REPORT OF THE SECRETARY OF NATURAL RESOURCES

FY 2018 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
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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*. This consolidated report also includes the "*2014 Chesapeake Bay Watershed Agreement Progress Report: State of the Chesapeake Bay Program Report to the Chesapeake Bay Executive Council*," August 2018 as required in § 2.2-220.1. This consolidated report also addresses Item 361.A. in the 2018 Special Session I Budget (Chapter 2) for FY 2019 and FY 2020.

Water Quality Improvement Fund and Cooperative Nonpoint Source Pollution Programs

For FY 2018 (the period July 1, 2017 – June 30, 2018), DCR allocated over $16 million in agricultural cost-share and technical assistance funds to Soil and Water Conservation Districts. This included over $500,000 in Conservation Reserve Enhancement Program (CREP) cost-share funds to be disbursed by Districts as state match for completed projects. Of the $16 million, approximately $13.88 million was distributed to farmers through the Virginia Agricultural Cost-Share Program (VACS) and CREP for implementation of best management practices (BMPs). An additional $2.2 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 $4 million in the Chesapeake Bay watershed to less than $720,000 ($8 million statewide). Practices installed on farms during FY 2018 will result in estimated edge of field nitrogen reductions of approximately 9.4 million pounds, phosphorus reductions of approximately 3.1 million pounds, and sediment reductions of approximately 856 thousand tons.

Under the Water Quality Improvement Fund (WQIF) Point Source Program, DEQ currently has 66 signed agreements that 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, 62 have been completed and four are active in the construction stage. For calendar year 2017, 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: https://www.deq.virginia.gov/Portals/0/DEQ/Water/PollutionDischargeElimination/Watershed%20GP/2017%20Published%20Loads%20Draft%203_28_2018.pdf?ver=2018-04-05-085935-537.

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 $3.4 million to implement nonpoint source (NPS) pollution control 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 relative 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 identified 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 $103 million of stream exclusion practices statewide that either have been installed or were underway as of June 30, 2018 ($95 million, including nearly $53 million in the Bay watershed), or await funding ($7.9 million, including $711,000 in the Bay watershed). The WIP implementation schedule focuses on full implementation by 2025, recognizing that based on 2017 mid-term targets, 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 2019 – 2025, the final scheduled year of the Chesapeake Bay 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 that implement the VACS program.

Actual FY 2018 allocations from state sources for implementation of agricultural best management practices had the following breakdown:

FY 2018 (Program Name – agency subprogram code – amount):

VACS Cost-Share program funding (50323) - $13.8 million

District Technical Assistance (50322) - $2.2 million

District Financial Assistance (50320) - $7.1 million

FY 2018 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 2018-2019 biennium are estimated in the 2018 Ag Needs Assessment Table on page 14.

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 Watershed Model are difficult to quantify, but all are expected to further reduce overall costs and enhance progress towards the 2018 goals.

Chesapeake Bay and Virginia Waters Clean-Up Plan Report

During FY 2018, many strategies were implemented to reduce pollutants entering the Chesapeake Bay tributaries and Southern Rivers basins. Significant progress was made in reducing point source pollutant 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 Chesapeake Bay Phase II WIP continues. Virginia agencies successfully completed most of the 2016-2017 WIP milestones. EPA approved the 2018-2019 milestones in July 2018.

In FY 2018, DEQ developed 44 Total Maximum Daily Load (TMDL) equations for small watersheds and completed 3 TMDL implementation plans covering 16 impaired waterbody segments. A total of 185 small TMDL Implementation Watersheds saw BMP activity resulting in a total of 2,003 BMPs installed using a total of $5,913,645 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 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 (VNRCF) (§10.1-2128.1 of the *Code of Virginia*) 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 implement the nonpoint source elements of the Act. DCR and DEQ continue to work cooperatively 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. 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 source pollution problems.

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 2018, DCR allocated $13.8 million in VACS cost-share with an additional $2.2 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 $7.9 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 FY 2018 was $13.8 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 (CREP). 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 that 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 2018, DEQ developed and managed numerous 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 $3.4to 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 relative 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. After two years of implementation, many projects are nearing fruition. One project has been terminated and one project has been completed on budget and on schedule.

2018 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	$6,576,958.87	$4,085,435.66	$3,147,431.74	$938,003.92	$326,658.37	$2,164,864.84	$416,228.26
1999	$5,912,593.56	$4,437,793.05	$4,026,364.92	$411,428.13	$213,063.44	$1,261,737.07	$350,507.40
2000	$13,661,495.61	$8,304,576.76	$8,243,830.83	$60,745.93	$906,150.61	$4,450,768.24	$825,714.15
2001	$15,921,804.61	$7,897,867.01	$6,524,548.00	$1,373,319.01	$2,575,618.08	$5,448,319.52	$810,759.47
2002	$23,085,809.39	$8,339,569.86	$6,576,358.82	$1,763,211.04	$6,506,805.74	$8,239,433.79	$889,591.94
2003	$13,733,997.23	$3,197,822.34	$2,364,969.91	$832,852.43	$4,937,607.95	$5,598,566.94	$985,618.94
2004	$10,070,559.07	$2,777,504.24	$2,398,052.08	$379,452.16	$3,359,456.92	$3,933,597.91	$535,907.53
2005	$11,204,651.14	$4,307,458.65	$3,681,507.66	$625,950.99	$2,207,948.41	$4,689,244.08	$603,939.92
2006	$19,373,145.52	$9,628,007.15	$8,886,188.04	$741,819.11	$2,851,103.06	$6,894,035.31	$858,693.41
2007	$24,605,886.59	$15,283,215.10	$14,245,011.97	$1,038,203.13	$3,524,256.32	$5,798,415.17	$939,824.44
2008	$24,522,524.86	$13,955,030.01	$12,914,758.25	$1,040,271.76	$3,154,319.66	$7,413,175.19	$1,065,161.91
2009	$31,367,309.49	$16,010,313.84	$15,153,328.01	$856,985.83	$5,893,159.13	$9,463,836.52	$1,330,127.77
2010	$37,070,080.33	$23,493,322.35	$22,509,796.65	$983,525.70	$4,458,722.71	$9,118,035.27	$1,445,304.92
2011	$17,804,631.20	$10,746,969.55	$10,299,038.53	$447,931.02	$1,933,530.72	$5,124,130.93	$976,035.16
2012	$32,356,108.03	$21,639,816.76	$21,428,973.39	$210,843.37	$2,834,009.50	$7,882,281.77	$1,393,439.57
2013	$37,173,912.10	$28,265,679.57	$27,944,758.73	$320,920.84	$3,990,137.06	$4,918,095.47	$1,074,491.97
*2014	$40,073,118.86	$30,905,744.33	$28,886,815.89	$2,018,928.44	$3,975,330.01	$5,192,044.52	$971,334.54
*2015	$65,874,216.68	$54,270,387.59	$50,515,385.47	$3,755,002.12	$5,144,081.82	$6,459,747.27	$1,048,980.07
2016	$17,020,070.39	$10,252,310.23	$9,886,427.97	$365,882.26	$1,078,239.95	$5,689,520.21	$881,556.86
2017	$25,394,530.51	$17,512,964.04	$16,922,641.08	$590,322.96	$1,789,664.73	$6,091,901.74	$737,888.05
**2018	$16,970,658.67	$9,731,914.52	$9,592,504.20	$139,410.32	$807,402.61	$6,431,341.54	$1,164,128.08
State Totals	$489,774,062.71	$305,043,702.61	$286,148,692.14	$18,895,010.47	$62,467,266.80	$122,263,093.30	$19,305,234.36

*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, 2017 and 2018 was transferred to these FYs to cover 100% SL-6s.

**2018 figures do not include approved BMPs carried forward into FY 2018 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 2018 is provided in the following table.

CREP Summary FY 2001-2018 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	1325.90	50.76
Chesapeake Bay	2002	$1,460,044.46	5032.10	258.24
Chesapeake Bay	2003	$602,270.38	1716.10	164.05
Chesapeake Bay	2004	$338,178.07	1988.80	103.28
Chesapeake Bay	2005	$219,240.64	1130.50	77.93
Chesapeake Bay	2006	$237,233.72	1609.94	85.68
Chesapeake Bay	2007	$227,018.64	545.20	49.43
Chesapeake Bay	2008	$351,833.72	1468.04	94.66
Chesapeake Bay	2009	$467,166.54	1411.70	97.34

Chesapeake Bay	2010	$645,947.21	1580.80	81.54
Chesapeake Bay	2011	$444,625.29	575.50	50.67
Chesapeake Bay	2012	$477,040.35	442.00	51.81
Chesapeake Bay	2013	$129,214.22	159.00	11.65
Chesapeake Bay	2014	$115,096.92	176.90	6.94
Chesapeake Bay	2015	$115,683.77	99.40	12.62
Chesapeake Bay	2016	$425,530.86	200.58	23.33
Chesapeake Bay	*2017	$423,570.47	118.94	21.19
Chesapeake Bay	*2018	$6,313.75	1.91	0.32
Chesapeake Bay Totals:		**$7,007,256.51**	**19,583.31**	**1,241.47**
Southern Rivers	2001	$275,966.34	606.80	41.98
Southern Rivers	2002	$1,011,454.63	2638.90	184.75
Southern Rivers	2003	$381,269.67	1964.40	102.79
Southern Rivers	2004	$391,879.34	1666.00	124.33
Southern Rivers	2005	$346,378.31	2207.90	145.18
Southern Rivers	2006	$226,432.45	1519.36	121.50
Southern Rivers	2007	$197,151.05	541.50	154.44
Southern Rivers	2008	$267,733.17	845.30	203.61
Southern Rivers	2009	$250,768.21	1787.96	98.33
Southern Rivers	2010	$388,281.49	481.00	42.73
Southern Rivers	2011	$342,884.67	295.50	28.56
Southern Rivers	2012	$405,606.84	535.10	33.90
Southern Rivers	2013	$271,355.39	516.18	23.69
Southern Rivers	2014	$247,485.72	152.20	28.73
Southern Rivers	2015	$314,990.14	228.10	28.78
Southern Rivers	2016	$670,504.24	225.90	30.29
Southern Rivers	*2017	$581,469.10	244.94	27.57
Southern Rivers	*2018	$44,064.10	9.76	3.09
Southern Rivers Totals:		**$6,615,674.86**	**16,466.80**	**1,424.23**
Statewide Totals:		**$13,622,931.37**	**36,050.11**	**2,665.70**

*Note: Prior years 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 head of 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 24 nutrient management plans written on unpermitted operations covering 2,779 acres. The remaining funds were put towards another RFP that 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 have recently expired. DCR is currently preparing to advertise for additional contracts to continue to assist animal operations. Substantial progress has been made. As of June 30, 2018, there are 244 unpermitted dairies with current nutrient management plans, or 75% of the total. There are 82 permitted dairies remaining in Virginia. Sixty-six of these permitted operations have current plans with 22 having expired plans in phase of renewal.

Livestock Stream Exclusion in Virginia

Through June 30, 2015, DCR offered 100% grants for the SL-6 (Stream Exclusion with Grazing Land Management) practice to cost-share applicants. All participant 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 2018, approximately $95 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 1,858 stream miles and approximately 119,000 animal units excluded.

WQIF Point Source Program

Since 1998, 66-point source WQIF grant agreements obligating $799.8 million have been signed. The 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. Sixty-two 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 nearing completion with the proposal of revised chlorophyll criteria and assessment method changes to the State

Water Control Board in September 2018. 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 total nitrogen and total phosphorus waste load allocations assigned to the significant dischargers in the Chesapeake Bay watershed under the EPA–adopted Chesapeake Bay TMDL. As of June 30, 2018, the grant amount owed under existing, signed WQIF agreements was $11,088,570. 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 funding 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 2018, WQIF and VNRCF funding supported agricultural BMPs that are expected to reduce edge of field nutrient and sediment losses by over 9.4 million pounds of nitrogen, 3.1 million pounds of phosphorus, and 856,631 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	1,503,710.59	377,108.70	239,878.33
2002	1,640,321.50	362,002.42	280,991.64
2003	1,156,267.46	269,801.97	185,756.64
2004	536,768.43	107,595.81	98,811.54
2005	1,189,873.36	268,783.48	200,781.54
2006	1,998,395.34	436,729.61	354,757.96
2007	4,695,994.50	1,507,268.66	475,417.12
2008	6,108,453.79	1,655,391.97	834,977.22
2009	4,510,628.79	1,185,362.42	613,326.60
2010	6,708,560.56	2,034,396.14	757,505.36
2011	5,995,842.62	1,779,524.05	836,730.51
2012	9,562,731.58	2,904,869.46	1,300,708.83
2013	10,259,161.80	3,086,298.14	1,386,398.98
*2014	7,673,669.61	2,617,558.19	722,913.68

*2015	9,208,931.13	3,297,394.84	713,403.94
2016	7,543,800.57	2,928,281.59	439,033.17
2017	10,935,900.37	3,749,558.39	930,112.84
**2018	9,389,382.93	3,137,091.32	856,631.04

*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

**2018 figures do not include approved BMPs carried forward into FY 2018 that are awaiting completion

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

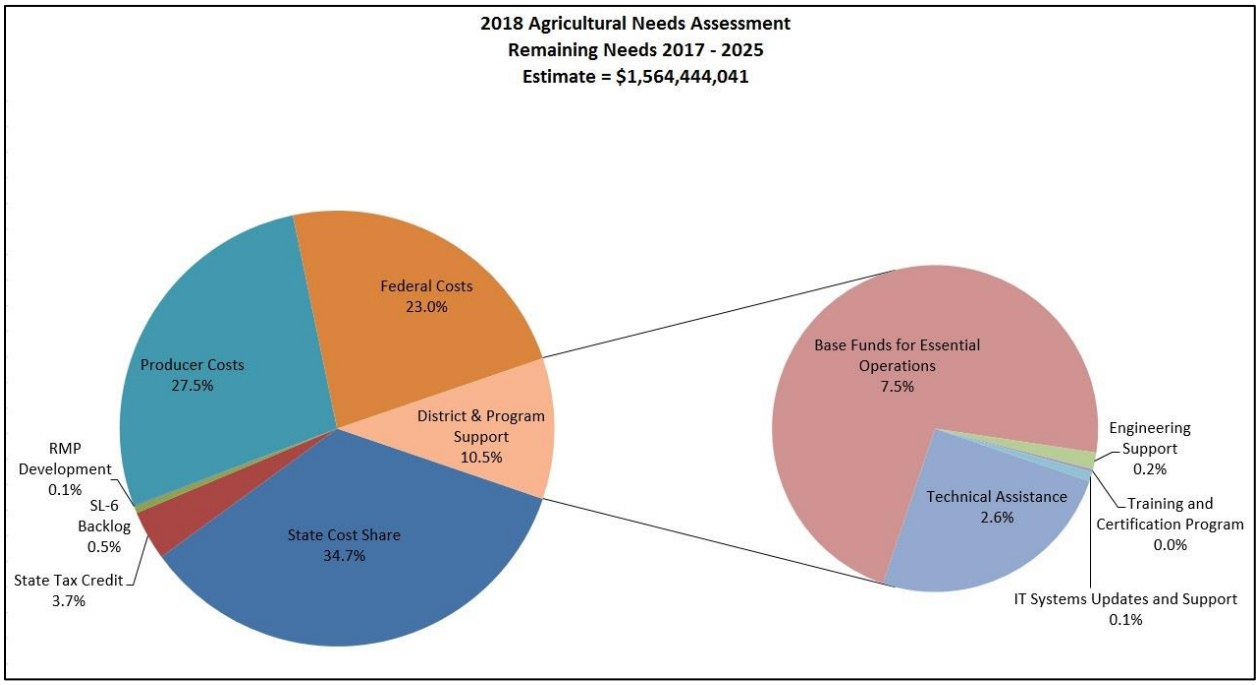
Estimated Nutrient Reductions from Point Source WQIF-Funded Projects

To date, 62 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 2017, annual nitrogen discharges were reduced by about 9,533,000 pounds; phosphorus annual loads were reduced by almost 737,000 pounds, exceeding the milestone commitments set in Virginia's WIP for both nutrients. Because 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.

2018 Agricultural Needs Assessment Summary



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 $95 million has either been expended or obligated statewide for the SL-6 practice. As of June 30, 2018, $7.9 million worth of these

practices were awaiting available funding with $711,000 worth of practices in the Chesapeake Bay watershed remaining.

As projects are completed, or others are cancelled for various reasons, earlier cost estimates are adjusted. The $103 million livestock stream initiative includes $53 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 69,000 animal units in the Chesapeake Bay watershed that will be excluded (statewide, the impact would be almost 9.7 million linear feet of stream bank protected and 119,000 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, and 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.

FY 2018 CHESAPEAKE BAY AND VIRGINIA WATERS CLEAN-UP PLAN

2018 Agricultural Needs Assessment - Biennial Needs Summary with All Data

Estimated Costs					2017 - 2018 Biennium		2019 - 2020 Biennium		2021-2022 Biennium		2023-2024 Biennium		2025 Target Year	
FY2017 - FY2025	Budget Code	FY17 Funding Obligated/Paid	FY18 Funding Obligated/Paid[11]	FY19 Funding Available	2017	2018	2019	2020	2021	2022	2023	2024	2025	Adjusted Total Need[10]:
Chesapeake Bay Cost-Share[1]	50323	$7,687,155	$3,799,059	$11,076,091	$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	**$255,031,994**
Chesapeake Bay SL-6 Backlog[2]	50323	$16,008,809	$1,646,184	$0	$16,008,809	$1,646,184	$711,799							**$711,799**
Chesapeake Bay Annual BMP Cost Share	50323	$7,268,700	$2,497,961	$3,308,443	$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	**$70,669,881**
Chesapeake Bay Tax Credit		$495,358	$204,642	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	**$34,552,614**
Chesapeake Bay Producer Portion[3]		$4,180,044	$1,795,130	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	**$258,419,423**
Chesapeake Bay Federal Portion[4]		$4,075,029	$1,346,437	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	**$214,907,365**
Chesapeake Bay Technical Assistance[5]	50322	$4,760,086	$1,313,324	$2,143,484	$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	**$23,588,463**
Chesapeake Bay RMP Development	50301	$261,479	$284,827	$413,904	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	**$839,790**
Southern Rivers Cost-Share[1]	50323	$4,290,171	$2,777,901	$7,402,474	$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	**$170,592,320**
Southern Rivers SL-6 Backlog[2]	50323	$15,638,807	$1,275,270	$0	$15,638,807	$1,275,270	$7,185,992							**$7,185,992**
Southern Rivers Annual BMP Cost Share	50323	$4,710,828	$1,599,173	$2,211,129	$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	**$47,308,860**
Southern Rivers Tax Credit		$245,503	$120,555	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	**$23,135,684**
Southern Rivers Producer Portion[3]		$2,709,679	$1,896,582	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	**$171,656,804**
Southern Rivers Federal Portion[4]		$889,339	$488,185	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	**$145,508,363**
Southern Rivers Technical Assistance[5]	50322	$3,173,391	$879,613	$1,428,989	$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	**$17,262,487**
Southern Rivers RMP Development	50323	$161,188	$0	$15,118	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	**$273,694**
Base Funds for Essential Operations[6]	50320	$7,191,091	$7,191,091	$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	**$118,111,713**
Engineering Support[7]	50301	$297,713	$372,190	$459,850	$424,000	$424,000	$424,000	$424,000	$424,000	$424,000	$424,000	$424,000	$424,000	**$2,686,247**
Training and Certification Program[8]	50301	$79,000	$60,590	$79,927	$60,590	$80,000	$80,000	$80,000	$80,000	$80,000	$80,000	$80,000	$80,000	**$481,073**
IT Systems Updates and Support[9]	50301/50320	$378,246	$1,061,246	$903,246	$378,246	$1,061,246	$253,246	$903,246	$253,246	$253,246	$253,246	$253,246	$253,246	**$1,519,476**
	Totals:	**$84,501,615**	**$30,609,959**	**$36,633,746**	**$206,271,456**	**$181,427,694**	**$188,839,622**	**$181,818,475**	**$184,543,107**	**$187,985,231**	**$191,496,198**	**$195,077,384**	**$198,730,194**	**$1,564,444,041**

Footnotes:

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

[2] 2017 - 2018 Biennium figures were adjusted to the funds that were obligated. The 2019 Biennium figures represents the remainder of the backlog.

[3] Includes producers costs from installation of 100% voluntary BMPs and costs from installation of costshare BMPs after state and/or federal payments and any tax credits received.

[4] Includes BMPs which were at least partially funded with Federal 319 grants and other Federal costshare (FSA-CREP, NRCS) provided on BMPs also receiving VACS funding. 319 Funding for SL-6 backlog shown in the FY17 column.

[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 figures includes staff salaries, benefits and vehicle costs.

[8] Training and Certification funding to develop an internal DCR-SWCD training and certification program to further build SWCD technical capacity. These figures includes staff salaries, benefits and vehicle costs.

[9] Includes staff salaries and annual O&M costs, FY17 includes costs for system enhancements for BMP Verificaiton, and, FY18 includes costs for NMP Module development and AgBMP/CP Module enhancements. Financial Database project planned for FY20 even though $650k available in FY19.

[10] The Adjusted Total Need represents the previously identified Needs from 2017-2025, minus the FY17 and 18 Funding Obligated, minus the FY18 Funding Available.

[11] Figures do not include $3.8 million in DuPont Settlement Funds obligated for BMPs, but do include any VACS funds obligated for those BMPs.

Notes on 2018 spreadsheet development:

-VACS funding split 77% to non-annual BMPs, 23% to annual BMPs based on previous analysis/splits

-TA sources split 60-40% between CB/OCB then added together for a total

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 one Engineering Specialist in FY 2016 to assist SWCDs and farmers. A second PE has been approved to hire in FY 2018.

Total engineering support at an annual cost of $559,850 will be needed to support both existing engineering staff plus one additional engineering specialist 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

2018 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 9.6 million pounds of nitrogen (48% reduction) and 685,000 pounds of phosphorus (50% 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 that accounted for 81% of the statewide point source nitrogen loads and 80% of the statewide point source phosphorus loads in 2017. Reductions from the James River facilities are being phased in 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. DEQ will begin development of final chlorophyll-a based wasteload allocations upon public notification of the proposed water quality criteria for chlorophyll-a (currently scheduled for late 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 60% of the statewide phosphorus reductions despite the absence of final chlorophyll-a based wasteload allocations. Additional upgrades are planned 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 2017 milestone for this sector.

TMDL development and implementation for waters impacted by toxic contamination

2018 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. A PCB TMDL study has been initiated and consists of a source identification study that includes instream monitoring during base flow and high flow conditions. A second round of monitoring is scheduled during fall 2018. The results will also be used to develop a PCB fate and transport model from which loading allocations and reductions will be established. The TMDL is scheduled to be completed in 2021.

Elizabeth/tidal James Rivers: A PCB fish consumption advisory extends from the fall-line in Richmond, Virginia 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 2019 will establish reductions needed to attain the fish consumption use within these impaired waters. A PCB source investigation study has been completed 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 has been developed by the Virginia Institute of Marine Science (VIMS).

James (non-tidal)/Jackson/Maury Rivers: The non-tidal James River basin is located in central Virginia. Five river segments were listed for PCB fish consumption advisories beginning in 2004 with the most recent occurring in 2008. Initial TMDL studies to delineate the geographic distribution and possible sources of the PCB contamination were initiated in 2017 and continued through 2018. The purpose of this intensive monitoring effort is to identify sources of PCBs throughout the impaired watershed in addition to informing fate and transport of PCBs to assist with the TMDL model development. TMDL development is expected to follow the 2018 monitoring effort and is planned for completion by 2021.

Levisa Fork: A PCB TMDL was completed in April 2010 for the Levisa Fork watershed, which is part of the Tennessee/Big Sandy River basin. 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 of PCB loads for which the development of pollutant minimization plans (PMP) has been initiated.

Lewis Creek: Lewis Creek is located in the Potomac-Shenandoah River Basin in western Virginia. The impaired segment of Lewis Creek was first listed for fish consumption advisories in 2004. Initial TMDL studies to delineate the geographic distribution and possible sources of the contamination were initiated in 2017 and continued during 2018. The purpose of the monitoring is to identify sources of PCBs throughout the TMDL watershed in addition to informing fate and transport of PCBs to assist with TMDL model development. TMDL development is expected to follow the 2018 monitoring effort and is planned for completion by 2021.

Mountain Run: The Mountain Run PCB impairment extends from the Route 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 also occurred during 2014, 2015, and 2018 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 2019-2021 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. The Biological Systems Engineering (BSE) Department at Virginia Tech completed a TMDL, developed to restore the fish consumption use, during the summer of 2018. If the TMDL is approved by the State Water Control Board at their December 2018 meeting, an Implementation Plan will be developed to assist in identifying and reducing PCB loadings from TMDL non-point source categories with an emphasis on the "Uncategorized" category.

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. During 2018, the Environmental Protection Agency (EPA) performed additional instream mercury monitoring under the Superfund Program as an initial step in assessing on-going loadings from the Olin plant site to the river.

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 and will be addressed through the water permitting process.

Roanoke (Staunton): A PCB TMDL was completed in early 2010 for the Roanoke River that included drainage areas from the headwaters and extended downstream all the way to the Dan River (Kerr Reservoir). The Roanoke TMDL source investigation study identified two noteworthy PCB sources in the downstream (Staunton River) portion of the river. One facility successfully eliminated 10 percent of the on-going PCB load to the river by identifying, treating, and eliminating the source. TMDL implementation continues at the other significant source and after identifying the on-site sources, is in the process of performing site modifications that should greatly reduce the on-going load. A PCB monitoring requirement is also applicable 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.

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 in the production of rayon 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. A total of $10 million of settlement funds was specifically designated for projects to improve water quality and fish habitat. The Soil and Water Conservation Districts awarded grant funds (Lord Fairfax, Shenandoah Valley, and Headwaters) and have started implementing best management practices, including stream exclusion with grazing land management and animal waste control facilities practices. The Fish and Wildlife Service is working on funding agreements with other partners (City of Waynesboro, Augusta County, Alliance for Chesapeake Bay) to complete their proposed water quality and habitat restoration work.

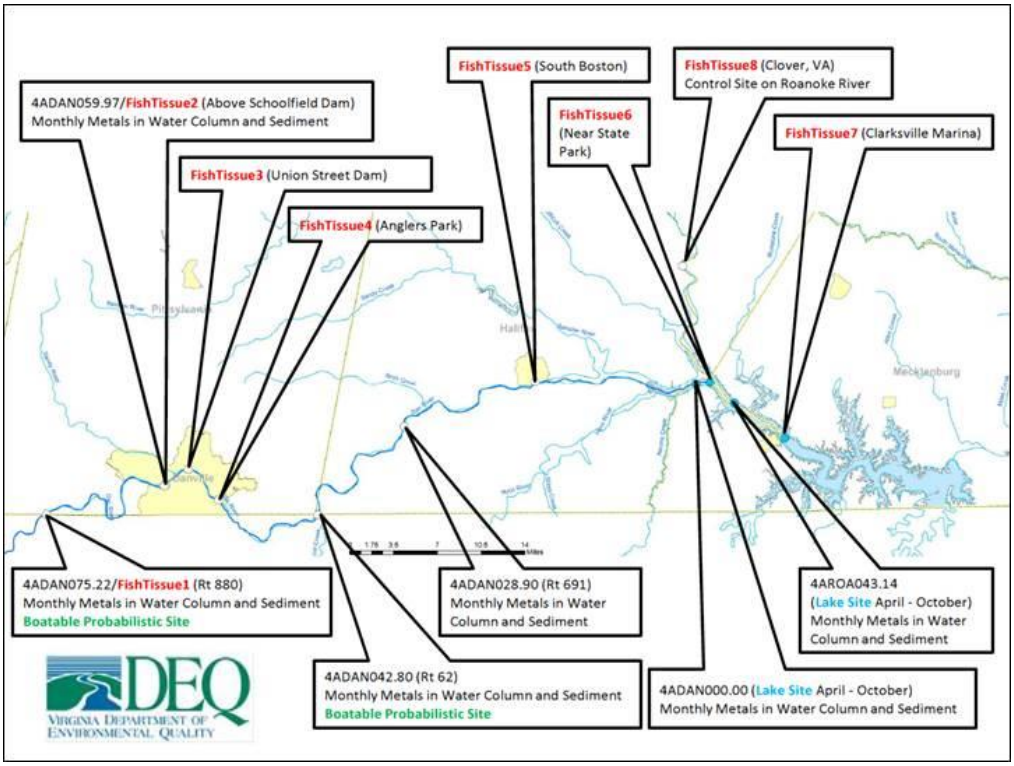
Dan River Coal Ash Spill and State Response

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.

EPA, DEQ, U.S. Fish and Wildlife Service (USFWS), North Carolina Department of Environmental Quality, and Duke Energy conducted emergency response monitoring to detect any acute affects to aquatic life over the next 10-12 months. 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. Longer-term environmental monitoring, aimed at detecting any trends in sediment or water column concentrations of trace metals associated with the ash, was done from 2015 – 2017. This trend monitoring plan was 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.



Because the accumulated results indicate that impacts were minimal and trends were essentially in a positive direction (*i.e.*, decreasing concentrations) the Dan River monitoring program has been scaled back to a few "sentinel" sites periodically sampled for sediment and water column metals levels. Fish tissue collection continues at a slightly expanded scope, with the addition of five more stations located within the larger Roanoke and Yadkin River basins, under a five-year grant from the National Fish and Wildlife Foundation (using a portion of the penalty settlement funds paid by Duke Energy to the federal government). Following is a summary of the results from the 2014-2017 monitoring program:

- Sediment metals levels remain low, below thresholds of potential concern, and the ash continues to be 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 (640 total) from 2014 through 2017. 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 four years of monitoring, with the exception of chromium in the 2017 results. There was notable uptick in the number of samples in which chromium was detected above the Method Detection Limit (MDL) of 0.01 parts per million (ppm), but only one concentration in 160 samples was above the Practical Quantification Limit (PQL) of 0.50 ppm. Even with this result for chromium in 2017, the reported concentrations of all the 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.

Regarding State-level compliance actions, 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.

The monitoring data is being used in a basinwide Natural Resources Damage Assessment and Restoration (NRDAR) process 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. 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, underway or completed 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 has been removed, reopening 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 was the last obstacle to complete Franklin County's Pigg River Blueway.

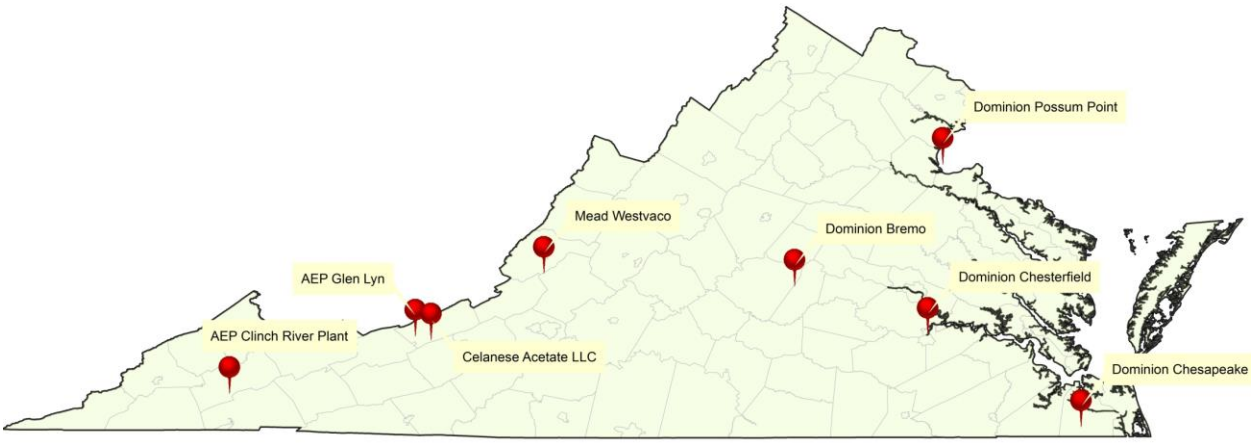
- Roanoke Logperch Restoration – fund genetic research and restoration of Roanoke Logperch population at Goose Creek over seven years; promote restoration of gene flow between previously connected fish populations.
- Freshwater Mussel Restoration & Conservation Fund – maintain and expand Virginia Department 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. The Executive Summary of the report is accessible at this link: http://www.danvilleva.gov/DocumentCenter/View/21762/Dan-River-Virginia-Tech-River-Study-Executive-Summary?bidId=
- Abreu-Grogan Park Improvements – add a bathroom, deck, handicap access pier, bank stabilization and other enhancements.
- Public Boat Ramp (location to be determined) – 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 eight 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 807 adopted by the 2018 General Assembly requires every owner or operator of any coal combustion residuals (CCRs) surface impoundment or other CCRs unit that no longer receives CCRs, *located within the Chesapeake Bay watershed*, to issue a request for proposals for entities to conduct recycling or beneficial use projects for the CCRs at such impoundment or unit. The request must be issued by July 15, 2018. By November 15 2018, the owner or operator must submit a business plan compiling the information from the request to various committees of the General Assembly and state agencies. The request and business plan will be posted once it becomes available. The legislation also delays the solid waste permitting for closure of these units where the unit is proposed to be closed in place until after July 1, 2019. The legislation does allow for permitting of the unit where CCRs have already been removed and placed in another impoundment on site, are being removed from an impoundment, or are being processed in connection with a recycling or beneficial use project.

This prohibition on permitting continues a moratorium previously established by Senate Bill 1398 in the 2017 General Assembly. Consistent with both Senate Bills, no permit for a CCR surface impoundment proposed to be closed in place located within the Chesapeake Bay watershed will be issued before July 1, 2019. If permitting documents related to CCR units that are being closed by removal are received, they will be posted as have previous permitting documents and those actions will be subject to the same public participation elements including a public notice and public hearing prior to any final action. A solid waste permit for the AEP Clinch River and the Celanese facility for closure has been issued.

No Discharge Zone (NDZ) designations

2018 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 after which, the applications will be resubmitted to EPA for continuation of the final determination process. 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 in December 2016 after which it was sent to the SNR for review and transmittal to EPA. EPA has not yet started the federal final determination process. 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

2018 Progress Report

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

Certain AOSS can reduce total nitrogen at the edge of drainfield up to 69% when compared to conventional onsite sewage systems. As required by 12VAC5-613-90 Section D, new AOSS installed after December 7, 2013 in the Chesapeake Bay Watershed must provide a 50% reduction of total nitrogen (TN) as compared to a conventional gravity drainfield system.

Although AOSS installations provide a relatively high percentage of nitrogen reduction, the actual pounds of nitrogen reduced is not extreme. A 50% nitrogen reduction equates to 4.5 lbs of nitrogen reduction per person per year. Additionally, the cost to install an AOSS can be thousands of dollars more than a conventional onsite system. The AOSS owner is also responsible for hiring a licensed operator to complete an operation and maintenance (O&M) inspection annually. These two factors together provide for a relatively low pounds of nitrogen reduced per dollar spent ratio. This may be a barrier for receiving funds to reduce nitrogen loading from the onsite sector.

In some cases, the replacement of a failing onsite system requires an AOSS to meet VDH regulations. This is commonly due to small lot size, shallow water table, shallow depth to impervious strata, or poor soils. Due to the economic strain this may impose on the homeowner, 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. From July 1, 2017 through June 30, 2018, VDH issued 92 treatment waivers to homeowners statewide. These waivers can dissuade homeowners to upgrade a failing septic system with additional treatment and are known opportunities to help homeowners comply with AOSS regulations and reduce nitrogen loading.

The Virginia Environmental Information System (VENIS) is the primary database and record retention tool for the agency's environmental health programs. From July 1, 2017, through June 30, 2018, VDH issued 9,079 new onsite construction permits statewide; 1,431 of which were for AOSS. During the same time, VDH issued 3,347 repair permits statewide; for which 263 required the installation of an AOSS. In March of 2018, VDH began a yearlong database transition to a proprietary cloud-based system. This new system, scheduled to be fully deployed by April 2019, will replace VENIS, facilitate better data collection, and provide advanced environmental health informatics capabilities. VDH will continue working towards a complete inventory of all onsite sewage systems in the Commonwealth using the new system. However, even with the new database, this project has limitations, such as the ability to collect data due to regulatory authority.

VDH's strategic vision is to shift evaluation and design services for onsite sewage systems and private wells from VDH to the private sector. This shift in services will allow VDH to focus its limited resources on health monitoring, data collection and sharing, providing quality assurance inspections of private sector work, developing policies to improve health, and providing reasonable enforcement and programmatic oversight. To help implement this strategic vision, the General Assembly passed two bills in 2018 relevant to the onsite program, House Bill (HB) 887 and HB 888. HB 888 directs VDH to take steps to eliminate evaluation and design services currently provided by VDH staff. VDH already required private sectors evaluations and designs for AOSS and non-residential systems; HB 888 affects evaluation and design of conventional onsite sewage systems and private wells. Although most onsite services will be gradually eliminated, the bill directs VDH to develop "hardship guidelines" under which VDH will remain as a provider of last resort for onsite sewage system and private well evaluation and design services. VDH will publish draft hardship guidelines for stakeholder review no later than November 1, 2018.

The General Assembly also passed HB 887, which revised the definition of maintenance to include the adjustment or replacement of certain onsite sewage system components (conveyance lines, distribution boxes, etc.). This eliminates the permit requirement to conduct these adjustments or replacements, thus

streamlining the process to allow owners to correct sewage failures faster. Another bill, HB 885, would have provided VDH authority to develop operation and maintenance requirements for conventional onsite sewage systems; however, the bill was continued to 2019. The bill would have provided an avenue for VDH to improve reporting of septic BMPs through reporting of conventional onsite sewage system pumpouts to VDH. The bill may have also helped in developing a complete inventory of onsite sewage systems.

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

2018 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 2018, DEQ provided funding to pump-out septic systems, repair or replace failing septic systems or remove straight pipes from at least 551 homes using $322,533 from State and Federal funding and landowner contributions.

Residential Septic Program - Grant Funded BMPs 7/1/2017-6/30/2018

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
RB-1	Septic Tank Pumpout	449	1,229.20	2.24E+12	$72,379	$74,169	$146,548
RB-3	Septic Tank System Repair	26	600.86	9.70E+11	$49,029	$32,206	$81,235
RB-3R	Conventional Onsite Sewage Systems Full Inspection and Non-permitted Repair	32	739.52	1.19E+12	$15,888	$9,186	$25,074
RB-4	Septic Tank System Replacement	34	785.74	1.27E+12	$121,424	$107,547	$228,971
RB-4P	Septic Tank System Installation/Replacement with Pump	8	184.88	2.98E+11	$39,600	$79,855	$119,455
RB-5	Installation of Alternative Waste Treatment System	2	46.22	7.46E+10	$24,213	$14,238	$38,450
Total		551	3,586.42	6.04E+12	$322,533	$317,200	$639,733

- Note *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, 2017 thru June 30, 2018 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	New River	15	$12,754	$15,655	1.72E+11	103
	Roanoke-Dan	7	$768	$4,226	6.72E+10	37
	Tennessee-Clinch	0	$0	$0	0.00E+00	-
	Tennessee-Holston	0	$0	$0	0.00E+00	-
Sub-Total		22	$13,522	$19,881	2.39E+11	140
Waters inside the Chesapeake Bay Watershed	James-Appomattox	52	$67,636	$116,182	8.41E+11	511
	James-Rivanna	30	$7,566	$13,503	2.46E+11	137
	Middle James	82	$57,855	$138,235	7.96E+11	473
	Potomac-Shenandoah	44	$23,558	$53,094	4.45E+11	265
	Rappahannock	294	$125,384	$247,187	3.18E+12	1,886
	York	27	$27,013	$51,652	2.96E+11	174
Sub-Total		529	$309,011	$619,852	5.80E+12	3,446
TOTAL		**551**	**$322,533**	**$639,733**	**6.04E+12**	**3,586**

Adoption of cost-effective agricultural best management practices

2018 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, 2017, through March 31, 2018. Sixty of these cases became official complaints. The official complaints fell into 13 categories according to the following types of agricultural activity: beef (31), land conversion (10), equine (4), dairy (3), cropland (2), beef, dairy (2), other (2), nursery stock, orchard (1), poultry (1), beef, dairy, equine, goats, poultry, sheep, swine (1) nursery stock (1), sod (1) and swine (1).

There were also seven different categories based on the types of pollution: sediment, nutrient, and bacteria (27); sediment only (20); bacteria and nutrient (6); sediment and nutrient (3); nutrient only (2); bacteria and toxins (1); bacteria, nutrient, and toxins (1).

During the program year, 24 (40 percent) of the 60 official complaints were determined to be founded and required agricultural stewardship plans to address water 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.

Seventeen (28 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 (32 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/operator fails to submit or 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 stewardship plans.

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

2018 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 2018, the VDOF was involved in 192 water quality actions initiated under the Silvicultural Law. Of these actions, two 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 2017, 96.6 percent of the timber harvest acres in Virginia conducted within the boundaries of the Bay Watershed were under BMPs. The audit also showed that 100 percent of

the sites visited had no active sedimentation present after the closeout 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 2018, VDOF field personnel inspected 4,774 timber harvest sites across Virginia on 216,077.31 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.

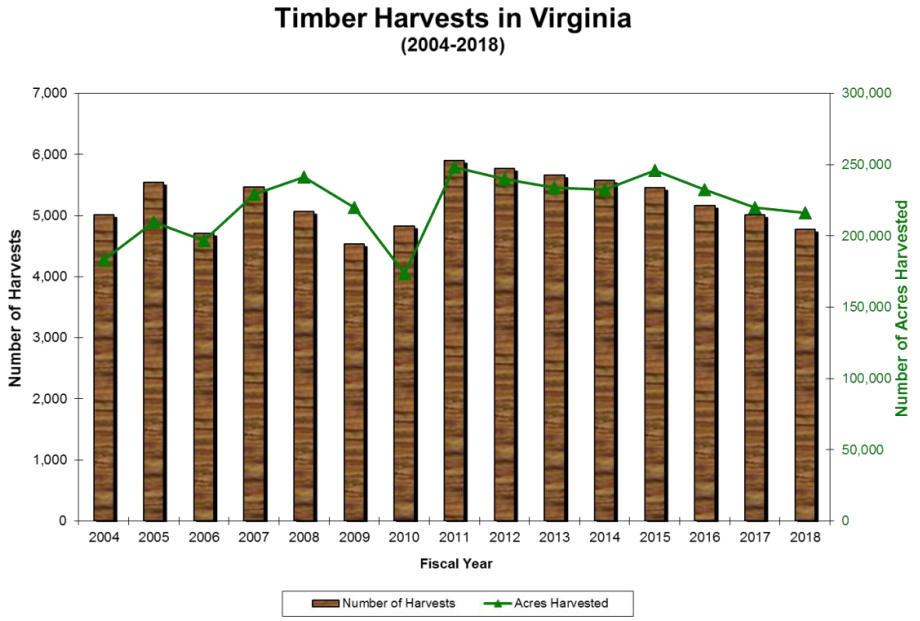


Figure 3-1: Number of harvests inspected and total number of acres harvested: 2004 through 2018

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

Environmental Impact Reviews

In its role as a reviewing agency for DEQ's and the 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 20 Logger education programs in FY 2018 educating 606 timber harvesting professionals through the Virginia SHARP Logger Program in cooperation with Virginia Tech and the Sustainable Forestry Initiative (SFI®) State Implementation Committee. This program has enabled VDOF to assist in training 9,272 harvesting professionals in 304 programs relating to water quality protection since its inception. Figure 3-2 exhibits historical levels of participation in VDOF logger education programs since 2004.

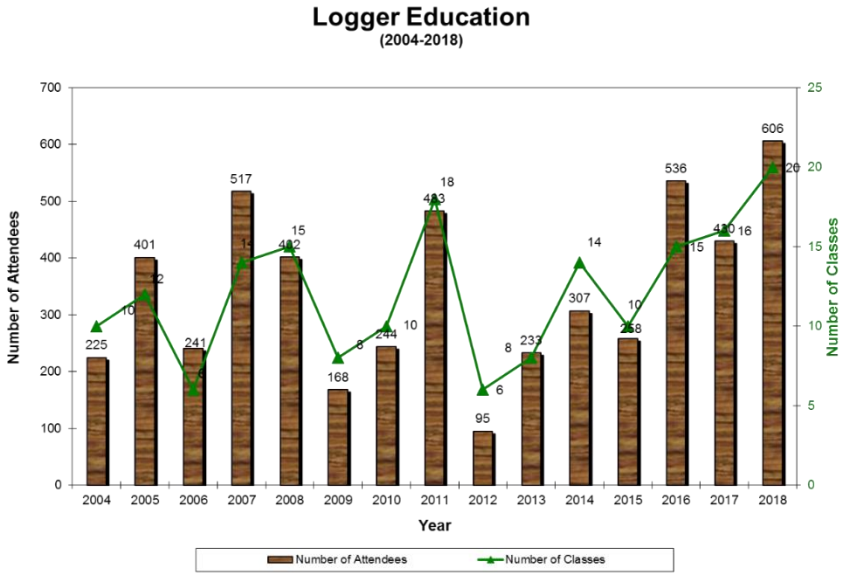


Figure 3-2: VDOF logger education: 2004 through 2018

Virginia Trees for Clean Water

Through its Virginia Trees for Clean Water program, VDOF is improving water quality across the Commonwealth by promoting on-the-ground tree planting efforts. To date, VDOF has assisted 123 projects resulting in more than 45,250 trees being planted in Virginia communities, including special projects such as: riparian buffer tree planting, a Turf to Trees program, and community and neighborhood and street tree plantings.

Project Learning Tree

During 2018, Project Learning Tree (VDOF) has provided three professional development trainings to support Meaningful Watershed Educational Experiences (MWEE) and watershed education. On May 24 – 25 a two day MWEE Institute funded by a NOAA BWET grant to the VRUEC who contracted PLT was held at the New Kent Forestry Center for 25 science lead teachers and coordinators. A four day MWEE Institute led by VDOF/PLT and VDGIF in partnership with VDOE through a NOAA BWET grant was held from June 25- 28 at Mathews State Forest for 15 educators. A five day Ecology Institute held at New Kent Forestry Center on July 23 -27 for ten high school Biology and Ecology teachers funded jointly by PLT and VDOE focused on investigating watersheds and aquatic ecosystems. VDOF/PLT also participated in Back to the Bay Day at Brown's Island on June 9 to teach citizens about the importance of riparian buffer zones in keeping our waterways clean.

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 2018, there were 68 riparian buffer establishment projects reported by the VDOF for 159.3 acres within the Chesapeake Bay watershed. These are projects where the VDOF was directly involved by providing planning, oversight and certification of project completion.

Riparian Forest Buffer Tax Credits

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

Easement Program

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 169 conservation easements in 56 counties and the City of Suffolk that permanently protect nearly 50,000 acres of vital forestland. In FY2018, the VDOF permanently protected 7824 acres of open space and more than 39 miles of water courses through 24 conservation easements.

Forest Stewardship Program

Virginia's Forest Stewardship Program is a cooperative effort of 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. In addition to comprehensive plans, foresters may prepare plans for portions of properties or smaller areas; briefer plans to meet requirements for forest use-value taxation in some counties, or plans for implementing specific practices. In total for FY2018, nearly 3,600 plans were prepared on nearly 164,500 acres.

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 2018 and beyond, when the Bay model will be revised.

Healthy Watershed Forest/TMDL Project

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

Phase III of the project began in the spring of 2018 and will continue for up to two years. Funding is provided by the Chesapeake Bay Program through the Chesapeake Bay Trust and the U.S. Endowment

for Forests and Communities. The goal of Phase III is to complete the successes of Phases I & II by addressing challenges associated with creating the policy and financial infrastructure needed to facilitate forest and agricultural land conservation/retention on a sustainable, Chesapeake Bay-wide basis. The Phase III team will work with landowners and other county stakeholders to develop specific policies and financial benefits to landowners and taxpayers to achieve the environmental goals that have been established. It will consist of two programmatic tasks: (1) Work with two Rappahannock river basin localities to develop and implement plans, policies and ordinances to foster high quality (HQ) forest and HQ agricultural land retention; and (2) Work with the financial community to develop long-term funding mechanisms supported by the private sector. A third integrating task will be focused on coordinating with other Chesapeake Bay program workgroups to institutionalize findings and recommendations on a concurrent basis.

Assessments of Forestland Change

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

Vital Habitat

VDOF diminished species work was highlighted with two new reports:

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

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

Implementation of Nutrient Management Planning

2018 Progress Report

Since January 1, 2018, DCR staff prepared nutrient management plans on 24,468 new acres and revised plans for 45,431 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	39,324	12,564	12,583	527			64,988
Revised	31,545	5,996	7,566	324			45,431
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	68,292.7
Revised	347,476	1,443	47,813	11,391	1,798	939	604,324.
Grand Total	427,683	18,420	65,783	15,681	13,319	1,777.4	672,114

DCR continues to contract with several private planners and now has 316 golf courses with nutrient management plans totaling nearly 28,787 acres. DCR has completed the golf course project at this time and will be working with courses over the next 18 months on plans that will expire for renewal. 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, 2018, 5,700 tons of litter have been shipped outside of Virginia's Chesapeake Bay watershed. DCR is worked with the two 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. The findings of this study indicated that the total population of turkeys in Virginia was over-estimated by 27 percent. The reflected changes have been made into the Bay model for Virginia.

Private landowners own a large portion of the remaining urban acreage that could come under nutrient management. 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 512 dairies in Virginia. Eighty-two permitted and 245 unpermitted dairies have nutrient management plans. Out of 383 dairies in Virginia's Chesapeake Bay watershed, 52 are permitted and 289 are unpermitted. DCR is also working with Virginia Tech Cooperative Extension to assess the number of unpermitted confined beef operations in the Commonwealth. At the current time, there are five permitted beef operations with nutrient management plans. Of a total $265,000 made available in FY 2016 for private sector plan writers, $120,000 was for plans on unpermitted animal operations. These contracts expired in June 2018. DCR is currently working to establish new contracts with the private sector. Approximately $150,000 per year in funding is needed, on an ongoing basis, to expand existing contracting with the private sector plan writers for these unpermitted animal operations.

Implementation of and compliance with erosion and sediment control programs

2018 Progress Report

Effective July 1, 2013, the Erosion and Sediment Control Program transferred from the Department of Conservation and Recreation 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

2018 Progress Report

From July 2017 through June 2018, no local governments requested or received approval to manage local stormwater management programs. Ninety-four 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 2017 through June 2018, new (*i.e.*, first-time) permit coverage under the 2014 Construction General Permit was approved for 270 land-disturbing activities where DEQ is the Virginia Stormwater Management Program (VSMP) authority and coverage under the 2014 Construction General Permits was approved for 1,243 land-disturbing activities 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 Stormwater Local Assistance Fund (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

2018 Progress Report

From September 2017 to September 2018, Chesapeake Bay Preservation Act compliance reviews were initiated for fourteen localities. Eleven of those reviews have been completed. If a DEQ review reveals conditions that must be addressed by a locality in order for their program to come into compliance with the Bay Act and the locality does not meet the conditions by an established deadline, a warning letter is issued with a short deadline to comply. The review is passed on to DEQ's Enforcement Division if the locality does not comply with the conditions after the established deadline.

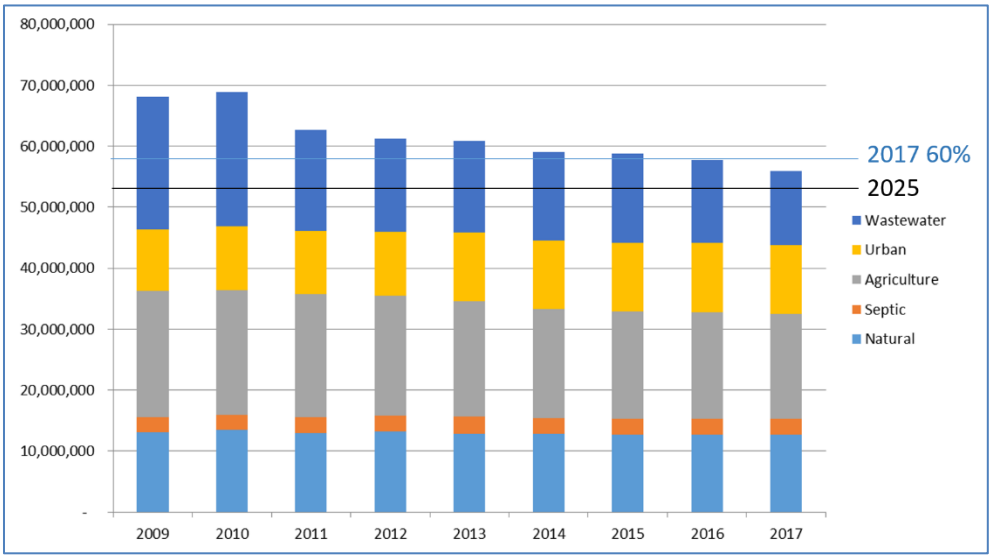
Fifty-three of the eighty-four Bay Act localities have now gone through a second round compliance review. During these compliance reviews, staff assess whether or not the locality is implementing soil and water quality conservation assessments for all active agricultural lands, the status of the water 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 2017 annual report cycle, 131 soil and water quality conservation assessments were conducted and 17,099 septic systems were pumped out.

Chesapeake Bay Total Maximum Daily Load implementation

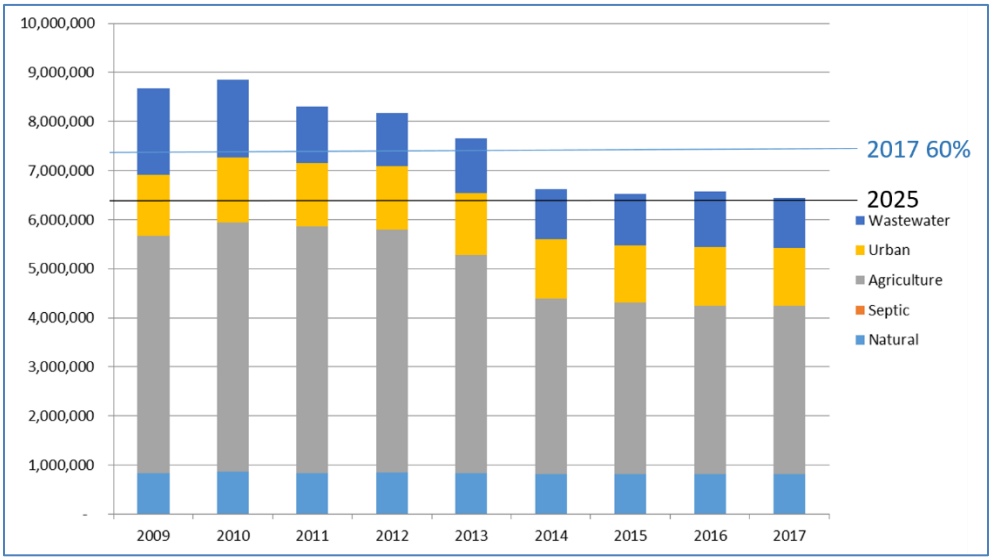
2018 Progress Report

A review of Chesapeake Bay TMDL implementation progress through 2017 shows that Virginia met its 2017 milestone targets for nitrogen and phosphorus reductions, but was slightly behind for sediment. Virginia successfully meet the 2017 target for achieving 60% of the required reductions for Nitrogen and Phosphorus.

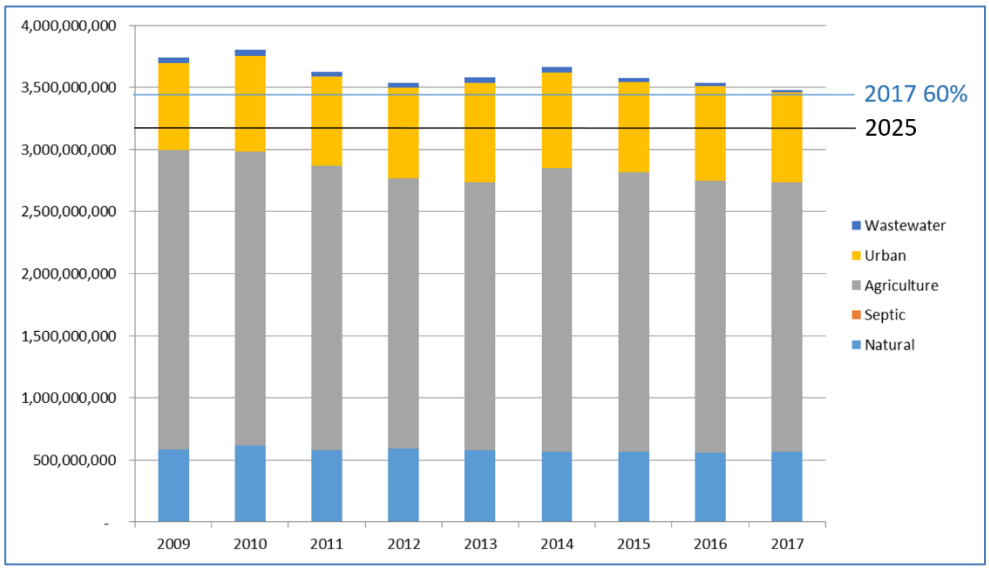
Virginia Delivered Nitrogen Loads (Model Version 5.3.2)



Virginia Delivered Phosphorus Load (Model Version 5.3.2)



Virginia Delivered Sediment Load (Model Version 5.3.2)



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.

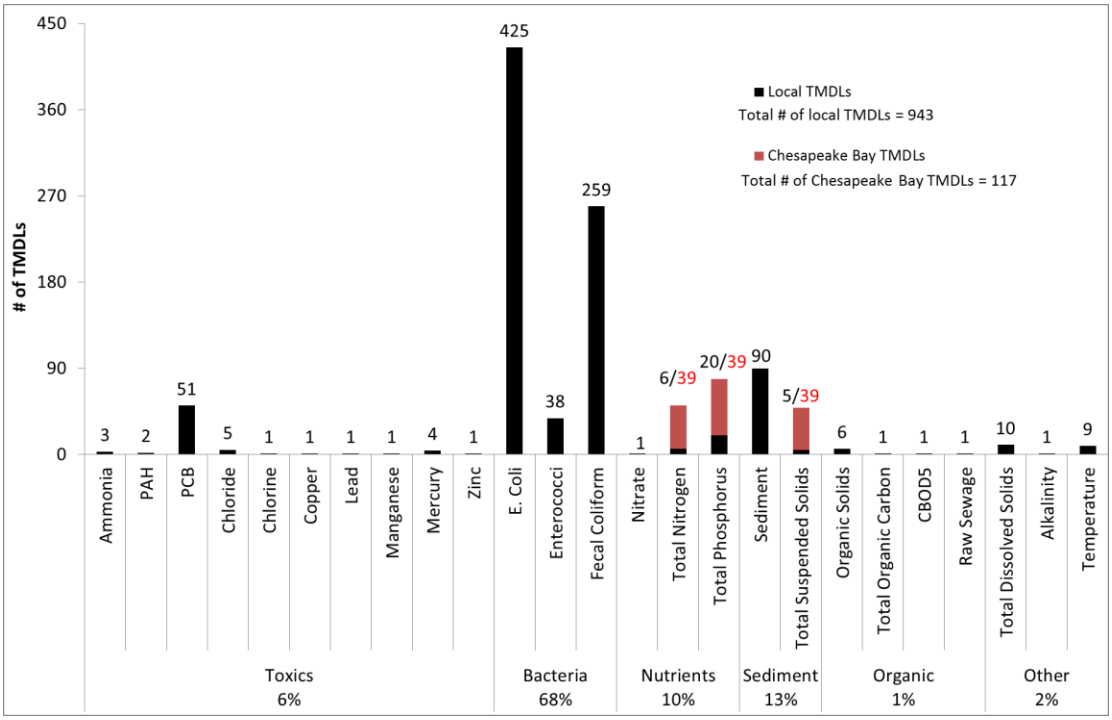
Development of TMDL reports, implementation plans, and implementation projects

Development of Total Maximum Daily Load Reports

2018 Progress Report

As of June 2018, 44 TMDL equations (28 new, 16 revised), each representing a watershed area draining to impaired surface waters, have been EPA approved since July 2017. 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 2016 Integrated Report, Virginia estimates that 8,358 miles of rivers, 79,901 acres of lake, and 2,046 square miles of estuary will require TMDL development in the coming years. 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

[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.

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 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. Most recently in 2018, EPA gave states the opportunity to adjust their priorities lists to adapt to changes in program resources. This revised list was public noticed for public comment on April 2, 2018. The comment period ended on May 4th, 2018 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.

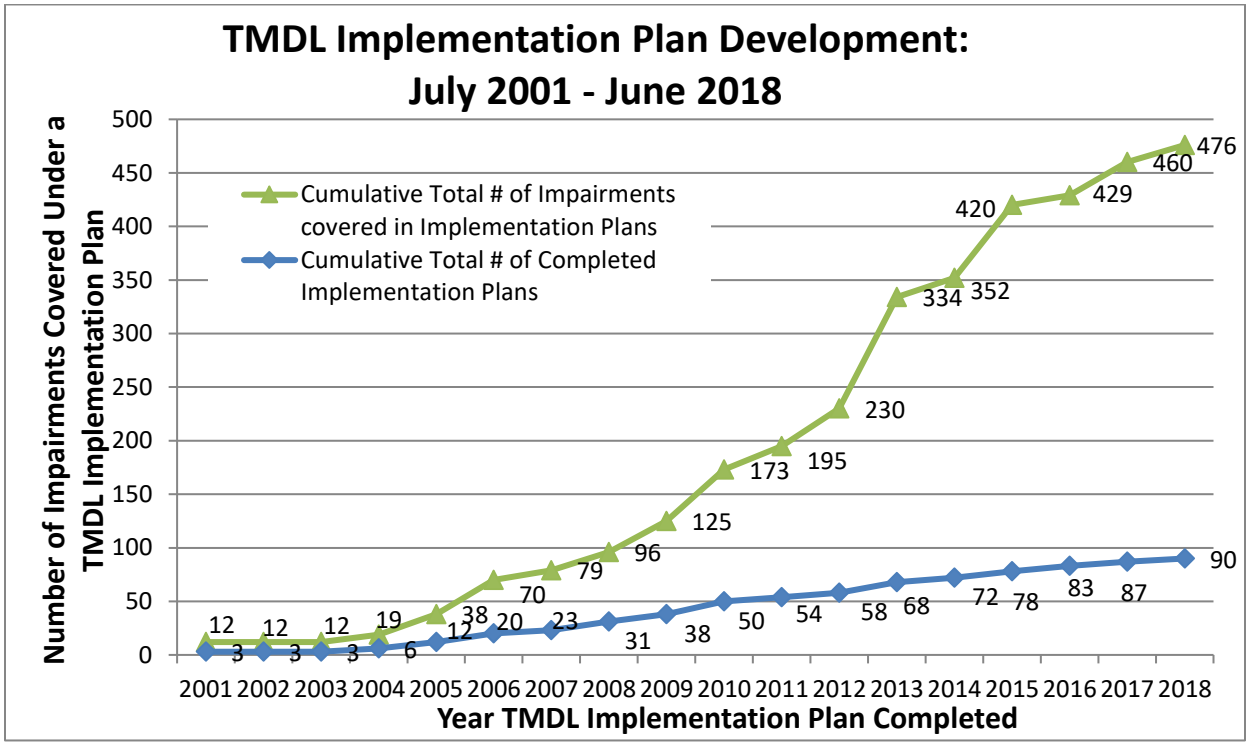
Development of TMDL Implementation Plans

2018 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 2018, DEQ and other partners developed 3 IPs covering 16 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 90 IPs, addressing 476 impairments.

Cumulative summary of TMDL Implementation Plan development through June 2018



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 2018

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
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

Watershed (# of impairments / # of impaired segments)	Location (county or city)	Impairment	Lead	Fiscal year Completed
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
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

Watershed (# of impairments / # of impaired segments)	Location (county or city)	Impairment	Lead	Fiscal year Completed
York Basin Watersheds – Beaver Creek, Goldmine Creek, Mountain Run, Pamunkey Creek, Plentiful Creek, Terry's Run (6/6)	Louisa, Orange, Spotsylvania	Bc	DCR	2011
James River Watersheds- James River and Bernards, Powhite Reedy, Gilles, Almond, Goode, Falling and Noname Creeks (10/10)	Chesterfield, Powatan, Henrico, Richmond	Bc	DEQ	2011
Little River Watershed – Little River, Meadow Run, Pine, West Fork Dodd, Dodd, Meadow, Brush, Laurel, Big Indian Creeks (26/26)	Montgomery & Floyd	Bc, Be (sed), Temp	DEQ	2012
Clinch River; Coal, Middle, and Plum Creeks (7/7)	Tazewell	Bc, Be (sed)	DEQ	2012
Hoffler Creek (1/1)	Suffolk & Portsmouth	Bc	DEQ	2012
Mill Creek (1/1)	Northampton	Be (DO, pH)	DEQ	2012
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
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

Watershed (# of impairments / # of impaired segments)	Location (county or city)	Impairment	Lead	Fiscal year Completed
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	2018**
Little Calfpasture River (1/1)	Augusta, Rockbridge	Be(sed)	DEQ	2018**
Powell River, North Fork Powell, South Fork Powell, Butcher Creek, Wallen Creek (12/10)	Lee, Wise	Bc, Be (sed)	DEQ	2018**
Dan River- Birch Creek, Byrds Branch, Doubles Creek, Fall creek,, Sandy Creek (94/94)	Carroll, Floyd, Halifax, Henry, Patrick, Pittsylvania	Bc	DEQ	2019*
Yeocomico River (13/13)	Northumberland, Westmoreland	Bc	DEQ	UD
Accotink Creek (3/3)	Fairfax, Fairfax County	Chloride	DEQ	UD
Woods Creek IP (1/1)	Lexington, Rockbridge	Bc	DEQ	UD
Bullpasture River IP (1/1)	Bath, Highland	Bc	DEQ	UD
Mattaponi River IP (14/14)	Caroline, King and Queen, Spotsylvania	Bc	DEQ	UD
*Impairment types: Bc = bacteria, Be = Benthic, P- phosphorus, TSS = Total suspended solids, TDS = Total dissolved solids, Sed = sediment. *IP has been completed, but not yet submitted to USEPA. **IP has been approved by USEPA, but not yet approved by the State Water Control Board.*				

Watershed Restoration and TMDL Implementation

2018 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

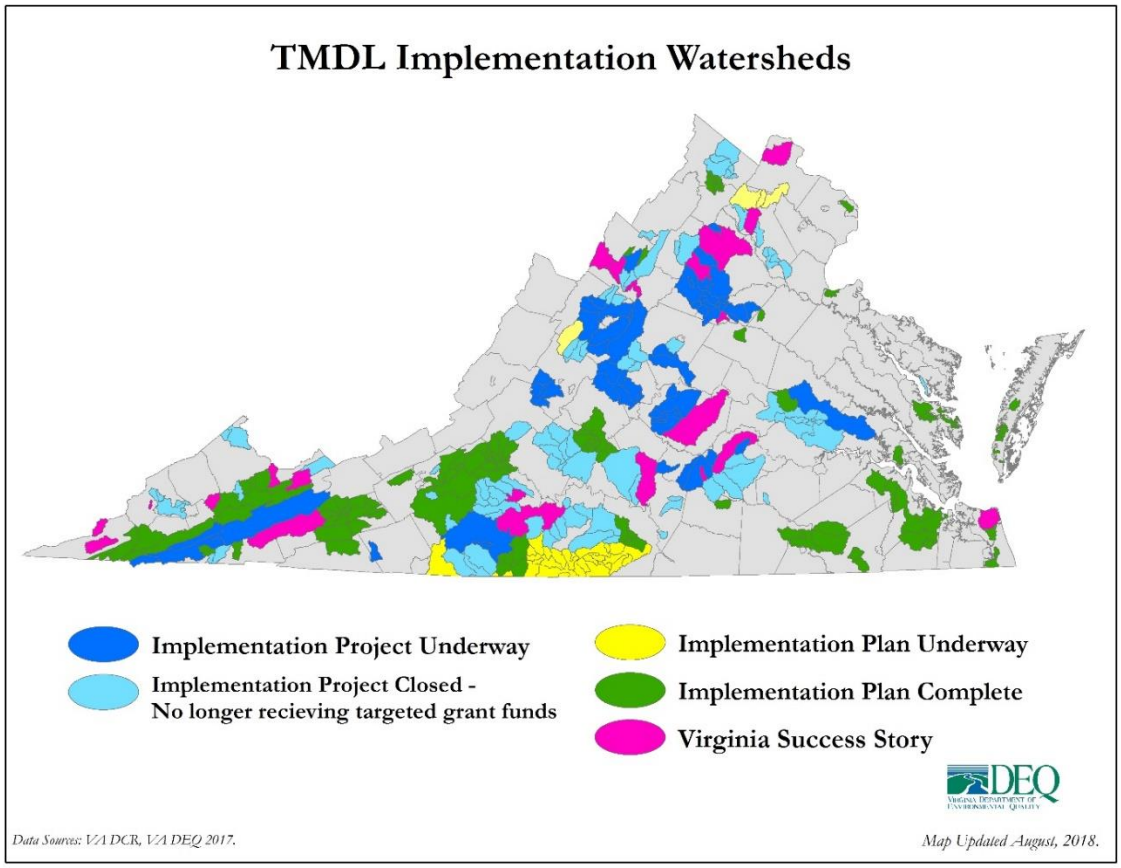
water quality objectives in a timely and cost-effective manner. Virginia's TMDL Implementation Program was developed by DCR in 2001 and has been funded by a mix of federal and state funds. In June 2013 the responsibility for program administration was moved to DEQ. From July 1, 2017 through June 30, 2018 DEQ managed 17 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 2018

Watershed Area	District and/or Partner	Years of Implementation and Funding
17 Projects in some part of Fiscal Year 2018 that actively receiving targeted TMDL funds from Federal §319(h)		
Chestnut Creek	New River SWCD	§319(h): 2016-2018
Chickahominy River	Hanover-Caroline SWCD	§319(h): 2015-2018
Flat, Nibbs, Deep and West Creeks	Piedmont SWCD	§319(h): 2015-2019 (septic only); WQIF/VNRCF: 2007-2015– Agriculture only
Hardware River	John Marshall SWCD	§319(h): 2015-2019
Linville Creek	Shenandoah Valley SWCD	§319(h): 2015-2019
Little Dark Run and Robinson River	Culpeper SWCD	§319(h): 2015-2021
North Fork Holston River – Washington County	Holston River SWCD	§319(h): 2017-2020
North Fork Holston River – Scott County	LENOWISCO PDC	§319(h): 2017-2020 (Residential Only)
Slate River and Rock Island Creek	Peter Francisco SWCD	§319(h): 2010-2020
Smith River and Blackberry Creek	Blue Ridge SWCD	§319(h): 2017-2020 (Residential Only)
South River and Christians Creek	Chesapeake Bay Foundation and Headwaters SWCD	§319(h): 2017-2020 (Agriculture Only)
Spring, Briery, Little Sandy, Saylers Creeks and Bush River	Piedmont SWCD	§319(h): 2016-2019 (residential only); WQIF/VNRCF: 2007-2015– Agriculture only
Tye River, Hat Creek, Rucker Run and Piney River	John Marshall SWCD	§319(h): 2015-2021
Upper Clinch River	Upper TN River Roundtable, Inc,	§319(h): 2016-2019
Upper Hazel River, Hughes River, Rush River and Thornton River	Culpeper SWCD	§319(h):2009-2019, VNRCF: 2011-2015, WQIF RFP: 2007-2009, 2016-2019
Upper Rapidan River	Culpeper SWCD	§319(h): 2016-2021
Upper York River	Culpeper SWCD	§319(h): 2012-2019,VNRCF: 2012-2015, WQIF RFP: 2016-2019
Federal EPA Nonpoint Source Implementation Grant (319h); Watershed Improvement Fund Request for Proposals (WQIF RFP), State Virginia Natural Resources Commitment Fund (VNRCF)		

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 August 2018



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 FY 2018

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 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 FY18 and collectively spent $2,063,797 in

state, federal and private funds on 627 BMPs installed in 17 IP areas encompasing 56 Implementation watersheds. In addition, DCR and other partners administered federal, state and private funds, partly through the Virginia Agricultural Cost Share (VACS) program, to install an additional 1,376 BMPs in 55 additional IP areas and 129 TMDL watershed implementation plan areas totalling $2,849,878 in BMP costs. A total of 2,003 BMPs were installed in 71 IP areas encompassing 185 IP watershed areas. The table below summarizes the BMP installation in implementation plan areas, distinguishing what was coordinated by DEQ and what wasn't coordinated by DEQ.

Summary of BMP Installation by Project Coordinated by DEQ: July 2017 – June 2018

Coordination of Work	# of IP Reports	# of IP Watersheds	# of BMPs	Total BMP Cost	% of BMP	% of Funding	% # of IP Watersheds
Coordinated by DEQ	**17**	**56**	627	$2,063,797	31%	35%	30%
Not Coordinated by DEQ	**55**	**129**	1376	$3,849,848	69%	65%	70%
Total	**72**	**185**	**2003**	**$5,913,645**			

Implementation was almost evenly split between work within the Chesapeake Bay drainage and work outside of the Chesapeake Bay drainage. Of the BMPs installed, 49.8% were outside of the Chesapeake Bay, accounting for 47% of the total BMP funding and working in 43% of the implementation plan watersheds. The table below summarizes the BMP installation in implementation plan areas, within the Chesapeake Bay drainage basin and activity outside of the Chesapeake Bay.

Summary of BMP Installation by Water Basin: July 2017 – June 2018

Watershed Drainage Basin	# of IP Reports	# of IP Watersheds	# of BMPs	Total BMP Cost	% of BMP	% of Funding	% # of IP Watersheds
Chesapeake Bay	39	106	1006	$3,115,945	50.2%	53%	57%
Outside Chesapeake Bay	33	79	997	$2,797,700	49.8%	47%	43%
Total	**72**	**185**	**2003**	**$5,913,645**			

In FY 2018, a total of 2,003 BMPs were installed costing a total of $3,451,221 of federal and state funds and $2,462,424 of landowner contributions; for an overall total of $5,913,646 spent on BMPs in watersheds with TMDL implementation plans. A total of 307 BMPs were installed with partial or full funding from Federal Section 319(h) funding from the Environmental Protection Agency. A summary of FY 2018 funding for BMP implementation in TMDL watershed areas is provided in the table below.

Summary of BMP Installation by Funding Source within IP Watersheds: July 2017 – June 2018

Funding Source	# of BMPs	$ of Cost-share Paid	$ of Landowner contribution	Total BMP Cost
Federal-319H	306	$336,141	$254,020	$590,162
Federal-319H&State	1	$21,453	$3,786	$25,239
Federal-NRCS_RCPP	1	$3,771	$6,961	$10,732
Local Funding	2	$5,492	$1,421	$6,913
Private Funding (Tax-Credit)	416		$895,915	$895,915
State-CREP	14	$37,580	$118,792	$156,372
State-VACS	1213	$2,946,969	$1,148,458	$4,095,426
State-VACS & Remediation Funds	2	$76,304	$2,961	$79,265
State-WQIF	48	$23,512	$30,112	$53,623
Grand Total	**2,003**	**3,451,221**	**2,462,424**	**5,913,646**

In additiona breakdown of BMP installation and funds spent by Implementation Plan area is shown in the table below

Cost-share funds spent on implementation by TMDL IP Watershed: July 2017 – June 2018

TMDL Implementation Plan	# BMPs	Cost-Share Paid	Landowner Contribution	Total Cost
Back Bay Watershed	15	$28,531	$0	$28,531
Back Creek	1		$2,645	$2,645
Banister River, Winn Creek, and Terrible Creek	3	$3,084	$2,865	$5,949
Beaver Creek and Little Creek	11	$22,734	$4,169	$26,903
Big Otter River Watershed	4	$9,696	$261,160	$270,856
Blackwater River (Upper, Middle, North Fork and South Fork)	5	$53,760	$11,246	$65,005
Buffalo Creek, Colliers Creek and Cedar Creek	6	$11,512	$10,609	$22,120
Carter Run, Great Run, Deep Run and Thumb Run	9	$36,033	$0	$36,033
Catoctin Creek	11	$23,544	$1,421	$24,965
Cedar Creek, Hall Creek, Byers Creek and Hutton Creek	29	$19,045	$7,873	$26,918
Chestnut Creek Watershed	42	$44,425	$10,543	$54,968
Chickahominy River and Tributaries	42	$80,222	$0	$80,222
Chowan River Watershed	212	$234,860	$103,845	$338,705
Chuckatuck and Brewers Creek	4	$25,282	$0	$25,282
Clinch River and Cove Creek	5	$115,330	$31,075	$146,405
Cooks Creek and Blacks Run	14	$5,189	$8,726	$13,915
Crab Creek	1	$3,780	$1,938	$5,718
Craig Run, Browns Run and Marsh Run	5	$25,620	$5,891	$31,511
Cripple Creek and Elk Creek	18	$72,956	$56,775	$129,731
Cub Creek, Turnip Creek, Buffalo Creek and UT to Buffalo Creek	1	$437	$1,076	$1,513
Fairview Beach	1	$728	$0	$728

Falling River	2	$12,011	-$1,130	$10,881
Flat, Nibbs, Deep and West Creeks	40	$164,422	$233,851	$398,273
Goose Creek	13	$58,563	$8,339	$66,901
Greenvale, Paynes and Beach Creeks	9	$5,363	$6,964	$12,326
Guest River	2	$22,605	$12,143	$34,748
Hardware and North Fork Hardware River	15	$2,640	$2,435	$5,075
Hawksbill Creek and Mill Creek	3	$7,685	$3,236	$10,922
Hays, Moffatts, Walker and Otts Creeks	13	$21,535	$9,329	$30,864
Holmans Creek	3	$3,922	$2,065	$5,987
James River and Tributaries - City of Richmond	39	$113,396	$2,388	$115,784
Kings Creek	1	$1,941	$0	$1,941
Linville Creek Watershed	29	$15,980	$59,284	$75,265
Little Dark Run and Robinson River	65	$106,737	$19,154	$125,891
Little River Watershed	2	$36,378	$26,997	$63,374
Long Meadow Run and Turley Creek	17	$79,267	$34,219	$113,485
Lower Banister River	11	$3,888	$5,290	$9,178
Lower Blackwater River, Maggodee and Gills Creek	4	$9,780	$256	$10,036
Middle Clinch River	5	$158,503	$176,233	$334,736
Middle Fork Holston River and Wolf Creek	14	$18,386	$6,180	$24,566
Middle River Watershed	55	$34,501	$26,199	$60,700
Mill Creek, Montgomery County	2		$10,880	$10,880
Mill Creek, Northampton County	3	$6,312	$0	$6,312
Mill Creek, Powhatan Creek Watersheds	1	$1,864	$0	$1,864
Mossy Creek, Long Glade Run and Naked Creek	51	$39,812	$7,880	$47,692
North Fork Holston River Watershed	25	$80,846	$56,264	$137,110
North Landing Watershed (including Milldam, Middle, West Neck and Nanney Creeks)	25	$58,461	$0	$58,461
North River	44	$116,849	$185,941	$302,790
Occohannock Creek	8	$7,781	$2,627	$10,408
Opequon Creek Watershed	1		$22,338	$22,338
Piankatank River, Gwynns Island, Milford Haven	65	$51,410	$0	$51,410
Pigg River and Old Womans Creek Watersheds	9	$30,263	$75,188	$105,451
Reed Creek Watershed	21	$47,054	$77,356	$124,409
Slate River and Rock Island Creek	61	$55,258	$56,306	$111,564
Smith Creek Watershed	16	$8,773	$24,257	$33,031
Smith River and Mayo River Watersheds	11	$14,193	$1,564	$15,756
South River Watershed and Christians Creek	71	$80,300	$32,729	$113,029
Spout Run	1		$5,173	$5,173
Spring Creek, Briery Creek, Bush River, Little Sandy River and Saylers Creek	52	$84,787	$168,428	$253,215
The Gulf, Barlow, Mattawoman, Jacobus and Hungars Creeks	13	$28,892	$3,133	$32,025
Three Creek, Mill Swamp, Darden Mill Run	503	$291,807	$204,773	$496,580
Tye River, Hat Creek, Rucker Run and Piney River	23	$63,613	$70,265	$133,877

Upper Banister River and Tributaries	7	$49,405	$79,100	$128,505
Upper Clinch River Watershed	1	$2,785	$31,016	$33,801
Upper Hazel River, Hughes River, Rush River and Thornton River	51	$84,013	$14,952	$98,965
Upper Nansemond River	45	$72,070	$0	$72,070
Upper Rapidan River	66	$271,230	$42,493	$313,723
Upper Roanoke River - Part 1	1		$7,332	$7,332
Upper Roanoke River - Part 2	2	$65,391	$16,348	$81,739
Upper York River Watershed	40	$143,783	$70,128	$213,911
Willis River Watershed	3		$40,672	$40,672
Grand Total	**2003**	**$3,451,221**	**$2,462,424**	**$5,913,646**

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 68 watershed implementation plan project areas where 2,003 BMPs were installed from January 1, 2017 through June 30, 2018. These actions resulted in over 446,568 linear feet of stream exclusion (excluding 2,303animals from accessing streams), 131 acres of riparian buffer, and the reduction of 2,351,260 pounds of nitrogen, 71,903 pounds of phosphorous, 58,365 tons of sediment, and 9.37E+15 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 through TMDL Implementation from 7/1/2017 - 6/30/2018

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	627	1376	2003
Total Pounds of Nitrogen Reduced	480,253	1,871,007	2,351,260
Total Pounds of Phosphorus Reduced	16,174	55,729	71,903
Total Tons of Sediment Reduced	19,627	38,738	58,365
Total Bacteria Reduced (CFU)	3.09E+15	6.28E+15	9.37218E+15

Types of BMPs Installed from 7/1/17-6/30/18 through TMDL Implementation

Practice	Practice Description	Units	# of BMPs	Extent of BMP Installed	Ac Riparian Buffer Created	Linear Ft Streambank Protected	Animal Units Excluded
CCI-CNT	Long Term Continuous No-Till Planting Systems	Acres	13	476.5	0	0	0
CCI-SE-1	Stream Exclusion - Maintenance Practice	Lin. Feet	59	327049	0	327049	0
CRFR-3	CREP Woodland Buffer Filter Area	Acres	6	7.2	7.36	0	0
CRSL-6	CREP Stream Exclusion with Grazing Land Management	Lin. Feet	7	9505	8.52	9505	248
CRWQ-1	CREP Herbaceous Riparian Buffers	Acres	1	1.13	2.15	1874	0
FR-1	Afforestation of Crop, Hay and Pasture Land	Acres	8	147.3	0	0	0
FR-3	Woodland buffer filter area	Acres	2	16.4	0	0	0
LE-1T	Livestock Exclusion with Riparian Buffers for TMDL Imp.	Lin. Feet	8	26347	24.69	26347	345
RB-1	Septic Tank Pumpout	Count	283	283	0	0	0
RB-3	Septic Tank System Repair	Count	14	14	0	0	0
RB-3R	Conventional Onsite Sewage Systems Full Inspection and Non-permitted Repair	Count	11	11	0	0	0
RB-4	Septic Tank System Replacement	Count	28	28	0	0	0
RB-4P	Septic Tank System Installation/Replacement with Pump	Count	6	6	0	0	0
RB-5	Installation of Alternative Waste Treatment System	Count	2	2	0	0	0
SL-1	Long Term Vegetative Cover on Cropland	Acres	15	506.75	0	0	0
SL-10T	Pasture Management	Acres	1	119.74	0	0	0
SL-11	Permanent vegetative cover on critical areas	Acres	3	6.9	0	0	0
SL-15A	Continuous High Residue Minimal Soil Disturbance Tillage System	Acres	26	670.27	0	0	0
SL-6	Stream Exclusion With Grazing Land Management	Lin. Feet	33	81313	88.47	81313	1609.6
SL-6B	Alternative Water System	Acres	1	27	0	0	0
SL-7	Extension of CREP Watering Systems	Acres	4	338.03	0	0	0
SL-8	Protective cover for specialty crops	Acres	10	341.03	0	0	0
SL-8B	Small Grain and Mixed Cover Crop for Nutrient Management and Residue Management	Acres	1196	43634.58	0	0	0
SL-8H	Harvestable Cover Crop	Acres	238	12433.39	0	0	0
SL-9	Grazing Land Management	Acres	1	30	0	0	0

VSL-8B	Voluntary Small Grain and Mixed Cover Crop for Nutrient Management and Residue Management	Acres	6	344.23	0	0	0
WP-2	Streambank protection (fencing)	Lin. Feet	1	300	0.28	300	100
WP-2A	Streambank Stabilization	Lin. Feet	2	180	0	180	0
WP-3	Sod waterway	Acres	1	1	0	0	0
WP-4	Animal waste control facilities	Count	6	6	0	0	0
WQ-12	Roof Runoff Management System	Sq. Feet	2	13770	0	0	0
WQ-4	Legume Based Cover Crop	Acres	9	808	0	0	0
Grand Total			2,003	518,723	131	446,568	2,303

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.

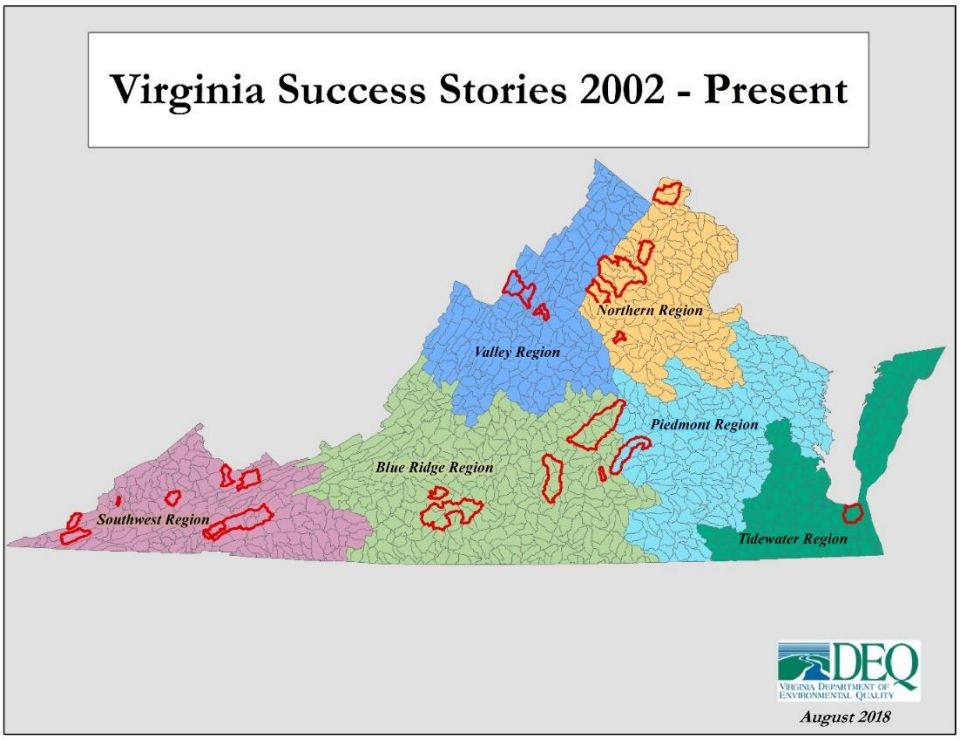
Since 2002 Virginia's Nonpoint Source Management Program and associated TMDL Implementation Program and its partners have written 24 success stories that address delisting and/or water quality improvement of 36 impaired stream segments. These stories are classified into two types: Type 1 stories are 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	2018[1]	TMDL Implementation
1	1	Stone Creek	2018[1]	Mining
1	2	Willis River	2018[2]	TMDL Implementation
1	1	Dumps Creek	2018[2]	TMDL Implementation
Total	36			

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

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



Healthy Waters

2018 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:

- Development and application of objective, quantitative, and diagnostic stream assessment protocols;
- 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 collaborate 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 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.

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, 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. New partnerships have been explored with those in the land protection and land brokering industry to advance the protection of lands directly benefiting Healthy Waters. 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, Rappahannock, Chickahominy, or Potomac rivers or where the HWP *Criteria for Ecologically Healthy Watershed Conservation* would be applied to advance the protection of those ecologically healthy streams.

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)

Chapter 4 - 2014 Chesapeake Bay Watershed Agreement Progress Report

State of the Chesapeake Bay Program Report to the Chesapeake Bay Executive Council, August 2018

Pursuant to § 2.2-220.1

For 35 years, the Chesapeake Bay Program has led and directed the restoration and protection of the Chesapeake Bay. A unique and regional partnership, the Chesapeake Bay Program brings together leaders and experts from a wide range of federal, state and local government agencies, including non-governmental organizations and academic institutions. The Chesapeake Bay Program is guided by the 2014 Chesapeake Bay Watershed Agreement, a plan for collaboration across political boundaries, and whose signatories include the seven watershed jurisdictions of Delaware, the District of Columbia, Maryland, New York, Pennsylvania, Virginia and West Virginia, as well as the Chesapeake Bay Commission and the Environmental Protection Agency on behalf of federal agencies.

The Watershed Agreement established ten goals to advance the restoration and protection of the Chesapeake Bay watershed. Each goal is linked to a set of outcomes, or time-bound and measurable targets, which will directly contribute to its achievement. Signatories promised to openly and publicly engage watershed citizens in implementing these goals and outcomes. Partners work through Goal Implementation Teams (GITs), Workgroups and Advisory Committees to collaborate, share information and set goals. Following the adoption of the Watershed Agreement, the partners crafted Management Strategies, and subsequently, work plans for the outcomes included within.

This report celebrates our successes by providing an overview of the progress toward our outcomes, as demonstrated by some our indicators. It also acknowledges the challenges we currently are facing and looks to the future as we continue down the road to 2025 and beyond.

Celebrating Successes

The Chesapeake Bay Program has now passed the halfway point of the Chesapeake Bay Total Maximum Daily Load (Bay TMDL) and remains at a critical tipping point. Our indicators are showing that the watershed is resilient, vibrant and healthy in many ways, but out of balance in others.

The Chesapeake Bay Program uses a suite of environmental health, restoration and stewardship indicators to track progress toward the Watershed Agreement. These indicators support the partnership's adaptive management-based decision-making process and highlight the critical work that is furthering the commitments we have made.

An update of the progress the Chesapeake Bay Program is making toward meeting the goals and outcomes of the Watershed Agreement is published annually in the Bay Barometer, our review of environmental health and restoration. Additionally, our indicators are published on ChesapeakeProgress, which supports federal, public and internal oversight of our work. Some of these indicators track the factors that influence our ability to achieve our goals. Others track whether we are putting our

management approaches and actions in place. Still others track whether we are achieving the goals and outcomes that will support our vision of a sustainable watershed. It is important to note that we are making progress toward all of our outcomes—even those currently without a performance indicator.

This is Progress

Blue crabs: Between 2017 and 2018, the abundance of adult female blue crabs in the Chesapeake Bay fell 42 percent, from 254 million to 147 million. This number is below the 215 million target but above the 70 million threshold. According to the Chesapeake Bay Stock Assessment Committee, an estimated 21 percent of the female blue crab population was harvested in 2017. For the tenth consecutive year, this number is below the 25.5 percent target and the 24 percent overfishing threshold. The stock is not depleted and is not being overfished.

Fish Passage: Between 2012 and 2017, Maryland, Pennsylvania and Virginia have opened 1,236 miles of streams to the movement of migratory fish, surpassing our 1,000-mile restoration goal.

Oysters: Eight out of 10 Chesapeake Bay tributaries have been selected for oyster reef restoration: Harris Creek, the Little Choptank River and the Tred Avon River in Maryland, and the Great Wicomico, Lafayette, Lower York, Lynnhaven and Piankatank rivers in Virginia. In seven of these tributaries, 1,008 acres of reefs have been restored. Each tributary is at a different level of progress in a process that involves developing a tributary restoration plan, constructing and seeding reefs, and monitoring and evaluating restored reefs.

Diversity: In the Watershed Agreement, the Chesapeake Bay Program adopted for the very first time a goal to increase the number and diversity of people who support and carry out conservation and restoration work. In 2016, the Alliance for the Chesapeake Bay distributed a diversity profile on behalf of the Chesapeake Bay Program to people who work for or with the partnership. Almost 84 percent of survey respondents self-identified as white or Caucasian, while 13 percent identified as non-white or non-Caucasian. Of those who identified as white, 32 percent identified themselves as a member of Chesapeake Bay Program leadership. Of those who identified as non-white, 24 percent identified themselves as a member of leadership. This latter group—people of color in positions of leadership—accounts for about three percent of total profile respondents. In 2018, the Chesapeake Bay Program committed to increasing the number of people of color in the partnership to 25 percent by 2025, and to increasing the number of people of color in leadership positions to 15 percent.

Environmental Literacy: In 2017, 23 percent of surveyed school districts identified as well-prepared to put environmental literacy programming in place. About half of these school districts are located in Virginia, and the other half in Maryland.

Public Access: Between 2010 and 2017, 153 boat ramps, fishing piers and other sites that provide direct access to the water were opening on and around the Chesapeake Bay. This brings the total number of public access sites in the region to 1,292.

Stewardship: In 2017, watershed residents scored a 24 out of 100 on the Citizen Stewardship Index: the region’s first comprehensive survey of stewardship actions and attitudes. There are three components to this score: Personal Action, Volunteering and Advocating. Personal Action (which in 2017 measured 38

out of 100) measures the adoption of 19 actions individuals can take to improve water quality and environmental health. Volunteering (which measured 23 out of 100) measures the portion of the public participating in community efforts to improve water quality and environmental health. Advocating (which measured 19 out of 100) measures the portion of the public engaging in local and regional activities on behalf of water quality and environmental health.

Student Meaningful Watershed Educational Experiences (MWEEs): In 2017, at least one-third of the Chesapeake Bay watershed's public-school students were enrolled in a district providing system-wide MWEEs. Seventy-two percent of surveyed school districts reported providing MWEEs to at least some of their elementary school students; 77 percent reported providing MWEEs to at least some of their middle school students; and 82 percent reported providing MWEEs to at least some of their high school students.

Sustainable Schools: At least 14 percent of public and charter school in the Chesapeake Bay watershed were certified sustainable as of 2017. Certified sustainable schools include public and charter schools with the watershed that have been recognized as sustainable by the following programs: U.S. Green Ribbon Schools, National Wildlife Federation Eco-Schools USA, Maryland Green Schools, Pennsylvania Pathways to Green Schools and Virginia Naturally Schools.

Pollution Trends: Practices are in place to achieve 87 percent of the phosphorus reductions, 67 percent of the sediment reductions and 40 percent of the nitrogen reductions needed to reach clean water standards as compared to 2009, the year prior to the establishment of the Bay TMDL.

Underwater Grasses: In 2017, underwater grass abundance reached 57 percent of our ultimate restoration goal and highest amount ever recorded—104,843 acres—by the annual aerial survey. This is 14,483 acres greater than the 2017 restoration target.

Water Quality: During the 2014 to 2016 assessment period, 40 percent of the Chesapeake Bay and its tidal tributaries met water quality standards: the highest estimate of water quality standards attainment since 1985.

The data and information that support our indicators are drawn from a range of trusted sources, including government agencies, academic institutions, nongovernmental organizations and direct demographic and behavior surveys. In some cases, this data and information dates back three decades, and in others, data collection began shortly before the Watershed Agreement was signed.

How We Work

Using indicators to take a high-level look at our progress is a critical piece of the Biennial Strategy Review System (SRS). Implemented in 2017, the Chesapeake Bay Program's Biennial Strategy Review System (SRS) is a two-year adaptive management process as called for in the Watershed Agreement. It is based on the Adaptive Management Decision Framework as approved by the Principal's Staff Committee and is designed to improve our effectiveness in achieving the goals and outcomes of the Watershed Agreement. The SRS began with a two-day Biennial Review meeting in February 2017 designed to provide a broad review of where and why we have made progress, and identify issues and developments in the scientific, fiscal and policy fields that could impact goal and outcome achievement.

Since May of 2017, the Management Board has held five of the seven quarterly progress meetings in an SRS cycle. During these meetings, the partnership reviews progress toward individual outcomes, identifies lessons learned, applies new opportunities and understandings, and implements needed changes to management approaches and/or actions. Following these quarterly progress meetings, workgroups and teams draft changes to work plans and Management Strategies based on thoughtful analysis and Management Board input.

As of July 12, 2018, almost half of the outcomes in the Watershed Agreement have updated their work plans and are working towards revising their Management Strategies to reflect new direction and understanding. Most groups noted their reliance on the continued collection and analysis of data used to make decisions within their group and within the broader partnership. Coordination and increased understanding between existing partners, and the broadening of the partnership as a whole, will be critical to future success for many outcomes. The remaining quarterly progress meetings will take place in August and November 2018 to complete the first cycle, and by the next meeting of the Executive Council will include a fuller review of this first cycle. The next two-year cycle will begin in May 2019. The partnership created an SRS Planning Team under the Enhancing Leadership, Partnership and Management Goal Implementation Team to facilitate the implementation of the SRS and assist workgroups throughout the process.

Acknowledge Challenges

Despite these encouraging signs of resiliency, challenges remain for the restoration of the Chesapeake Bay, including knowledge and support among lawmakers, landowners, local government officials and members of the public; the alignment of goals, priorities and resources among Chesapeake Bay Program partners; and the availability of funding.

The Bay TMDL, established by the Environmental Protection Agency (EPA) in 2010, called for an assessment in 2017 to review the progress that the seven watershed jurisdictions have made to reduce the amount of nutrients and sediment flowing into the Chesapeake Bay and local rivers and streams. The midpoint assessment looked at the jurisdictions final 2016-2017 milestones and 2017 progress data to determine if practices were in place to achieve 60 percent of the necessary pollution reductions. While the partnership exceeded its halfway goal for reducing phosphorus and sediment, it fell short for nitrogen. Practices are currently in place to achieve 40 percent of the nitrogen reductions, 87 percent of the phosphorus reductions, 67 percent of the sediment and 40 percent of nitrogen reductions necessary to attain water quality standards.

The midpoint assessment was a chance for the EPA and the Chesapeake Bay Program to step back and assess how the Bay TMDL and Watershed Implementation Plans (WIPs) are making a difference in Bay restoration, if they are working as intended and if there is a better way to implement priorities and achieve local water quality as well as Bay restoration goals.

With the midpoint assessment and two-year milestone evaluations, many of the challenges identified by the Chesapeake Bay Program for this year center around water quality. After the first full SRS cycle concludes at the end of this year, next year’s will focus on implementation of the other goals and outcomes of the Watershed Agreement.

The midpoint assessment identified two areas in which the implementation of conservation practices will need to accelerate in order to have 100 percent of pollution-reducing practices in place by 2025.

Agriculture: The U.S. Department of Agriculture Natural Resources Conservation Service estimates that there are more than 83,000 farms throughout the Chesapeake Bay watershed, comprising more than 30 percent of the region. Unfortunately, some agricultural practices can push pollution into the Bay and its waterways.

Urban/Suburban: Precipitation in an urban or suburban area that does not evaporate or soak into the ground but instead runs across the land and into the nearest waterway is considered stormwater runoff. Increased development across the watershed has made stormwater runoff the fastest growing source of pollution to the Chesapeake Bay. It can erode stream banks, lead to flooding and push excess nutrients, sediment and chemical contaminants into waterways.

Challenges to Bay restoration are not just limited to pollution from source sectors. Development, population growth, man-made structures such as the Conowingo Dam and the increasing threat of climate change all play a different role in their impact of the Chesapeake Bay.

Conowingo Dam: Located on the lower Susquehanna River in Maryland, the Conowingo Dam has long captured sediment flowing downstream, but because the reservoir behind the dam is essentially full, it is now only trapping sediment in the short term. During large storms and severe floods, the fast-moving water flow scoops up the sediment and attached nutrients stored within the reservoir and carries it over the dam and into the Chesapeake Bay.

Climate change: Over the past century, the waters of the Chesapeake Bay have risen about one foot and the temperature has increased about 1.2 degrees Fahrenheit. Increased rainfall and higher stream and air temperatures can impact plants, animals, human health and the economy. Adapting to these changes will mean adjusting our policies as well as our protection and restoration efforts.

Population growth: Thanks to a strong economy, diverse communities and rich natural and historic resources, more than 18 million people currently reside in the Chesapeake Bay watershed. However, each one of these people consume natural resources, pollute the land, water and air, and alter the landscape to best fit our needs. Since 1950, the human population of the watershed has more than doubled, and experts believe the number will reach 20 million by 2030.

Move Forward

Our partners are working hard to develop collaborative and innovative solutions for addressing the trapping capacity of the Conowingo Dam, accounting for the increasing watershed population and the threats of climate change. For example, Chesapeake Bay Program jurisdictions are also in the process of developing and will implement a separate WIP for Conowingo Dam with oversight by EPA. But other entities are deeply involved as well—from watershed organizations to local governments, people are engaged in what they can do to help combat the flow of nutrients and sediments into their local waterways.

The jurisdictions develop WIPs to help them determine how they will meet their pollution reduction goals. Phase I WIPs were developed in 2010 and Phase II in 2012. The results of the midpoint assessment

will help inform the next iteration of WIPs, Phase III, which will guide the jurisdictions and their local partners and stakeholders on what actions and controls they will need to take and put in place to meet their pollution reduction goals by 2025.

These updated plans, along with the most current science and data, and the actions taken by watershed residents, will all play a role in how the next chapter of Bay restoration is written.

New modeling tools: The Chesapeake Bay Program has developed a brand-new suite of modeling tools for jurisdictions and local partners to use in drafting and implementing their Phase III WIPs and two-year milestones through 2025. The new suite has a more simplified structure than the previous version and includes improved nutrient data, cutting edge high-resolution land cover data and new and improved information about the efficiencies of pollution reducing conservation practices.

Co-benefits: The Chesapeake Bay Program continues to foster a culture of collaboration and advocates for work that crosses organizational boundaries. Teams within the Bay Program continue to explore the opportunity to maximize the co-benefits of restoration and conservation work and to quantify ecosystem services. Jurisdictions are encouraged to build co-benefits into their Phase III WIPs to help meet their pollution reduction targets, improve the local waterways in their communities and meet additional restoration goals under the Watershed Agreement.

Next-generation stewards: The well-being of the watershed will soon rest in the hands of its youngest citizens. Strong, targeted environmental education programs can give students the skills they need to protect and restore their local watersheds. The Education Workgroup will continue to direct and support the systemic implementation of environmental literacy throughout the watershed, as well as advocate for encouraged collaboration between State Superintendents of Education and conservation and environmental agencies.

Promoting a culture of diversity and environmental stewards: The Chesapeake Bay Program will continue efforts to increase people of color both in the Bay Program and among its leadership. After adopting for the very first time a goal to increase diversity, the Bay Program now strives to meet a higher goal to be more reflective of the watershed it represents. The Chesapeake Bay Program will also continue to promote stewardship actions to empower residents to help enhance the health of their local watersheds.

Local action: Local governments play a critical role in the work of restoring and protecting the Chesapeake Bay watershed. Work continues to ensure local governments and local elected officials are engaged, informed and knowledgeable with watershed issues and the capacity to implement restoration and protection initiatives. Work is underway to develop a methodology for measuring our work to increase the knowledge and capacity of local officials on issues related to water resources and the implementation of incentives that will support local conservation.

The Chesapeake Bay Program celebrates the vibrancy and resiliency of the Chesapeake Bay watershed but continues to be mindful and address the challenges of the ecosystem. Efforts to engage localities, residents and students will help ensure a sustainable future for the Chesapeake Bay region. Through efforts like the Biennial Strategy Review System and the Phase III WIPs, jurisdictions and the Bay Program will continue to build a collaborative culture to protect this national treasure.

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