project, an independent non-profit organization, has created a task force to achieve increased pump-out compliance by addressing education and accessibility issues. This outreach effort by the Elizabeth River Project is in-lieu of pursuing a NDZ application at this time.

# On-site septic systems

## 2017 Progress Report

The Virginia Department of Health (VDH) Office of Environmental Health Services, along with local health district Environmental Health programs, oversees and implements 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, of which roughly 550,000 are located in the Chesapeake Bay watershed and 30,000 are alternative onsite sewage systems (AOSS). AOSS reduce nitrogen entering groundwater by as much as 69% when compared to conventional onsite sewage systems. An AOSS in the Chesapeake Bay watershed installed after December 7, 2013 always disperses secondary or better effluent, and sometimes includes disinfection or pressure distribution. On December 7, 2013, VDH required all new and repaired AOSS in the Chesapeake Bay watershed to reduce nitrogen by 50% as compared to a conventional onsite sewage system.

The VDH database, the Virginia Environmental Information System (VENIS), is the main record keeping tool for the agency's environmental health programs. From July 1, 2016 through June 30, 2017, VDH issued 9,929 new construction permits statewide; 1,370 were for AOSS. During the same time period, VDH issued 3,896 repair permits statewide; 251 required the installation of an AOSS. VDH revised VENIS and reporting policies to capture additional information about AOSS. VDH can now identify BMPs for onsite sewage systems recognized by the Chesapeake Bay Model (previously, VDH could only report those AOSS that reduced nitrogen by 50%), including nitrogen removal from AOSS (20%, 38%,

50%, and 69%), septic tank pump-outs (5% nitrogen reduction), and onsite sewage systems connected to municipal wastewater collection systems (100% nitrogen reduction).

In 2017, Virginia participated in the multi-state Bay Program workgroup to revise attenuation rates for effluent in different soil types and soil zones. Variable attenuation rates will replace the previously uniform 60% nitrogen attenuation rate applied to the onsite septic sector. In the new Phase 6 Chesapeake Bay Watershed Model, Virginia has an average 68.72% attenuation rate, reducing the onsite septic sector delivered nitrogen load from 3,088,876 million pounds to 2,416,262 million pounds (a reduction of almost 22% based on the improved model).

Repair permits are issued by VDH to correct failing septic systems, defined in the Sewage Handling and Disposal Regulations (12VAC5-610-350) as "… the presence of raw or partially treated sewage on the ground's surface or in adjacent ditches or waterways… Pollution of the groundwater or backup of sewage into plumbing fixtures may also indicate system failure." The correction of failing or malfunctioning onsite sewage systems helps to protect public and environmental health and groundwater supplies by keeping untreated or partially treated sewage from entering groundwater and surface waters and exposure to vectors that cause disease. Untreated or partially treated sewage can contribute bacterial pollution and excess nitrogen to waterways.

VDH strives to repair all onsite sewage systems within 60 days of when the failure is reported to VDH and this metric is monitored on a monthly basis with all Environmental Health Managers. Presently, about 51% of failed sewage systems are repaired within 60 days. Repairing failing sewage systems is one of five metrics reported to the governor from the Secretary of Health and Human Resources as an indicator of the health of Virginians. This metric has also been incorporated into the 2016-2017 Milestones for the Phase 2 Watershed Implementation Plan (WIP) for the Chesapeake Bay TMDL. Statewide, VDH aims to repair 43% of failing onsite sewage systems within 60 days of becoming aware of the failure by 2018 with additional increases in that repair percentage over time

The cost of installation and operation and maintenance prevents many repairs from being completed within 60 days. Repairs to failing systems can sometimes require the installation of a new system and can cost homeowners more than $30,000, especially in the coastal plain physiographic province (e.g. those areas east of I-95). The Code of Virginia, at § 32.1-164.1:1, allows a property owner to waive the requirements of additional treatment and/or pressure dispersal in the AOSS regulations (12VAC5-613) due to financial burden. Since January 1, 2012, VDH has issued over 600 waivers to homeowners statewide. These waivers can be a disincentive for homeowners to upgrade a failing septic system with additional treatment. Recent amendments to AOSS regulations (12VAC5-613), effective July 17, 2017, will allow homeowners to repair a failing system that is discharging directly to groundwater at less expense. One goal of the recent amendment was to encourage compliance with the AOSS Regulations so that owners will elect to receive fewer waivers. This regulatory change will help to reduce cost, protect groundwater quality, and encourage property owners to install additional treatment instead of requesting a waiver. VDH continues to explore other options for funding sources to assist homeowners with repairing failing septic systems and installing nitrogen reducing AOSS. VDH is also exploring options with DEQ and other stakeholders to determine how a repair fund could be created to help homeowners with costs to repair or upgrade a septic system in the Chesapeake Bay Watershed.

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

## DEQ grant funding for repairing/replacing failing on-site septic systems and straight-pipes

### 2017 Progress Report

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 FY 2017, DEQ provided funding to pump-out septic systems, repair or replace failing septic systems or remove straight pipes from at least 651 homes using $833,144 from State and Federal funding and landowner contributions.

## Residential Septic Program - Grant Funded BMPs 7/1/2016-6/30/2017

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

The grant funds were utilized in nine different river basins throughout Virginia. Generally, Soil and Water Conservation Districts facilitate septic repair and replacements along with overall TMDL implementation; however, in a few cases, not-for-profits, planning district commissions and localities assisted with the projects.

## 319H Funded Residential Septic BMPs: July 1, 2016 thru June 30, 2017 by Basin

| Watershed | River Basin | # of BMPs | Federal 319(h) and State WQIF NPS Funds | Total Cost of Practice | Bacteria Reductions CFU | Nitrogen Reduction Lbs/Year |
|---|---|---|---|---|---|---|
| Waters outside the Chesapeake Bay Watershed | Roanoke-Dan | 0 | 0 | 0 | 0 | 0 |
| | Tennessee-Clinch | 0 | 0 | 0 | 0 | 0 |
| | Tennessee-Holston | 68 | $28,200 | $49,580 | 6.35E+11 | 396 |
| Sub-Total | | 68 | $28,200 | $49,580 | 6.35E+11 | 396 |
| Waters inside the Chesapeake Bay Watershed | James-Appomattox | 29 | $30,575 | $53,910 | 5.65E+11 | 345 |
| | James-Rivanna | 35 | $39,324 | $73,997 | 4.90E+11 | 296 |
| | Middle James | 85 | $74,588 | $142,909 | 1.17E+12 | 705 |
| | Potomac-Shenandoah | 48 | $82,654 | $179,470 | 8.33E+11 | 508 |
| | Rappahannock | 320 | $125,439 | $266,361 | 2.95E+12 | 1,749 |
| | York | 66 | $32,755 | $66,917 | 6.52E+11 | 388 |
| Sub-Total | | 583 | $385,336 | $783,564 | 6.66E+12 | 3,992 |
| **TOTAL** | | **621** | **$413,536** | **$833,144** | **7.29E+12** | **4,368** |

# Adoption of cost-effective agricultural best management practices

## 2017 Progress Report:

### Agricultural Cost-Share Programs

DCR administers funds for conservation programs that Soil and Water Conservation Districts deliver to the agricultural community. Some of these programs include the Virginia Agricultural Best Management Practices Cost-Share, Agricultural BMP Tax Credit, and Conservation Reserve Enhancement Programs. Details on cost-share allocations to Soil and Water Conservation Districts are summarized in Chapter 2 of this report.

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

### Agricultural Stewardship Act Program

The Agricultural Stewardship Act (ASA) Program is a complaint-based program by which the Commissioner of Agriculture and Consumer Services receives information alleging water pollution from agricultural activities. Complaints alleging that a specific agricultural activity is causing or will cause water pollution are received by the Commissioner. If a complaint meets the criteria for investigation, the Commissioner (through the ASA program staff) contacts the appropriate SWCD about investigating the problem. If the district declines, the ASA program staff conducts the investigation on behalf of the Commissioner. In most cases, a joint investigation involving local district staff and ASA program staff is performed.

The purpose of the investigation is to determine whether the agricultural activity is causing or will cause water pollution. If no causal link is found, the Commissioner decides that the complaint is unfounded. If the Commissioner determines that the activity is the cause of pollution, the farmer is given up to 60 days to develop an agricultural stewardship plan to correct the identified water pollution problems. The local district typically reviews the plan, and the Commissioner will approve the plan when it is determined that it meets the necessary requirements to solve the water pollution problem.

The ASA provides the farmer up to six months from the date of the Commissioner's determination that a complaint is founded to start implementing the agricultural stewardship plan and up to 18 months from that date to complete plan implementation. The timing allows the farmer to take advantage of suitable weather conditions for outside work or required construction. If a farmer fails to submit a plan for approval or implement a plan within the given timeline, the Commissioner takes enforcement action.

The ASA program received numerous inquiries regarding possible agricultural pollution during the program year of April 1, 2016, through March 31, 2017. Sixty-seven of these cases became official complaints. The official complaints fell into 16 categories according to the following types of agricultural activity: beef (33), dairy (6), equine (6), tobacco (3), land conversion (3), swine (3), other (3), cropland (2), llamas/alpacas/poultry (1), equine/goat/land conversion/llama/alpaca/poultry (1), goats/swine (1), land conversion/beef (1), poultry (1), land conversion/other (1), goats (1), land conversion/sheep (1).

There were also seven different categories based on the types of pollution: sediment, nutrient, and bacteria (30); sediment only (11); sediment and nutrient (9); bacteria and nutrient (9); nutrient only (5); bacteria only (2); bacteria, nutrient, and toxins (1).

Twenty-two (33 percent) of the 67 official complaints received during the program year were determined to be founded and required agricultural stewardship plans to address pollution problems. In each founded case, there was sufficient evidence to support the allegations that the agricultural activities were causing or would cause water pollution.

Twenty-six (39 percent) of the complaints received during the program year were determined to be unfounded because there was insufficient or no evidence of water pollution. In some instances, farmers involved in the unfounded complaints voluntarily incorporated best management practices into their operations to prevent more complaints or to prevent potential problems from becoming founded complaints.

Nineteen (28 percent) of the complaints received during the program year were dismissed for various reasons. Many of the complaints that were dismissed were situations where a water quality concern existed but was remedied prior to the official investigation. Others were cases in which the ASA program had no jurisdiction in the matter or were dismissed because insufficient information was provided by the complainant.

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. 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 receive the facts on a case. Two corrective orders were issued during the program year for not implementing and maintaining the measures included in approved agricultural stewardship plans.

# Department of Forestry Implementation of Silvicultural Regulation and Strategic Water Quality and Watershed Protection Initiatives

## 2017 Progress Report

The mission of the Virginia Department of Forestry (VDOF) is protecting and managing healthy, sustainable resources for all Virginians. Managing the state forests and working with private forest owners and communities to assure that the forests of the Commonwealth are major contributors to water quality and healthy watersheds aligns with the Department's core mission, with its current strategic plan, and with its Forest Action Plan. Forests provide superior watershed benefits over nearly every other land use. Silvicultural water quality enforcement, fire suppression, riparian buffers, conserving forested

headwaters, providing for adequate water supplies to downstream communities, land conservation, restoring Longleaf and Shortleaf pine and American chestnut, wildlife habitat management, prescribed fire, urban and community forestry, and conservation education are key VDOF programs.

## Silvicultural Water Quality Law Enforcement Actions

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 authorizes the State Forester to assess civil penalties to owners and operators who fail to protect water quality in their forestry operations. Virginia is the only state in the southeastern United States that grants enforcement authority under such a law to a state's forestry agency. In FY 2017, the VDOF was involved in 186 water quality actions initiated under the Silvicultural Law. This represents a decrease of 29 percent from FY 2016. Of these actions, one resulted in Special Orders being issued for violations of the law.

## Forestry Best Management Practices (BMPs) for Water Quality

VDOF has been a leader in the protection of forested watersheds since the early 1970s when it published its first set of Forestry Best Management Practices for Water Quality. The fifth and current edition of those guidelines came out in 2011. 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 2016, 94.7 percent of the timber harvest acres in Virginia conducted within the boundaries of the Bay Watershed were under BMPs. The audit also showed that 98.32 percent of the sites visited had no active sedimentation present after the close-out of a harvesting operation. The goal for implementation under WIP II is 90 percent of timber harvest acres under BMPs by 2017 and 95 percent by 2025.

## Harvest Inspection Program

The Department's harvest inspection program began in the mid-1980s, and provides VDOF an opportunity to educate forestland owners and operators about BMPs and water quality protection techniques. In FY 2017, VDOF field personnel inspected 5,010 timber harvest sites across Virginia on 232,305.3 acres.

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 FY2016, VDOF field personnel inspected 5,163 timber harvest sites across Virginia on 220,105 acres – a marginally slight decrease in the number of acres harvested in FY2016 (Figure 3-1).

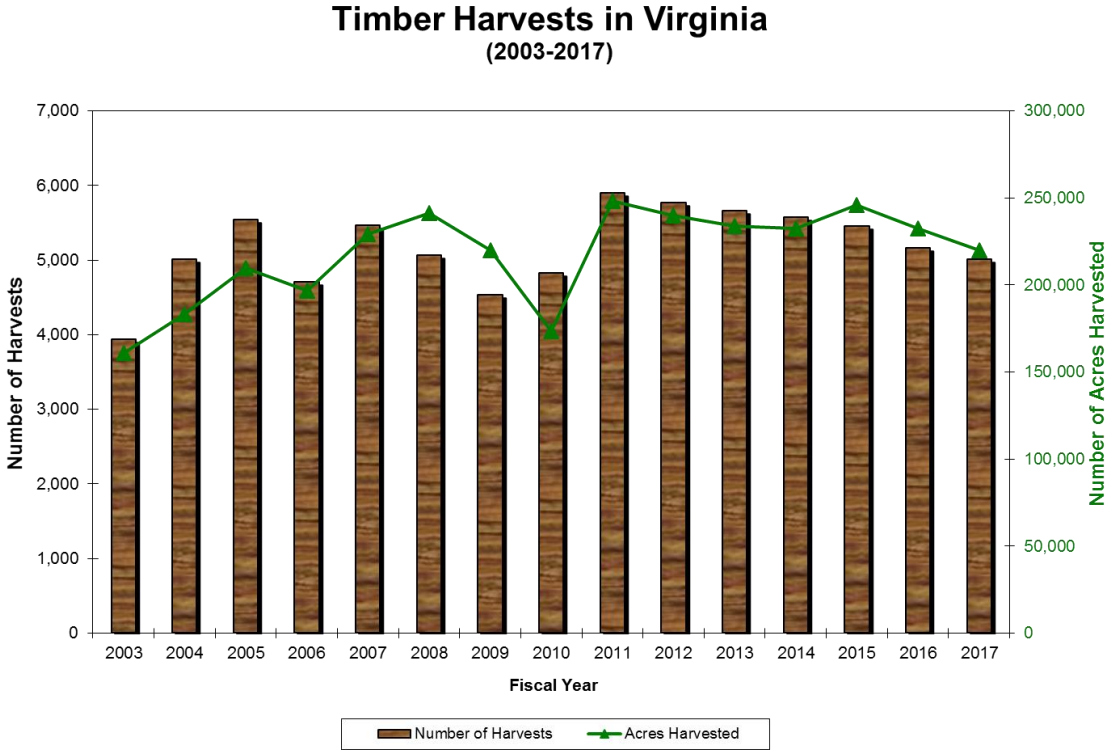



**Figure 3-1: Number of harvests inspected and total number of acres harvested: 2003 through 2017**

## Cost Share Assistance

VDOF offers cost-share assistance to timber harvest operators through a program funded by the Commonwealth's Water Quality Improvement Fund (WQIF). This program shares the cost of the installation of forestry BMPs on timber harvest sites by harvest contractors. Twenty-nine stream protection projects were funded in FY 2017 that are using portable bridges to provide stream crossing protection across the site during and after harvesting. In addition, 21 additional projects were funded under the "Virginia Trees for Clean Water" utilizing funds from the Commonwealth's WQIF. These projects included tree planting for establishment of riparian forest buffers as well as some stormwater retrofit projects that incorporated the use of trees.

## Environmental Impact Reviews

In its role as a reviewing agency for DEQ's and Virginia Department of Transportation's (VDOT) environmental impact review processes, VDOF 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 included special forestland mitigation guidance to project sponsors that was developed by VDOF in its environmental impact review instructions. VDOF has also been partnering with the Commonwealth's other natural resource agencies to look beyond the direct footprints of proposed long, linear infrastructure projects to measure the indirect impacts of forest fragmentation. VDOF was instrumental in creating the Virginia Forest Conservation Partnership (VFCP). This partnership was 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.

## Logger Education

VDOF was involved in 16 Logger education programs in FY 2017 educating 430 timber harvesting professionals through the Virginia SHARP Logger Program in cooperation with Virginia Tech and the Sustainable Forestry Initiative (SFI®) State Implementation Committee. This program has enabled VDOF to assist in training 8,666 harvesting professionals in 284 programs relating to water quality protection since its inception. Figure 3-2 exhibits historical levels of participation in VDOF logger education programs since 2003.

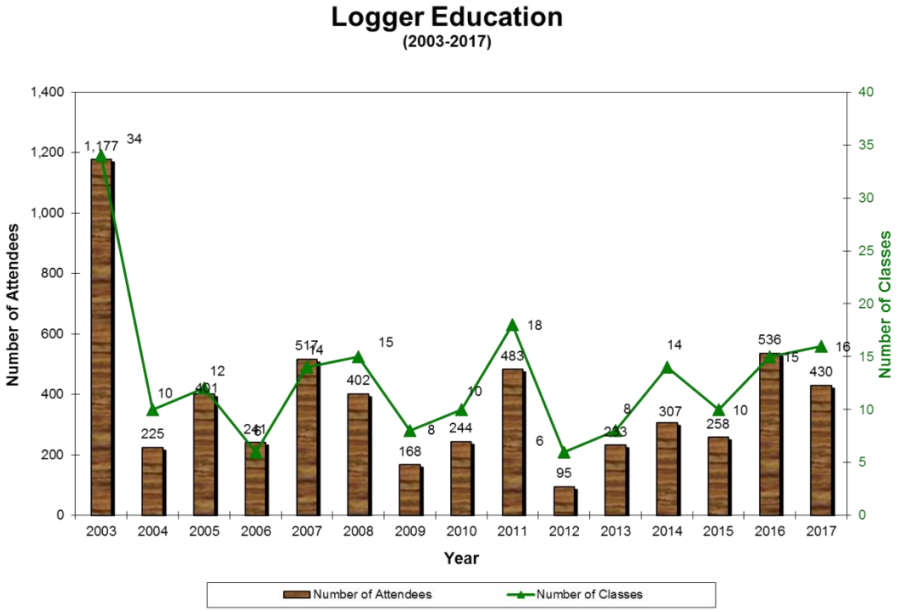



**Figure 3-2: VDOF logger education: 2003 through 2017**

## Virginia Trees for Clean Water

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

## Project Learning Tree

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

## Riparian Forest Buffers Technical Assistance

Protecting water quality in Virginia through the creation and protection of riparian forest buffers is very important, not only to the VDOF, but also to other state and federal conservation agencies, including DCR, the USDA Farm Service Agency (FSA) and the Natural Resources Conservation Service (NRCS). While these agencies can provide funding to landowners for creating riparian forest buffers, the VDOF provides the technical forestry expertise in the planning and creation of riparian forest buffers.
For FY 2017, there were a total of 143 riparian buffer establishment projects reported by the VDOF for 567.9 acres within the Chesapeake Bay watershed. These are projects where the VDOF was directly involved by providing planning, oversight and certification of project completion.

## Riparian Forest Buffer Tax Credits

For Tax Year 2016, VDOF issued Riparian Forest Buffer tax credits on 70 applications covering 1,288.7 acres of retained forested buffers. The tax benefit to forest landowners was $443,085.38 on timber valued at $2,101,493.85.

## Easement Program

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

## Forest Stewardship Program

Virginia's Forest Stewardship Program is a cooperative effort of VDOF and the U. S. Forest Service, and Private Forestry, to assist non-industrial private landowners to improve the management of private non-industrial forestlands for multiple resources, including wildlife, water, recreation and forest products.

Virginia's state forests owned by VDOF serve as demonstration sites for "best practices" in forestry including activities from tree planting to harvesting, and environmental considerations for water quality, aesthetics and wildlife. Management of vital streamside habitat focuses on a continuous source of clean water, travel corridors for wildlife, and diversity of plant and animal species.

## Urban Tree Canopy Program

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

## Healthy Watershed Forest/TMDL Project

For the past two years, VDOF has led a landscape-scale, Virginia and Pennsylvania partnership called the Healthy Watershed Forest/TMDL project that has been focused on, first, quantifying the value of retaining forestland for meeting water quality objectives. Secondly, Virginia engaged in more than 60 discussion and discovery sessions in the field to determine what is needed from the perspective of local leaders to prioritize forestland retention as a land-use planning option to meet Chesapeake Bay Watershed goals.

The project sponsors in Virginia were VDOF and the Rappahannock River Basin Commission. Virginia project partners were: the Virginia Department of Environmental Quality; the George Washington Regional Commission; the Water Resources Center at Virginia Tech; the Virginia Tech Land Use Education Program; the Chesapeake Bay Commission, and The Nature Conservancy. Project grant funding came from the Chesapeake Bay Program Healthy Watersheds Goal Implementation Team through the Chesapeake Bay Trust, the US Endowment for Forests and Communities and the Virginia Environmental Endowment.

Virginia successfully quantified that the value of retaining more forestland to meet Chesapeake Bay TMDL requirements could offset TMDL management investments and, thereby, save up to $125 million in the pilot study area alone, and had its methodology peer reviewed and validated by Pennsylvania. Such savings extrapolated across all the jurisdictions within the Chesapeake Bay Watershed could, therefore, be enormous. Secondly, it produced through extensive discussions with localities and numerous other

stakeholder groups a "toolbox" of policy and other incentives that can be used to stimulate forestland retention in land-use planning decision making. Lastly, it identified and focused discussions on some of the key challenges that thwart enhanced forestland retention planning so possible solutions can be explored. The final report on the project's findings and recommendations was submitted June 30, 2017 to the federal, Virginia and Pennsylvania governments and numerous other parties. Follow-on efforts are now underway to act on the project's recommendations.

## Assessments of Forestland Change

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

## Vital Habitat

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

- Comparison of planting months for maximizing survival and early growth of restored longleaf pine, and
- Relative performance of native Virginia longleaf pine compared to other geographic sources from North Carolina to Mississippi.

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

VDOF has established a six-acre longleaf pine orchard at its New Kent Forestry Center near Providence Forge, Virginia. With use of improved grafting techniques, cone-bearing trees are expected by 2020, and seed production is planned to eventually provide an annual crop of 250,000 seedlings, many of these will be grown as containerized stock at the Garland Gray Forestry Center in Sussex County, Virginia. A longleaf pine time-of-planting study at Suffolk's Lone Star Lakes Park has been evaluated and current survival rates are 87 percent to 100 percent. One-year-old containerized seedlings were planted each month from October 2014 until May 2015. The study will continue to be evaluated and have been duplicated for the 2015-16 planting season.

# Implementation of Nutrient Management Planning

## 2017 Progress Report

In FY 2017, DCR staff prepared nutrient management plans on 64,988 new acres and revised plans for 78,466 acres. As indicated in the following table, private nutrient management planners have developed or revised nutrient management plans statewide for nearly 460,000 acres.

| DCR Nutrient Management Planning | | | | | | | |
|---|---|---|---|---|---|---|---|
| **New or Revised** | **Sum Of Cropland** | **Sum Of Hayland** | **Sum Of Pasture** | **Sum Of Specialty** | **Sum of Turf** | **Sum of Non-Ag** | **Total** |
| New | 37,824 | 1,813 | 8,706 | 327 | | | 64,988 |
| Revised | 56,898 | 12,438 | 8,076 | 424 | | | 78,466 |
| **Private Nutrient Management Planning** | | | | | | | |
| **New or Revised** | **Sum Of Cropland** | **Sum Of Hayland** | **Sum Of Pasture** | **Sum Of Specialty** | **Sum of Turf** | **Sum of Non-Ag** | **Total** |
| New | 24,916 | 28 | 6,337 | 4,161 | 11,520 | 838.4 | 47,800.4 |
| Revised | 347,476 | 1,443 | 47,813 | 11,391 | 1,798 | 939 | 410,860 |
| **Grand Total** | 427,683 | 18,420 | 65,783 | 15,681 | 13,319 | 1,777.4 | 602,114 |

DCR continues to contract with several private planners and now has 264 golf courses with nutrient management plans totaling nearly 25,116 acres. DCR anticipates having over 300 golf courses with nutrient management plans by October 2017. Total urban areas with nutrient management now exceed 65,000 acres. Because of reporting/data collection limitations, the total urban acres with nutrient management is not reflective of the actual amount of urban acres with nutrient management. The actual acreage is much higher. Section 3.2-3602.1 of the *Code of Virginia* applies to 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. The total acreage reported to VDACS is not currently reflected in the total urban acres with nutrient management. DCR estimates the additional acreage is roughly 100,000 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.

DCR re-established a joint program with the Virginia Poultry Federation in February 2016 and poultry litter shipments out of the Chesapeake Bay watershed resumed in August 2016. As of June 30, 2017, 5,700 tons of litter had been shipped outside of Virginia's Chesapeake Bay watershed. DCR is working with the Virginia Poultry Federation and turkey integrators to incorporate actual turkey production data

into the Phase 6 Chesapeake Bay Model. This data set will help more accurately reflect turkey litter volume produced, turkey population, and nutrients generated via turkey litter in the Bay watershed.

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

In order to continue to progress toward meeting goals for the Chesapeake Bay TMDL, funding support is also needed to allow for contracting of private sector planners to continue to write nutrient management plans for unpermitted animal operations (i.e., those that do not require a Confined Animal Feeding Operation permit due to their relatively smaller size and number of animals). There are 545 dairies in Virginia. Eighty-two permitted and 155 unpermitted dairies have nutrient management plans. Out of 383 dairies in Virginia's Chesapeake Bay watershed, 52 are permitted and 331 are unpermitted. DCR is also working with Virginia Tech Cooperative Extension to assess the number of unpermitted confined beef operations in the Commonwealth. At the current time, there are five permitted beef operations with nutrient management plans. Of a total $265,000 made available in FY 2016 for private sector plan writers, $120,000 was for plans on unpermitted animal operations. Approximately $150,000 per year in funding is needed, on an ongoing basis, to expand existing contracting with the private sector plan writers for these unpermitted animal operations.

# Implementation of and compliance with erosion and sediment control programs

## 2017 Progress Report

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

# Implementation of stormwater management program

## 2017 Progress Report

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

## Authorization of SLAF Project Funding List

In order to reduce nonpoint source pollution from stormwater runoff, the Virginia General Assembly included Item 360 in Chapter 806 of the 2013 Acts of Assembly (the Commonwealth's 2013 Budget Bill) which created and set forth specific parameters for the administration of the Stormwater Local Assistance Fund (SLAF). The purpose of the Fund is to provide matching grants to local governments for the planning, design, and implementation of stormwater BMPs that address cost efficiency and commitments related to reducing pollutant loads to the state's surface waters. In accordance with that legislation, the State Water Control Board approved Guidelines for the implementation of the SLAF program. The Guidelines call for an annual solicitation of applications, an application review and ranking process, and the authorization of a Project Funding List (PFL) by the DEQ Director.

The General Assembly provided $35 million in bond funds for SLAF in FY 2014 and $20 million more in FY 2015. In the first cycle of SLAF funding, DEQ funded 71 projects in 31 localities totaling $22,937,158. In the second cycle of SLAF funding, DEQ authorized funding for 64 projects in 25 localities totaling $21,488,776. The remaining funds were carried over to be combined with the additional $5 million in appropriations provided by the General Assembly in FY 2016. In the third cycle of SLAF funding, DEQ authorized funding for 17 projects in 17 localities, totaling $8,486,209. The General Assembly made $20 million in bond funds available for the FY 2017 solicitation. DEQ authorized 41 projects from 26 localities totaling $19,855,948.

From the four funding cycles of SLAF grants, 34 localities have taken the next step and signed grant agreements to implement 82 projects, totaling $31,631,583.77 in cost-share. Additionally, 21 projects authorized for funding from the solicitations (17 from the first cycle and four from the second) have been withdrawn by the localities.

# Local government implementation and compliance with requirements of the Chesapeake Bay Preservation Act

## 2017 Progress Report

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

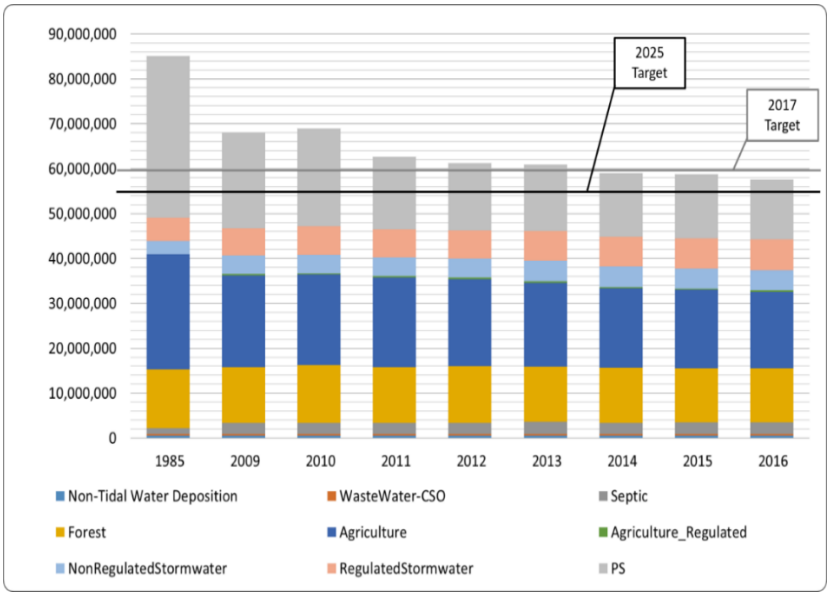
A total of 40 of the 84 Bay Act localities have now gone through a second round compliance review. During these compliance reviews, staff assess whether or not the locality is implementing soil and water quality conservation assessments for all active agricultural lands, the status of the water quality provisions of the local comprehensive plans, how well local governments are ensuring that impervious cover is minimized, indigenous vegetation is maintained and land disturbance is minimized on approved development projects and septic tank pump out requirements. As part of the compliance review process, localities are required to submit annual reports on their continued implementation of the Bay Act. Based on the 2016 annual report cycle, a total of 580 soil and water quality conservation assessments were conducted and 23,030 septic systems were pumped out.

# Chesapeake Bay Total Maximum Daily Load implementation

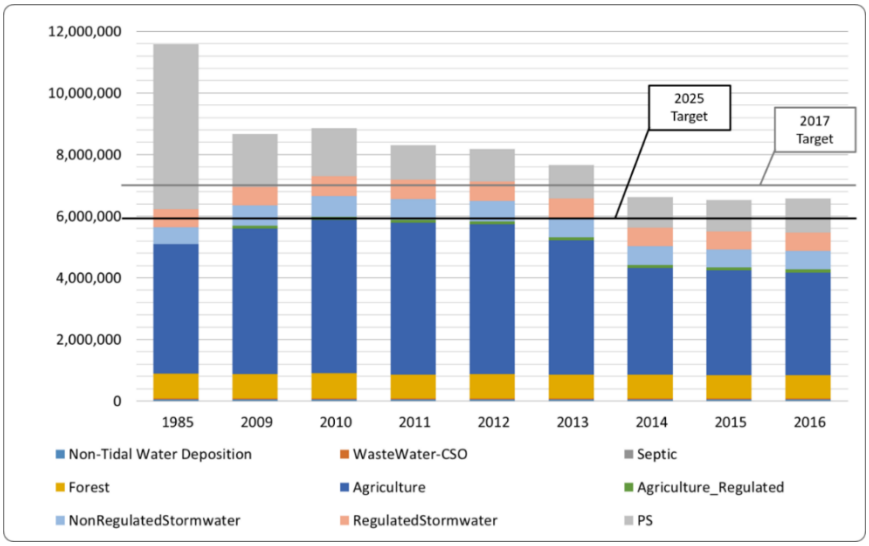
## 2017 Progress Report

A review of Chesapeake Bay TMDL implementation progress through 2017 shows that Virginia met its 2015 milestone targets for nitrogen and phosphorus reductions, but was slightly behind for sediment. Model forecasts of the 2016-2017 milestones suggest that Virginia is on track to meet the 2017 target for achieving 60% of the required reductions for all three pollutants.

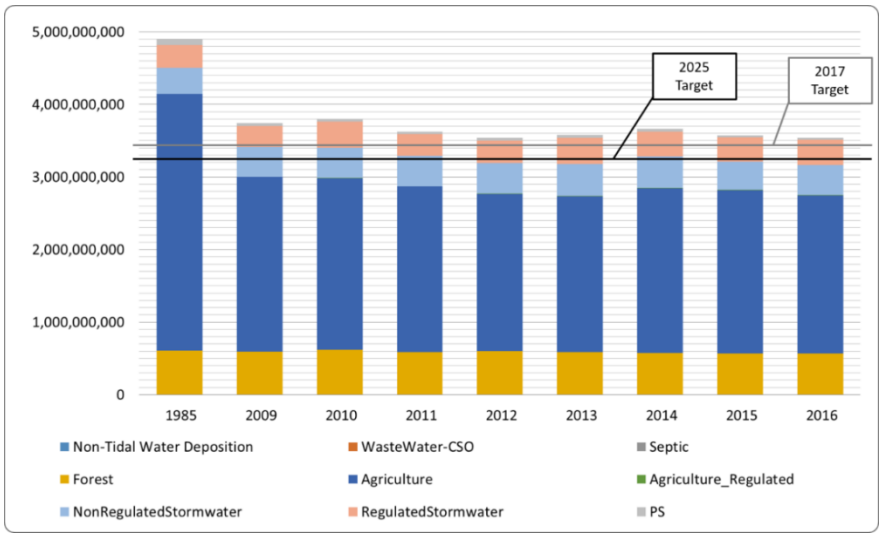
## Virginia Delivered Nitrogen Loads




## Virginia Delivered Phosphorus Load



**Virginia Delivered Sediment Load**




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

DEQ: http://www.deq.virginia.gov/Programs/Water/ChesapeakeBay.aspx.

ChesapeakeStat: http://stat.chesapeakebay.net/?q=node/130&quicktabs_10=4.

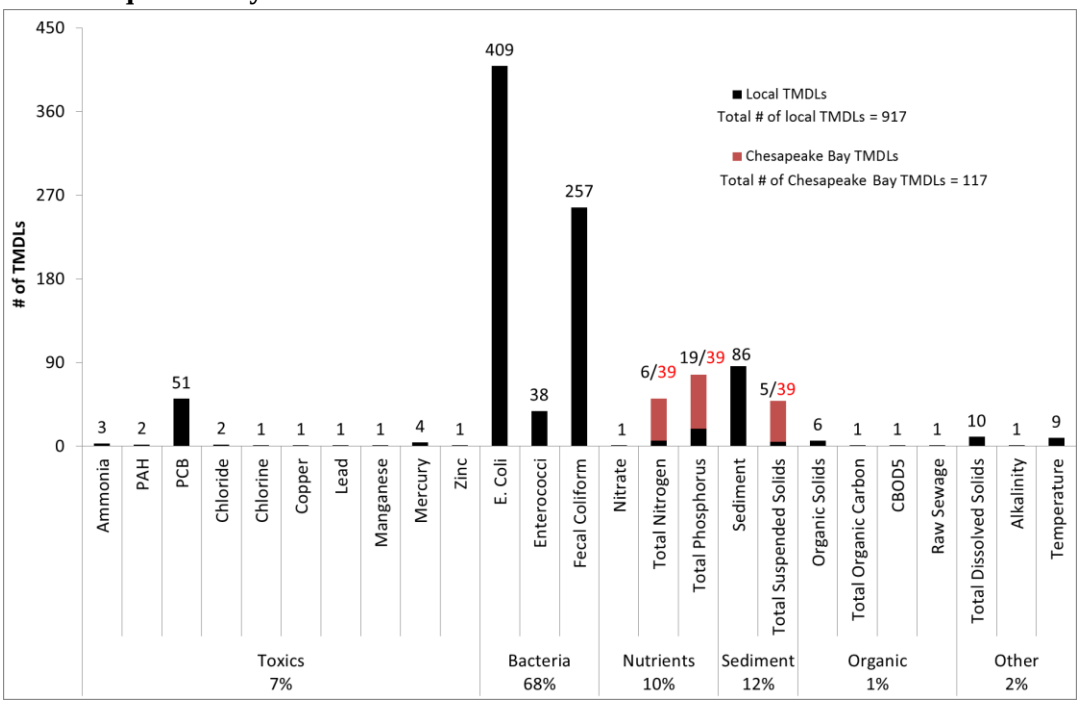
# Development of TMDL reports, implementation plans, and implementation projects

## Development of Total Maximum Daily Load Reports

## 2017 Progress Report

As of June 2017, 35 TMDL equations (31 new, 4 revised), each representing a watershed area draining to impaired surface waters, have been EPA approved since July 2016. Another 23 (10 new, 13 revised) are complete, have been State Water Control Board approved, and submitted to EPA for final approval. The figure below shows the number of TMDL equations by pollutant set across Virginia since the inception of the TMDL program.

**TMDL Equations by Pollutant[1]**




Based on the 2014 Integrated Report, Virginia estimates that over 8,000 miles of rivers, 79,929 acres of lake, and 2,053 square miles of estuary will require TMDL development in the coming years. To maintain a robust pace of TMDL development with level funding, Virginia has developed several strategies including: a) developing TMDLs using a watershed approach to address multiple impairments in watersheds with similar characteristics; b) developing TMDLs in-house; c) identifying non-TMDL solutions, such as plans that outline BMP implementation strategies in predominantly nonpoint source (NPS) polluted watersheds; and d) developing TMDLs that are more easily implemented. Virginia continues to explore tools and options for restoring and protecting water quality, both for environmental benefit and efficient program management.

Starting in the winter of 2014, states, including Virginia, began prioritizing watersheds for TMDL or TMDL alternative development for the approaching six-year window (2016-2022). Watersheds are prioritized for TMDL development based on types of impairment, public interest, available monitoring, regional input, and available funding. DEQ embarked on data analysis to identify highest priority watersheds, particularly those that appear to be valued for the impaired designated use. All of the prioritized watersheds for TMDL or TMDL alternative development during 2016-2022 were assembled into a list and public noticed for public comment on July 27, 2015. Only one comment was received and addressed by DEQ. It did not result in any changes to the priorities list that was then finalized following

[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.

the close of the 30-day public comment period and submitted to EPA. After a few months of implementing the priorities list, EPA announced that states could revise their priorities lists and include TMDL revisions in the list. Accordingly, in the winter of 2016 DEQ revised the list of prioritized impaired waters and public noticed it for public comment on April 4, 2016. The comment period closed on May 4, 2016 with no comments received. Following the close of the public comment period, the list of priorities was finalized and submitted to EPA. The 2016-2022 TMDL program priorities can be found on Virginia's TMDL website at: http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/TMDL/TMDLDevelopment/TMDLProgramPriorities.aspx.

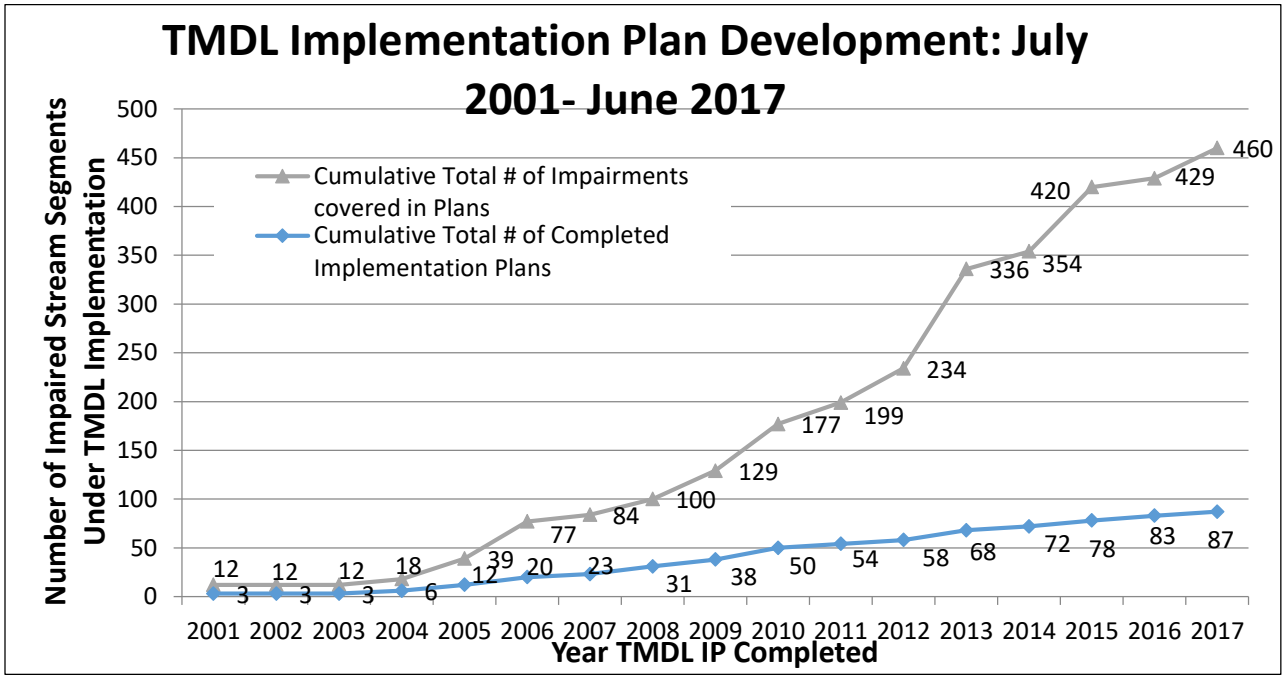
## Development of TMDL Implementation Plans

## 2017 Progress Report

Virginia law (1997 Water Quality Monitoring, Information, and Restoration Act, §§ 62.1- 44.19:4 through 19:8 of the *Code of Virginia*, or WQMIRA) requires expeditious development and implementation of TMDLs. The development of a TMDL implementation plan (IP) is Virginia's mechanism for addressing nonpoint pollutant sources in TMDL watersheds. The IP describes the measures that must be taken to reduce pollutant levels in the stream and includes a schedule of actions, costs, and monitoring. DEQ, along with other agency and non-agency partners, continues to develop TMDL IPs and to execute these plans throughout Virginia. In FY 2017, DEQ and other partners developed 4 IPs covering 31 impaired segments. In addition, 6 IPs covering 126 impairments were under development at the end of the fiscal year.

The graph below summarizes implementation planning progress. Since 2001, Virginia has completed 87 IPs, addressing 460 impairments.

**Cumulative summary of TMDL Implementation Plan development through June 2017**




A list of all completed local TMDL implementation plans is provided in the table below. Bacteria and sediment continue to be the most common pollutants addressed through TMDL implementation planning.

**Completed TMDL Implementation Plans, January 2001- June 2017**

| Watershed (# of impairments / # of impaired segments) | Location (county or city) | Impairment | Lead | Fiscal year Completed |
|---|---|---|---|---|
| Middle Fork Holston (3/3) | Washington | Bc | DCR | 2001 |
| North River (Muddy, Lower Dry, Pleasant, and Mill Creek) (5/4) | Rockingham | Bc, Be (Nitrate) | DCR | 2001 |
| Upper Blackwater River (4/4) | Franklin | Bc | DCR | 2001 |
| Catoctin Creek (4/4) | Loudoun | Bc | DCR | 2004 |
| Holmans Creek (2/2) | Shenandoah | Bc, Be (sed) | DCR | 2004 |
| Four Mile Run (1/1) | Arlington, Alexandria | Bc | DEQ | 2004 |
| Willis River (1/1) | Cumberland, Buckingham | Bc | DCR | 2005 |
| Chowan Study Area (9/9) | Multiple Counties | Bc | DEQ | 2005 |

| Watershed (# of impairments / # of impaired segments) | Location (county or city) | Impairment | Lead | Fiscal year Completed |
|---|---|---|---|---|
| Moores Creek (1/1) | Charlottesville, Albemarle | Bc | DEQ | 2005 |
| Guest River (5/5) | Wise, Scott, Dickenson | Be (sed) | DEQ | 2005 |
| Lower Blackwater, Maggoddee and Gills Creek (3/3) | Franklin | Bc | DCR | 2005 |
| Lynnhaven (shellfish) (2/2) | VA Beach | Bc | DEQ | 2005 |
| Cooks Creek and Blacks Run (6/2) | Rockingham, Harrisonburg | Bc, Be (sed & P) | DCR | 2006 |
| Thumb, Deep, Carter and Great Runs (4/4) | Fauquier, Stafford | Bc | DCR | 2006 |
| Big Otter (8/8) | Bedford, Campbell | Bc | DCR | 2006 |
| Mill and Dodd Creeks (2/2) | Floyd, Montgomery | Bc | DCR | 2006 |
| Little and Beaver Creek (3/2) | Bristol, Washington | Bc, Be (sed) | DCR | 2006 |
| Stroubles Creek (1/1) | Montgomery | Be (sed) | DEQ | 2006 |
| Back Creek (2/1) | Pulaski | Bc, Be (sed) | DEQ | 2006 |
| Abrams and Opequon Creek (8/5) | Frederick, Winchester | Bc, Be (sed) | DEQ | 2006 |
| Knox and PawPaw Creek (4/2) | Buchanan | Bc, Be (sed) | DEQ | 2007 |
| Hawksbill and Mill Creek (2/2) | Page | Bc | DCR | 2007 |
| Looney Creek (1/1) | Botetourt | Bc | DCR | 2007 |
| Upper Clinch River (1/1) | Tazewell | Be (sed) | DCR | 2008 |
| Occahannock Creek (shellfish) (1/1) | Accomack | Bc | DCR | 2008 |
| Falling River (1/1) | Campbell, Appomattox | Bc | DCR | 2008 |
| Dumps Creek (2/1) | Russell | TSS, TDS | DEQ | 2008 |
| Bluestone River (2/1) | Tazewell, Bluefield | Bc, Be (sed) | DCR | 2008 |
| Smith Creek (2/1) | Rockingham, Shenandoah | Bc, Be (sed) | DEQ | 2008 |
| Appomattox River – Spring Creek, Briery Creek, Bush River, Little Sandy River and Saylers Creek (5/5) | Prince Edward, Amelia | Bc | DCR | 2008 |
| Appomattox River – Flat, Nibbs, Deep and West Creeks (4/4) | Amelia, Nottoway | Bc | DCR | 2008 |
| Straight Creek, Stone Creek and Tributaries (3/3) | Lee | Bc, Be (sed) | DEQ | 2009 |

| Watershed (# of impairments / # of impaired segments) | Location (county or city) | Impairment | Lead | Fiscal year Completed |
|---|---|---|---|---|
| Long Glade Run, Mossy Creek and Naked Creek (5/3) | Augusta, Rockingham | Bc, Be (sed) | DCR | 2009 |
| Back Bay Watershed (1/1) | City of Virginia Beach | Bc | DEQ | 2009 |
| North Landing Watershed (4/4) | City of Virginia Beach | Bc | DEQ | 2009 |
| Pigg River and Old Womans Creek (8/8) | Franklin, Pittsylvania | Bc | DEQ | 2009 |
| Cub, Turnip, Buffalo and UT Buffalo Creeks (4/4) | Appomattox, Charlotte | Bc | DCR | 2009 |
| Hazel River Watershed (4/4) | Culpeper, Madison, Rappahannock | Bc | DCR | 2009 |
| Greenvale Creek, Paynes Creek and Beach Creek (shellfish)(3/2) | Lancaster | Bc | DCR | 2010 |
| Ash Camp and Twitty's Creek (2/2) | Charlotte | Be (sed) | DCR | 2010 |
| Upper & Lower Middle River, Moffett Creek & Polecat (7/5) | Augusta | Bc, Be (sed) | DCR | 2010 |
| Mill and Powhatan Creek (2/2) | James City County | Bc | DEQ | 2010 |
| Lewis Creek (1/1) | Russell | Be (sed) | DCR | 2010 |
| Browns, Craig and Marsh Runs (3/3) | Fauquier | Bc | DCR | 2010 |
| Little Dark Run and Robinson River (3/3) | Culpeper & Madison | Bc | DCR | 2010 |
| Rock Island, Austin, Frisby, Troublesome Creeks, North and Slate Rivers (6/6) | Buckingham | Bc | DCR | 2010 |
| Hays, Moffatts, Otts and Walker Creeks (4/4) | Augusta & Rockbridge | Bc | DCR | 2010 |
| Christians Creek and South River (6/3) | Augusta & Waynesboro | Bc, Be (sed) | DCR | 2010 |
| South James River, Ivy, Tomahawk, Burton, Judith, Fishing, Blackwater and Beaver Creeks (8/8) | Campbell, Bedford, Amherst, Lynchburg | Bc | DEQ | 2010 |
| Nansemond River, Shingle Creek (3/3) | Suffolk | Bc | DEQ | 2010 |
| Cherrystone Inlet, Kings Creek (shellfish) (1/1) | Northampton | Bc | DCR | 2011 |
| Roanoke River Watersheds – Upper Banister River and Stinking River, Bearskin, Cherrystone and Whitethorn Creeks (5/5) | Pittsylvania | Bc | DCR | 2011 |
| York Basin Watersheds – Beaver Creek, Goldmine Creek, Mountain Run, Pamunkey Creek, Plentiful Creek, Terry's Run (6/6) | Louisa, Orange, Spotsylvania | Bc | DCR | 2011 |

| Watershed<br><br>(# of impairments / # of impaired segments) | Location<br><br>(county or city) | Impairment | Lead | Fiscal year Completed |
|---|---|---|---|---|
| James River Watersheds- James River and Bernards, Powhite Reedy, Gilles, Almond, Goode, Falling and Noname Creeks (10/10) | Chesterfield, Powatan, Henrico, Richmond | Bc | DEQ | 2011 |
| Little River Watershed – Little River, Meadow Run, Pine, West Fork Dodd, Dodd, Meadow, Brush, Laurel, Big Indian Creeks (26/26) | Montgomery & Floyd | Bc, Be (sed), Temp | DEQ | 2012 |
| Clinch River; Coal, Middle, and Plum Creeks (7/7) | Tazewell | Bc, Be (sed) | DEQ | 2012 |
| Hoffler Creek (1/1) | Suffolk & Portsmouth | Bc | DEQ | 2012 |
| Mill Creek (1/1) | Northampton | Be (DO, pH) | DEQ | 2012 |
| Lower Banister River, Polecat Creek and Sandy Creek (3/3) | Halifax, Pittsylvania | Bc | DCR | 2013 |
| Middle Fork Holston River & Wolf Creek (8/6) | Abingdon, Smyth, Washington, Wythe | Bc, Be (sed) | DCR | 2013 |
| Spout Run (4/3) | Clarke | Bc, Be (sed) | DCR | 2013 |
| Piankatank River, Milford Haven, Gwynns Island (17/16) | Matthews, Middlesex, Gloucester | Bc | DCR | 2013 |
| Mill Creek, Cove Creek, Miller Creek, Stony Fork, Tate Run, S.F. Reed Creek, Reed Creek (9/9) | Wythe | Bc | DEQ | 2013 |
| Beaverdam, Boatswain Creek, Chickahominy River, Collins Run, Stony Run (5/5) | Hanover, Henrico, Charles City, Richmond | Bc | DEQ | 2013 |
| Rockfish River (4/4) | Nelson | Bc, Be (sed) | DEQ | 2013 |
| South Fork Mayo River, North Fork Mayo River, Blackberry Creek, Smith Creek, Marrowbone Creek, Leatherwood Creek (8/8) | Henry, Patrick, and City of Martinsville | Bc | DEQ | 2013 |
| Darden Mill Run, Mill Swamp, Three Creek (9) | Brunswick, Greensville & Southampton | Bc | DEQ | 2013 |
| North Fork Holston River (35/35) | Scott, Washington, Smyth, Russell, Bland, Tazewell | Bc, Temp | DEQ | 2013 |
| Linville Creek (2/1) | Rockingham, Broadway | Bc, Be (sed) | DEQ | 2014 |
| Wards Creek, Upper Chippokes Creek, Western Run, Crewes Channel, West Run, James River (6/6) | Charles City, Henrico & Hanover | Bc | DEQ | 2014 |
| Elk and Cripple Creek (2/2) | Grayson & Wythe | Bc | DEQ | 2014 |

| Watershed<br><br>(# of impairments / # of impaired segments) | Location<br><br>(county or city) | Impairment | Lead | Fiscal year Completed |
|---|---|---|---|---|
| Tye River, Hat Creek, Rucker Run, Piney River, Mill Creek, Turner Creek, Rutledge Creek, Buffalo River (8/8) | Amherst, Nelson | Bc | DEQ | 2014 |
| Mattawoman, Hungars, UT-Hungars, Barlow, Jacobus, The Gulf (6/6) | Northampton | Bc | DEQ | 2015 |
| Colliers Creek, North Fork Buffalo Creek, South Fork Buffalo Creek, Buffalo Creek, Cedar Creek (5/5) | Rockbridge | Bc | DEQ | 2015 |
| Crab Creek (2/1) | Town of Christiansburg, Montgomery County | Bc, Be (sed) | DEQ | 2015 |
| Fairview Beach (1/1) | King George | Bc | DEQ | 2015 |
| Chestnut Creek (2/2) | Carroll & Grayson, Town of Galax | Bc, Be (sed) | DEQ | 2015 |
| Roanoke River Watersheds -Part 1 – Mud Lick Creek, Mason Creek, Murray Run, Ore Branch, Peters Creek, Roanoke River, Carvin Creek, Glade Creek, Laymantown Creek, Tinker Creek, Back Creek (40/34)* | Botetourt, Montgomery, Roanoke, Roanoke City, Salem, Town of Vinton | Bc, Be (sed) | DEQ | 2015/2016 |
| Turley Creek, Long Meadow (2/2) | Rockingham | Be (sed) | DEQ | 2016 |
| Chuckatuck Creek, Brewers Creek (2/2) | Suffolk | Bc | DEQ | 2016 |
| Banister River, Winn Creek (3/3), Terrible Creek | Town of Halifax, Halifax | Bc | DEQ | 2016 |
| Hardware River (2/2) | Albemarle, Fluvanna | Bc | DEQ | 2016 |
| Upper Rapidan River Watersheds - Garth Run, UT Rapidan River, Rapidan River, Beautiful Run, Rapidan River, UT Rapidan River, Poplar Run, Blue Run, Marsh Run, Rippin Run (10/10). | Albemarle, Greene, Madison. Orange | Bc | DEQ | 2016 |
| Roanoke River Watersheds- Part 2 – North Fork Roanoke River, South Fork Roanoke River, Bradshaw Creek, Wilson Creek (8/4) | Floyd, Montgomery, Roanoke | Bc, Be (sed) | DEQ | 2017 |
| Crooked Run, Stephens Run, West Run, and Willow Run (4/4) | Frederick, Warren | Bc | DEQ | 2017 |
| Upper Clinch River and Tributaries (8/8) | Tazewell | Bc | DEQ | 2017 |
| Blackwater Creek, Clinch River, N.F. Clinch River, Stock Creek and Moll Creek (11/11) | Scott, Russell, Wise | Bc | DEQ | 2017* |
| Cromwells Run, Little River, Upper Goose Creek (3/3) | Fauquier, Loudoun | Bc | DEQ | UD |
| Yeocomico River (13/13) | Northumberland, | Bc | DEQ | UD |

| Watershed (# of impairments / # of impaired segments) | Location (county or city) | Impairment | Lead | Fiscal year Completed |
|---|---|---|---|---|
| | Westmoreland | | | |
| Dan River- Birch Creek, Byrds Branch, Doubles Creek, Fall Creek, Sandy Creek (94/94) | Pittsylvania, Halifax | Bc | DEQ | UD |
| Little Calfpasture River (1/1) | Augusta, Rockbridge | Be (sed) | DEQ | UD |
| Powell River, North Fork Powell, South Fork Powell, Butcher Creek, Wallen Creek (12/10) | Lee, Wise | Bc, Be (sed) | DEQ | UD |
| Accotink Creek (3/3) | Fairfax, Fairfax County | Chloride | DEQ | UD |
| *Total IPs Completed: 87 Plans, 460 Impairments; Total IPs Under Development (UD): 6 IPs, 120 impairments. Impairment types: Bc = bacteria, Be = Benthic, P- phosphorus, TSS = Total suspended solids, TDS = Total dissolved solids, Sed = sediment. * IP has been completed and submitted to USEPA, but not yet approved.* | | | | |

## Watershed Restoration and TMDL Implementation

## 2017 Progress Report

The goal of the TMDL Implementation Program is to implement targeted, on-the-ground activities, identified in TMDL implementation plans, which will result in water quality improvements and subsequent delisting of impaired streams. Virginia uses a staged approach that provides opportunities for periodic evaluation of the effectiveness of the implementation actions and adjustment of efforts to achieve water quality objectives in a timely and cost-effective manner. Virginia's TMDL Implementation Program was developed by DCR in 2001 and has been funded by a mix of federal and state funds. In June 2013 the responsibility for program administration was moved to DEQ. From July 1, 2016 through June 30, 2017 DEQ managed 20 implementation projects funded partially or fully with Federal Section 319(h). Those projects are listed below.

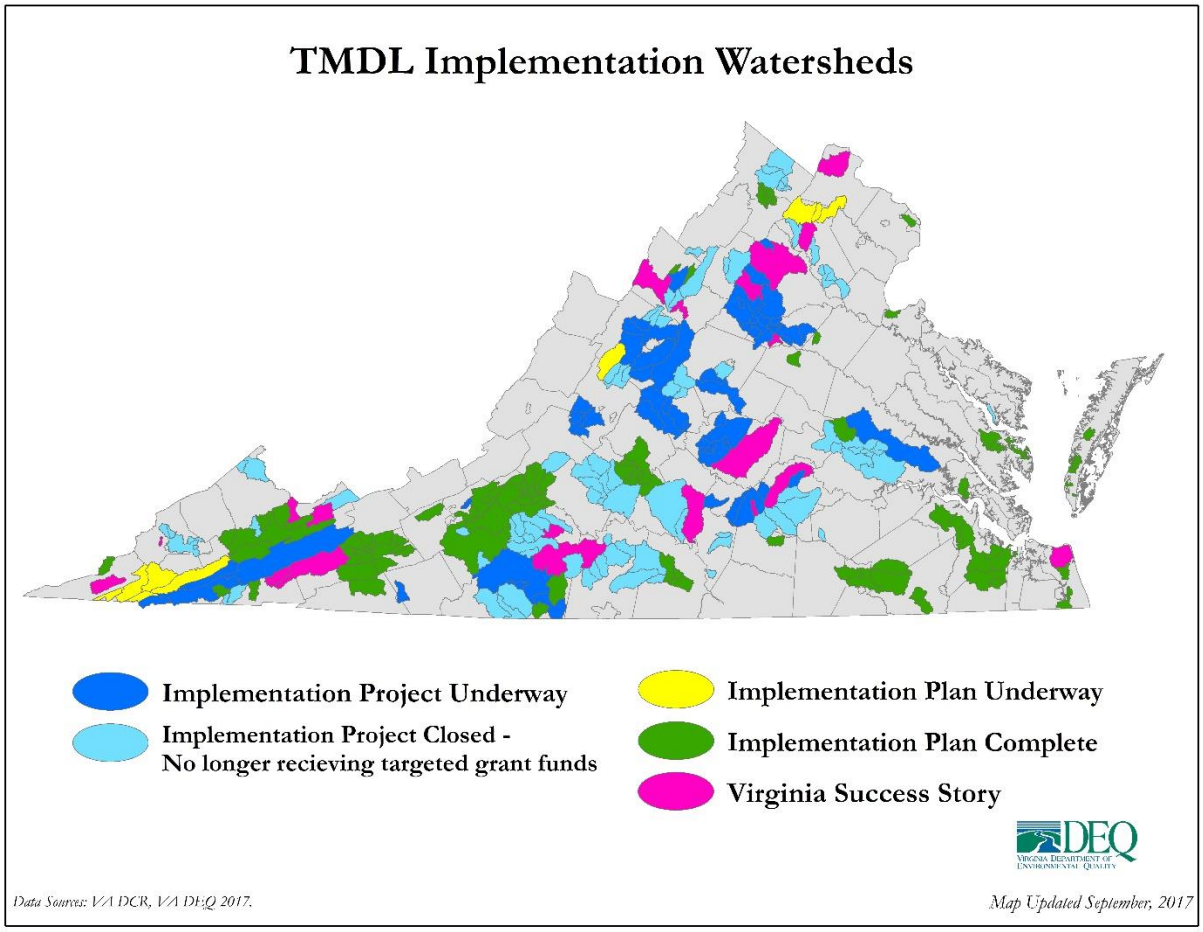
**TMDL Implementation Projects in Virginia Active VA Fiscal Year 2017**

| Watershed Area | TMDL Segment | Years of Implementation and Funding |
|---|---|---|
| ***20 Projects in some part of Fiscal Year 2017 that actively receiving targeted TMDL funds from Federal §319(h)*** | | |
| Thumb, Great, Carter and Deep Runs | VAN-E01R, E02R & E10R | §319(h):2006-2016, VNRCF: 2011-2015 |
| Upper Hazel River | VAN-E03- 05R | §319(h):2009-2017, VNRCF: 2011-2015, WQIF RFP: 2007-2009 |
| Slate River and Rock Island Creek | | §319(h): 2010-2017 |
| Upper York River | VAN-F06R, F07R | §319(h): 2012-2017,VNRCF: 2012-2015: |

| | | |
|---|---|---|
| Spout Run | VAV-B57R | §319(h): 2014-2017 |
| Lower Banister River | VAC-L67R, L70R, L71R | §319(h):2014-2017, VNRCF (2012-2015) |
| Middle Clinch River | | §319(h): 2017 |
| Middle Fork Holston River | VAS-O03R | §319(h): 2014-2017 |
| Middle River | | §319(h): 2015-2017 |
| Stroubles Creek | VAW-N22R | §319(h): 2014-2017, WQIF RFP: (2006-2008): |
| Greenvale, Payne and Beach Creeks | VAN-E25R | §319(h): 2014-2016 |
| Flat, Nibbs, Deep and West Creeks | VAP-J08-09R, J11R | §319(h): 2015-2017 (septic only); WQIF/VNRCF: 2007-2015– Agriculture only |
| Linville Creek | | §319(h): 2015-2017 |
| Little Dark Run and Robinson River | | §319(h): 2015-2017 |
| Tye River | | §319(h): 2015-2017 |
| Hardware River | | §319(h): 2015-2017 |
| Briery, Little Sandy, Spring, Saylers Creeks and Bush River | VAC-J02- J06R | §319(h): 2016-2017; WQIF/VNRCF: 2007-2015– Agriculture only |
| Upper Rapidan River | | §319(h): 2016-2017 |
| Chestnut Creek | | §319(h): 2016-2017 |
| Upper Clinch River | | §319(h): 2016-2017 |
| 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) | | |

The map below depicts the overall status of nonpoint source (NPS) TMDL implementation in Virginia since 2001. It includes watersheds where TMDL implementation planning, as well as funded TMDL implementation projects have occurred in Virginia since 2000.

**Status of NPS TMDL Implementation Planning by Watershed in Virginia as of September 2017**




In addition, the Virginia Department of Conservation and Recreation administered a statewide agricultural cost-share program that resulted in BMP installation and implementation in various implementation plan areas.

## Past TMDL Implementation Projects with Continued Implementation Activity during FY17

## Funding of Implementation

As the agency taking the lead in TMDL implementation, DEQ utilizes both federal §319(h) and Chesapeake Bay Implementation Grant Program grant funds to pay for six staff, DEQ NonPoint Source Coordinators, that provide project management and technical support to watershed stakeholders implementing these projects. In addition, Virginia runs a comprehensive cost-share program for BMP implementation utilizing both federal (§319(h) and CBIG) grants and state resources (from the Water Quality Improvement Fund, the Virginia Natural Resources Commitment Fund and the Virginia Agricultural Cost-Share program).

The implementation projects listed earlier in this report were supported in part by federal EPA §319(h) grants. Of these, 18 projects successfully installed BMPs in FY17 and collectively spent $1,850,918 in state, federal and private funds on 377 BMPs installed in 46 TMDL watersheds. In addition, DCR provided federal EPA Chesapeake Bay Implementation Grants (CBIG), Conservation Reserve and Enhancement Program (CREP), State Virginia Natural Resources Commitment Fund (VNRCF) and Virginia Agricultural Cost Share (VACS) to install an additional 2,382 BMPs in 71 TMDL watershed implementation plan areas. In Fiscal Year 2017, a total of 2,759 BMPs were installed in 204 watersheds addressing 72 TMDL implementation plans. A total of $13,316,377 of federal and state funds and $3,834,498 of landowner contributions; for an overall total of $17,150,875 spent on BMPs in watersheds with TMDL implementation plans.

A summary of FY17 funding for BMP implementation in TMDL watershed areas is provided in the table below. The subsequent table shows funding itemized by implementation plan.

**Summary of BMP implementation funding in TMDL Watersheds: July 2016 – June 2017**

| Type of Funding | Funding Source | # of IPs | # of Watersheds | # of BMPs Installed | $ of Cost-share Paid | $ of Landowner contribution or match | TOTAL BMP Cost |
|---|---|---|---|---|---|---|---|
| **DEQ Managed TMDL Work** | **Targeted TMDL (319(h) with any other funding source** | 18 | 46 | 377 | $1,525,273 | $325,645 | **$1,850,918** |
| | **Sub-Total** | 18 | 46 | 377 | $1,525,273 | $325,645 | **$1,850,918** |
| **DCR Managed TMDL Work** | Federal Chesapeake Bay Funding (with or without State funding) | 9 | 10 | 14 | $691,017 | $92,901 | $783,919 |
| | Federal RCPP Grant Program | 7 | 7 | 7 | $62,546 | $156,893 | $219,438 |
| | No State or Fed Funds | 16 | 28 | 87 | $0 | $298,798 | $298,798 |
| | CREP (with or without other state cost-share funding) | 23 | 38 | 92 | $570,281 | $685,784 | $1,256,065 |
| | State VACS or WQIF | 70 | 182 | 2,182 | $10,467,261 | $2,274,476 | $12,741,737 |
| | **Sub-Total** | 71 | 190 | 2,382 | $ 11,791,104 | $3,508,853 | $15,299,957 |
| | **TOTAL** | **72** | **204** | **2,759** | **$ 13,316,377** | **$3,834,498** | **$17,150,875** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Chesapeake Bay Watershed** | 39 | 121 | 1,568 | $5,718,956 | $2,520,783 | $8,239,739 |
| | **Waters Outside the Chesapeake Bay Watershed** | 33 | 85 | 1,191 | $7,597,421 | $1,313,715 | $8,911,136 |
| | **TOTALS** | **72** | **204** | **2,759** | **$13,316,377** | **$3,834,498** | **$17,150,875** |

## Cost-share funds spent on implementation by TMDL IP Watershed: July 2016 – June 2017

| TMDL Implementation Plan & TMDL Implementation Watershed | # BMPs | Cost-Share Paid | Landowner Contribution | Total Cost |
|---|---|---|---|---|
| Ash Camp and Twitty's Creeks | 2 | 60,959 | 5,359 | 66,318 |
| Back Bay Watershed | 14 | 29,172 | - | 29,172 |
| Back Creek | 2 | 109,211 | - | 109,211 |
| Banister River, Winn Creek, and Terrible Creek | 2 | 729 | 761 | 1,490 |
| Beaver Creek and Little Creek | 12 | 15,926 | 10,029 | 25,955 |
| Big Otter River Watershed | 17 | 1,277,742 | 81,124 | 1,358,866 |
| Blackwater River (Upper, Middle, North Fork and South Fork) | 5 | 102,580 | 16,568 | 119,148 |
| Bluestone River | 1 | 31,080 | - | 31,080 |
| Buffalo Creek, Colliers Creek and Cedar Creek | 8 | 15,861 | 20,159 | 36,020 |
| Carter Run, Great Run, Deep Run and Thumb Run | 10 | 187,090 | 275 | 187,365 |
| Catoctin Creek | 18 | 81,046 | 6,049 | 87,095 |
| Cedar Creek, Hall Creek, Byers Creek and Hutton Creek; Middle Fork Holston River and Wolf Creek | 25 | 97,571 | - | 97,571 |
| Chestnut Creek Watershed | 4 | 25,799 | 24,770 | 50,569 |
| Chickahominy River and Tributaries | 55 | 80,480 | - | 80,480 |

| | | | | |
|---|---|---|---|---|
| Chowan River Watershed | 269 | 373,433 | 89,038 | 462,470 |
| Chuckatuck and Brewers Creek | 50 | 60,150 | - | 60,150 |
| Clinch River and Cove Creek | 23 | 905,296 | 64,092 | 969,388 |
| Cooks Creek and Blacks Run | 8 | 4,040 | 6,649 | 10,689 |
| Crab Creek | 4 | 88,702 | 5,931 | 94,633 |
| Craig Run, Browns Run and Marsh Run | 6 | 81,782 | 3,893 | 85,675 |
| Cripple Creek and Elk Creek | 19 | 337,224 | 55,219 | 392,443 |
| Cub Creek, Turnip Creek, Buffalo Creek and UT to Buffalo Creek | 8 | 303,483 | 7,774 | 311,257 |
| Falling River | 6 | 56,370 | 21,789 | 78,159 |
| Flat, Nibbs, Deep and West Creeks | 35 | 136,063 | 262,787 | 398,850 |
| Greenvale, Paynes and Beach Creeks | 52 | 13,992 | 3,510 | 17,502 |
| Guest River | 2 | 67,156 | 22,075 | 89,231 |
| Hardware and North Fork Hardware River | 26 | 209,949 | 31,352 | 241,301 |
| Hawksbill Creek and Mill Creek | 11 | 52,214 | 56,385 | 108,599 |
| Hays, Moffatts, Walker and Otts Creeks | 19 | 39,779 | 23,822 | 63,601 |
| James River and Tributaries-City of Richmond | 64 | 279,297 | 14,009 | 293,305 |
| James River-Lynchburg | 6 | 354,786 | 8,933 | 363,720 |
| Linville Creek Watershed | 56 | 67,606 | 73,694 | 141,300 |
| Little Dark Run and Robinson River | 80 | 425,623 | 139,591 | 565,215 |
| Little River Watershed | 10 | 195,158 | 34,410 | 229,568 |

| | | | | |
|---|---|---|---|---|
| Little River Watershed; Mill Creek, Montgomery County | 3 | 73,470 | 1,352 | 74,822 |
| Long Meadow Run and Turley Creek | 9 | 6,288 | 134,386 | 140,674 |
| Looney Creek | 4 | 139,793 | 29,796 | 169,590 |
| Lower Banister River | 14 | 107,087 | 25,937 | 133,024 |
| Lower Blackwater River, Maggodee and Gills Creek | 17 | 389,289 | 54,098 | 443,388 |
| Middle Clinch River | 6 | 255,710 | - | 255,710 |
| Middle Fork Holston River and Wolf Creek | 99 | 286,375 | 84,226 | 370,601 |
| Middle River Watershed | 75 | 534,576 | 188,212 | 722,788 |
| Mill Creek, Northampton County | 4 | 3,679 | - | 3,679 |
| Mill Creek, Powhatan Creek Watersheds | 3 | 3,156 | - | 3,156 |
| Mossy Creek, Long Glade Run and Naked Creek | 51 | 241,353 | 82,273 | 323,626 |
| North Fork Holston River Watershed | 55 | 766,216 | 93,512 | 859,729 |
| North Landing Watershed (including Milldam, Middle, West Neck and Nanney Creeks) | 27 | 57,850 | - | 57,850 |
| North River | 43 | 64,795 | 177,378 | 242,173 |
| Occohannock Creek | 15 | 48,692 | 3,893 | 52,585 |
| Opequon Creek Watershed | 4 | 78,033 | 66,915 | 144,948 |
| Piankatank River, Gwynns Island, Milford Haven | 121 | 83,254 | - | 83,254 |
| Pigg River and Old Womans Creek Watersheds | 18 | 434,335 | 75,046 | 509,382 |
| Reed Creek Watershed | 35 | 400,317 | 170,828 | 571,145 |
| Rockfish River Watershed | 7 | 5,564 | | |

| | | | | |
|---|---|---|---|---|
| | | | 8,084 | 13,648 |
| Shenandoah Tributaries | 3 | 33,143 | 44,644 | 77,787 |
| Slate River and Rock Island Creek | 35 | 135,124 | 43,881 | 179,005 |
| Smith Creek Watershed | 43 | 97,662 | 529,552 | 627,214 |
| Smith River and Mayo River Watersheds | 17 | 264,398 | 52,933 | 317,331 |
| South River Watershed and Christians Creek | 91 | 279,085 | 80,480 | 359,564 |
| Spout Run | 5 | 166,394 | 26,038 | 192,432 |
| Spring Creek, Briery Creek, Bush River, Little Sandy River and Saylers Creek | 46 | 187,141 | 178,278 | 365,419 |
| Stroubles Creek | xx | | | |
| The Gulf, Barlow, Mattawoman, Jacobus and Hungars Creeks | 13 | 14,646 | 7,787 | 22,433 |
| Three Creek, Mill Swamp, Darden Mill Run | 448 | 349,860 | 137,692 | 487,552 |
| Tye River, Hat Creek, Rucker Run and Piney River | 20 | 82,741 | 30,541 | 113,283 |
| Upper Banister River and Tributaries | 21 | 127,777 | 174,577 | 302,353 |
| Upper Hazel River, Hughes River, Rush River and Thornton River | 75 | 215,289 | 48,371 | 263,661 |
| Upper Nansemond River | 249 | 356,562 | 3,834 | 360,396 |
| Upper Rapidan River | 92 | 473,950 | 31,993 | 505,943 |
| Upper Roanoke River -Part 2 | 2 | 3,467 | 4,576 | 8,043 |
| Upper York River Watershed | 50 | 260,515 | 39,842 | 300,357 |
| Willis River Watershed | 10 | 121,442 | 113,496 | 234,938 |
| **Grand Total** | **2,759** | **13,316,377** | **3,834,498** | **17,150,875** |

| | | | | |
|---|---|---|---|---|
| **Total number of Implementation Plans** | **72** | | | |
| **Total number of Implementation Watersheds** | **204** | | | |

## BMP Implementation and Pollutant Reductions

Tracking both BMP implementation and water quality improvements in TMDL watersheds is critical in measuring success of the TMDL program. BMPs are effective and practical ways to prevent or reduce pollutants from nonpoint sources to protect and restore water quality. While highly effective BMP tracking programs are in place to account for BMPs installed using state or federal cost share funds, tracking BMPs installed voluntarily (without government assistance) has proven challenging. DEQ, along with partner agencies, is planning mechanisms by which voluntary practices can be accounted for; however, BMP implementation and associated pollutant reductions reported to date are mostly practices installed with government cost share funds.

As previously stated, there were 72 watershed implementation plan project areas where 2,759 BMPs were installed from January 1, 2016 through June 30, 2017. These actions resulted in over 1,155,290 linear feet of stream exclusion (excluding 27,591 animals from accessing streams), 1,190 acres of riparian buffer, and the reduction of 742,201 pounds of nitrogen, 78,529 pounds of phosphorous, 462,520 tons of sediment, and 4.83E+16 colony forming units (CFU) of fecal coliform bacteria. In addition, the program was able to address straight pipes and failing or failed septic systems from 448 homes with TMDL Implementation Plan areas.

The tables below provide a summary of the pollutant reductions achieved and associated funding source for BMPs installed in TMDL watersheds as well as a distribution of the type of BMPs installed.

**Summary of Pollutants Reduced from 7/1/2016 - 6/30/2017 through TMDL Implementation**

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

## Types of BMPs Installed from 7/1/16-6/30/17 through TMDL Implementation

| Practice | Practice Description | # of BMPs | Extent of BMP Installed | Riparian Buffer (Acres) | Units |
|---|---|---|---|---|---|
| CCI-CNT | Long Term Continuous No-Till Planting System | 36 | 1,209 | | Acres |
| CCI-SE-1 | Stream Exclusion - Maintenance Practice | 16 | 75,350 | | Lin. Feet |
| CRFR-3 | CREP Riparian Forest Buffer Planting | 45 | 141 | 141 | Acres |
| CRSL-6 | CREP Grazing land protection | 55 | 145,929 | 145 | Lin. Feet |
| CRWP-2 | CREP Streambank protection | 1 | 900 | 1 | Lin. Feet |
| CRWQ-1 | CREP Grass filter strips | 1 | 1 | 1 | Acres |
| FR-1 | Aforestation of erodible crop and pastureland | 8 | 40 | | Acres |
| FR-3 | Woodland buffer filter area | 4 | 14 | 14 | Acres |
| LE-1T | Livestock Exclusion with Riparian Buffers for TMDL Imp. | 18 | 71,022 | 60 | Lin. Feet |
| LE-2 | Livestock Exclusion with Reduced Setback | 2 | 2,400 | | Lin. Feet |
| LE-2T | Livestock Exclusion with Reduced Setback for TMDL Imp. | 1 | 1,660 | | Lin. Feet |
| RB-1 | Septic Tank Pumpout | 360 | 360 | | Count |
| RB-2 | Connection to Public Sewer | 4 | 4 | | Count |
| RB-3 | Septic Tank System Repair | 38 | 38 | | Count |
| RB-4 | Septic Tank System Replacement | 30 | 30 | | Count |
| RB-4P | Septic Tank System Installation/Replacement with Pump | 14 | 14 | | Count |
| RB-5 | Installation of Alternative Waste Treatment System | 2 | 2 | | Count |
| SL-1 | Long Term Vegetative Cover on Cropland | 37 | 749 | | Acres |
| SL-11 | Permanent vegetative cover on critical areas | 6 | 9 | | Acres |
| SL-15A | Continuous High Residue Minimal Soil Disturbance Tillage System | 63 | 2,387 | | Acres |
| SL-6 | Stream Exclusion With Grazing Land Management | 202 | 748,458 | 735 | Lin. Feet |
| SL-6B | Alternative Water System | 3 | 100 | | Acres |
| SL-6T | Stream Exclusion with Grazing Land Management for TMDL Imp. | 14 | 84,551 | 73 | Lin. Feet |

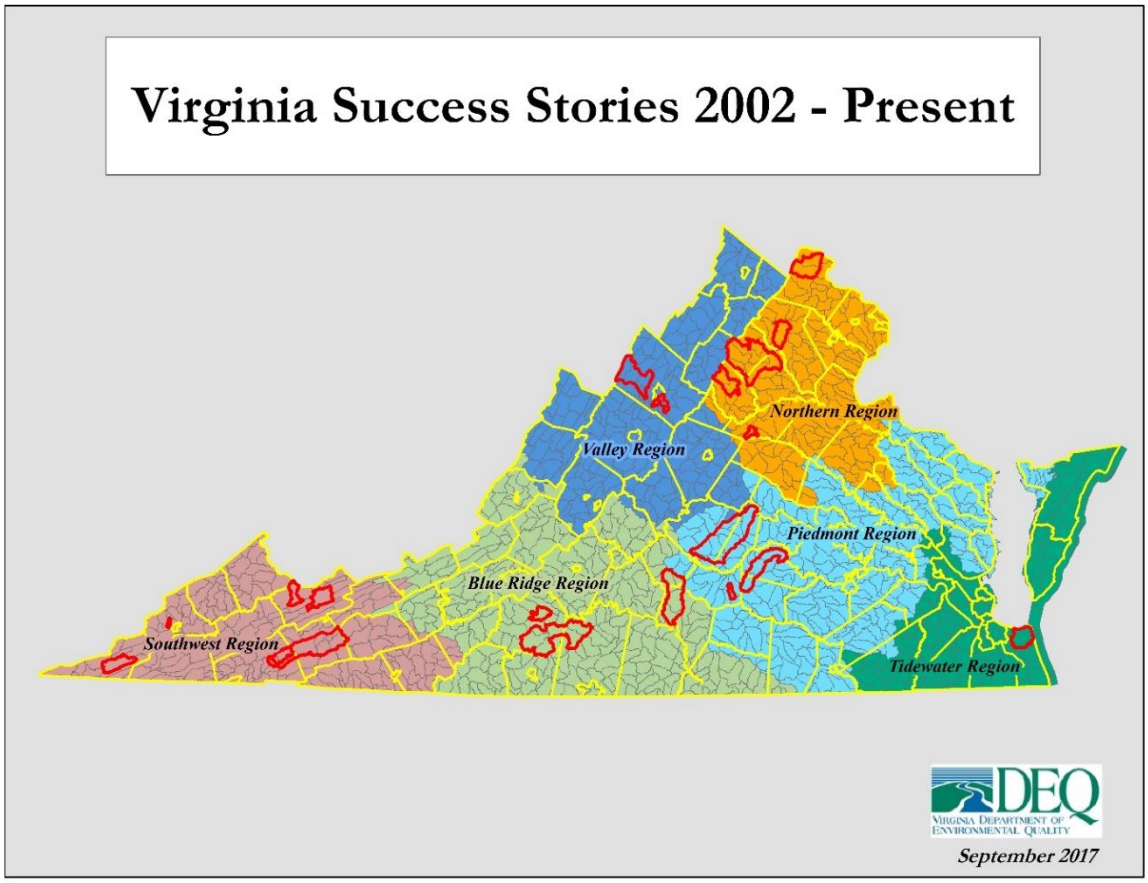
| | | | | | |
|---|---|---|---|---|---|
| SL-7 | Extension of CREP Watering Systems | 11 | 589 | | Acres |
| SL-8 | Protective cover for specialty crops | 12 | 705 | | Acres |
| SL-8B | Small Grain and Mixed Cover Crop for Nutrient Management and Residue Management | 1395 | 49,393 | | Acres |
| SL-8H | Harvestable Cover Crop | 334 | 15,680 | | Acres |
| SL-9 | Grazing Land Management | 7 | 168 | | Acres |
| WP-1 | Sediment retention, erosion or water control structures | 2 | 2 | | Count |
| WP-2 | Streambank protection (fencing) | 5 | 25,020 | 20 | Lin. Feet |
| WP-3 | Sod waterway | 2 | 6 | | Acres |
| WP-4 | Animal waste control facilities | 10 | 10 | | Count |
| WP-4C | Composter Facilities | 4 | 4 | | Count |
| WQ-12 | Roof Runoff Management System | 2 | 4,074 | | Sq. Feet |
| WQ-4 | Legume Based Cover Crop | 15 | 914 | | Acres |
| **Grand Total** | | **2,759** | **n/a** | **1,190** | |
| **Total of Linear Feet of Stream Exclusion or Streambank protection** | | **314** | **1,155,290** | | **Linear feet** |
| **Acres of riparian Buffer (from buffer practices and stream exclusion practices)** | | **345** | | **1,190** | **Acres** |
| **Number of Animal excluded from stream access** | | | **27,591** | **Animals** | |

## Virginia Water Quality Improvements and Success Stories

The success of Virginia's Nonpoint Source Management Program and the TMDL Implementation Program is also documented by describing improvement of water quality conditions via NPS Success Stories. Through Section 319 Nonpoint Source Success Stories, EPA and DEQ document progress of partially or fully restoring waterbodies associated with NPS implementation actions.

Since 2002 Virginia's Nonpoint Source Management Program and associated TMDL Implementation Program and its partners have written 22 success stories that address delisting and/or water quality improvement of 33 impaired stream segments. These stories are classified into two types: Type 1 stories are related to partial or full restoration (delisting of impairments), Type 2 indicates significant water quality improvement.

| Type | # Segments delisted or WQ improved | Name of Success Story | Year Approved by EPA | Topic |
|---|---|---|---|---|
| 2 | 1 | Cabin Branch Mine Orphaned Land Project | 2001 | Mining |
| 2 | 1 | Toncrae Mine Orphaned Land Project | 2002 | Mining |
| 2 | 1 | Middle Fork Holston River (Three Creeks) | 2005 | TMDL Implementation |
| 2 | 2 | Muddy Creek and Lower Dry River | 2007 | TMDL Implementation |
| 1 | 1 | Batie Creek | 2008 | Karst Program |
| 1 | 3 | Lynnhaven, Broad and Linkhorn Bays | 2009 | Shellfish |
| 2 | 1 | Valzinco Mine Orphaned Land Project | 2008 | Mining |
| 1 | 3 | Willis River | 2010 | TMDL Implementation |
| 1 | 1 | Middle Creek | 2012 | Mining |
| 2 | 1 | Black Creek | 2012 | Mining |
| 1 | 1 | Muddy Creek | 2012 | TMDL Implementation |
| 2 | 1 | Carter Run | 2013 | TMDL Implementation |
| 2 | 1 | Flat Creek | 2013 | TMDL Implementation |
| 1 | 1 | Upper Clinch River | 2014 | TMDL Implementation |
| 1 | 2 | Cub Creek | 2014 | TMDL Implementation |
| 1 | 2 | Byers and Hutton Creeks | 2015 | TMDL Implementation |
| 1 | 1 | Little Sandy Creek | 2015 | TMDL Implementation |
| 1 | 2 | Blackwater River | 2016 | TMDL Implementation |
| 2 | 1 | Big Chestnut Creek | 2016 | TMDL Implementation |
| 1 | 3 | Upper Robinson River | 2017 | TMDL Implementation |
| 1 | 2 | Mountain Run | 2017 | TMDL Implementation |
| 1 | 1 | Stone Creek | 2017 | TMDL Implementation |
| Total | 33 | | | |




## Healthy Waters Strategy

## 2017 Progress Report:

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. The role of Virginia's Department of Conservation and Recreation, Division of Natural Heritage (DNH) is the identification and protection of aquatic and terrestrial communities and rare plant and animal species that contribute important ecosystem services or represent significant ecological resources. 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. Virginia has a well-established record of identifying and achieving protection for rare species and terrestrial communities. The VA DCR Healthy Waters Program (HWP) at DNH, in collaboration with Virginia Commonwealth University and DEQ, is an important step in aquatic community identification and conservation. The challenges associated with these important efforts, specifically as they relate to aquatic communities, include:

1) Development and application of objective, quantitative, and diagnostic stream assessment protocols;

2) Defining a set of measurable and appropriate stream conditions, based on empirical data, as goals for protection efforts; developing consistent statewide assessments to identify communities with intact aquatic integrity; and developing a resampling protocol and schedule for assessing existing resources to identify long term changes and track trends in protection and identification of ecologically healthy resources.

These challenges are dependent on an understanding of, and comparison to, relevant reference conditions that describe accurately and quantitatively the ecological potential of streams and rivers within a specific region.

Traditionally, water quality based programs have emphasized the assessment of streams to determine if water bodies meet water quality standards with a subsequent restoration plan to improve degraded surface waters. While this is a critical activity to provide the Commonwealth a healthy ecosystem it is equally as important to seek viable opportunities for best management practices to protect streams that are already considered to have high aquatic, ecological integrity. It is economically and ecologically preferable to conserve and protect healthy ecosystems than to restore them after they have been damaged. Agricultural BMPs may serve a key role in the protection of healthy waters and healthy watersheds. The health of streams is tightly linked to the watersheds of which they are a part. There is a direct relationship between land cover, key watershed processes and the health of streams.

Virginia has more than 400 ecologically healthy streams, creeks and rivers throughout the state, and there are more to be identified. Healthy streams are identified by factors that include: high numbers of native species and a broad diversity of species, few or no non-native species, few generalist species that are tolerant of degraded water quality, high numbers of native predators, migratory species whose presence indicates that river or stream systems are not blocked by dams or other impediments, and low incidence of disease or parasites. The Healthy Waters Program uses high-quality archival data, combined with extensive, new data collected by the VCU stream assessment team with assistance from the DCR DNH field personnel, to develop a broad suite of georeferenced databases of aquatic resources, including fish and macroinvertebrate communities, instream and riparian habitat, and geomorphological data to provide the basis for community level identification and protection of critical resources. Healthy streams in Virginia have been identified and ranked through a stream ecological integrity assessment known as the Interactive Stream Assessment Resource (INSTAR), http://instar.vcu.edu/ as “outstanding”, “healthy”, or “restoration candidate.” INSTAR was originally designed to assist individuals with planning and land use decisions by identifying healthy streams in their communities and encouraging their protection.

The Healthy Waters Program has included a multiagency partnership from its inception. DNH manages the Healthy Waters Program and provides program administration, data management, field data collection, oversight, and coordination with land trusts, local governments and others toward conservation of identified Healthy Waters. DEQ has provided significant data and funding to support the Program and new partnerships with VDOF are broadening the applicability of the Program. Virginia Commonwealth University (VCU) has provided the majority of the significant technical, field data collection, model development and data management services. This partnership continues to grow a comprehensive aquatic resource assessment program to identify and protect the most biologically diverse and valuable aquatic resources in the Commonwealth. 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 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 leads discussions to improve communication materials illustrating the location of identified healthy resources and to develop strategies to advance resource protection in the Chesapeake Bay. Additionally, the GIT4 provided guidance on the Goals for the Chesapeake Bay Agreement to meet the protection of Healthy Waters. The Healthy Waters Program is continually self-evaluating to fine tune the direction of the Program. While the Chesapeake Bay Basin has been and continues to be a priority, statewide data collection is absolutely necessary for the Program to make a long lasting impact on the natural resources of the Commonwealth. The Watershed Integrity Model, used and developed by the DCR DNH and VCU, 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 are: Watershed Integrity, Landscape Position, Soil Sensitivity, and Land Cover. A survey was distributed to stakeholders and potential users of the new model to obtain feedback on the changes and proposed weighting of various parameters.

Protecting and maintaining the ecological integrity of identified ecologically healthy waters in Virginia is the overarching measure of success for this program. Expansion and identification of new Healthy Waters data is critical to the success of the Healthy Waters Program. Additionally, a continual cycle of re-assessment of those waterbodies identified as Healthy is essential to the long-term success of protection of valuable aquatic resources in the Commonwealth. With the Program residing in DNH, the juncture of both aquatic and terrestrial resource protection lays the foundation for long term identification, prioritization and protection of resources that will benefit future generations. A continual update of the existing INSTAR point data identifies Healthy Catchments, a clarification has been made to improve the identification of Healthy Watersheds and the DCR DNH Biotics database reflects those new Stream Conservation Units (SCUs) and Ecological Occurrences (EOs) based on those data.

For the long-term and to meet objectives under the Bay Agreement, the DNH has completed a statewide resource vulnerability assessment that can identify those areas most likely to be lost due to changes in land use or land cover. This vulnerability assessment has focused on all resources identified under the DNH, and a specific vulnerability assessment of those ecologically healthy sites in the Chesapeake Bay watershed are being conducted. DNH has a long history of successfully working with private and public partners to share information and gain protection for Virginia's most important biological resources. This now includes the Healthy Waters Program and priorities to protect these special places will be established to best appropriate the resources (voluntary agreements, easements, acquisitions, buffers, etc.) to protect Virginia's Healthy Waters for the future. Additionally, the DNH is conducting a prioritization of those Stream Conservation Units (SCUs) prioritized list of NHP Stream Conservation Units using their aquatic community biodiversity ranks, in addition to the amount of core forest, agriculture, developed land cover types, etc., in each watershed in order to identify those aquatic resources most need of conservation. This will be used guide conservation and protection actions in Virginia by NHP staff, VDEQ, Conservation Districts, land trusts and nongovernmental organizations such as the Virginia Chapter of the Nature Conservancy. An intended application of the prioritization

would be the selection of a watershed in the upper James, upper Rappahannock, or upper Potomac rivers where the HWP *Criteria for Ecologically Healthy Watershed Conservation* would be applied.

Specific goals and actions have been identified internally to advance the continued development of the program to meet the objectives of maintaining those systems that have high ecological integrity. This effort has been advanced through the placement of the program at DNH but requires the following actions for continued implementation:

- Advance Healthy Waters Program geo-referenced data sets. Continue to update 10-year old (or older) data in Bay Watershed and develop an on-going maintenance and continuous monitoring and assessment plan
- Complete detailed INSTAR assessments in the Southern River Basins including the Clinch, Powell, New, Big Sandy, Yadkin and Roanoke basins.
- Improve 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, including additional staff at DNH, as necessary
- Work toward the identification and development of strategies to achieve the 2025 goal of: *100% of state-identified currently healthy water and watersheds remain healthy* (2014 Chesapeake Bay Watershed Agreement Goal)

# Chesapeake Bay Watershed Agreement Progress Report Glossary of Acronyms and Abbreviations

AMD – Acid Mine Drainage

AOSS – Alternative Onsite Sewage System

ASA – Agricultural Stewardship Act

Bc – Bacteria

Be – Benthic

BMP – Best Management Practice

CBIG – Chesapeake Bay Implementation Grant

CBLEI – Chesapeake Bay Livestock Exclusion Initiative

CBP – Chesapeake Bay Program

CD – Consent Decree

CFR – Code of Federal Regulations

CFU – Colony Forming Unit (bacteria)

CREP – Conservation Reserve Enhancement Program

CSO – Combined Sewer Overflow

DCR – Department of Conservation and Recreation

DEQ – Department of Environmental Quality

DMLR – Division of Mine Land Reclamation

DMME – Department of Mines, Minerals and Energy

DNH – Division of Natural Heritage

EIT – Engineer in Training

EPA – United States Environmental Protection Agency

FGD – Flue Gas Desulfurization

FSA – Farm Service Agency

FY – Fiscal Year (Virginia, July 1 – June 30)

GIS – Geographic Information System

GIT4 – Chesapeake Bay Program Goal Implementation Team Four

HWP – Healthy Waters Program

IFRIS – Integrated Forest Resource Information System

INSTAR – Interactive Stream Assessment Resource

IP – Implementation Plan

IT – Information Technology

MG – Master Gardner

MS4 – Municipal Separate Storm Sewer System

MTD – Manufactured Treatment Device

NCDENR – North Carolina Department of Environment and Natural Resources

NDZ – No Discharge Zone

NFWF – National Fish and Wildlife Foundation

NPS – Nonpoint Source

NRCS – Natural Resources Conservation Service

NRDAR – Natural Resources Damage Assessment and Restoration

ODU – Old Dominion University

PCB – Polychlorinated Biphenyl

PDC – Planning District Commission

PE – Professional Engineer

PFL – Project Funding List

PMP – Pollutant Minimization Plans

R3 – Environmental Protection Agency Region 3

RFP – Request for Proposals

SAG – Stakeholder Advisory Group

SAPS – Successive Alkalinity Producing System

Sed – Sediment

SFI – Sustainable Forestry Initiative

SHARP – Sustainable Harvesting and Resource Professional

SLAF – Stormwater Local Assistance Fund

SNR – Secretary of Natural Resources

SR – Southern Rivers

SWCD – Soil and Water Conservation District

TDS – Total Dissolved Solids

TMDL – Total Maximum Daily Load

TSS – Total Suspended Solids

UD – Under Development

USDA – United States Department of Agriculture

USFWS – United States Fish and Wildlife Service

VA – Virginia

VAC – Virginia Administrative Code

VACS – Virginia Agricultural Cost Share Program

VCU – Virginia Commonwealth University

VDACS – Virginia Department of Agriculture and Consumer Services

VDH – Virginia Department of Health

VDOF – Virginia Department of Forestry

VDOT – Virginia Department of Transportation

VECI – Virginia Enhanced Conservation Initiative

VENIS - Virginia Environmental Information System

VIMS – Virginia Institute of Marine Science

VITA- Virginia Information Technology Agency

VNRCF – Virginia Natural Resources Commitment Fund

VPA –Virginia Pollution Abatement (permit)

VPDES –Virginia Pollutant Discharge Elimination System (permit)

VSMP – Virginia Stormwater Management Program

VSWCB- Virginia Soil and Water Conservation Board

WIP – Watershed Implementation Plan

WQIA – Water Quality Improvement Act

WQIF – Water Quality Improvement Fund

WQMIRA – Water Quality Monitoring, Information, and Restoration Act