REPORT OF THE SECRETARY OF NATURAL AND HISTORIC RESOURCES

FY 2022 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 APPROPRIATIONS; AND THE HOUSE COMMITTEE ON APPROPRIATIONS

COMMONWEALTH OF VIRGINIA
RICHMOND

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 and Historic 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*. The 2022 report includes the "*Water Quality Improvement Fund Requests Estimate Report"* required by § 10.1-2134.1 of the *Code of Virginia* and the "*Stormwater Local Assistance Fund Requests Estimates Report*" required by § 62.1-44.15:29.2 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 2022 as required in § 2.2-220.1. This consolidated report also addresses Item 361.A. in the 2018 Special Session I Budget for fiscal year (FY) 2021 and FY 2022 in Chapter 2.

Water Quality Improvement Fund and Cooperative Nonpoint Source Pollution Programs

For FY 2022 (the period July 1, 2021 – June 30, 2022), the Virginia Soil and Water Conservation Board allocated $73.8 million in agricultural cost-share and $9.75 million in technical assistance funds to Soil and Water Conservation Districts. An additional $500,000 in Conservation Reserve Enhancement Program (CREP) cost-share funds were available for disbursement to Districts as state match for new projects. Practices installed on farms during FY 2022 will result in estimated edge of field nitrogen reductions of approximately 11.3 million pounds, phosphorus reductions of approximately 4.1 million pounds, and sediment reductions of approximately 847,000 tons.

Under the Water Quality Improvement Fund (WQIF) Point Source Program, since 2006, 71 point source WQIF grant agreements obligating $887 million have been signed. The construction project grants range from 35% to 95% cost-share for design and installation of nutrient reduction technology at Chesapeake 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-six of the projects have been completed and are operational. For calendar year 2021, 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 currently in effect for all Chesapeake Bay tributary basins. Tables of discharged and delivered loads for each individual facility and basin totals are available online from DEQ.

With nonpoint source funding made available through the WQIF, along with matching funds, DEQ has worked with local government and state agency partners to implement a wide range of actions to reduce nonpoint source pollution that contributes to water quality problems.

Although there has been no additional WQIF Nonpoint Source Program funding since 2016, implementation activities continue under a Request for Assistance (RFA) made available to local government (cities, towns, counties, Soil and Water Conservation Districts, and Planning District Commissions) and state agency applicants. DEQ continues to manage projects awarded through the $3.4 million RFA. These nonpoint source (NPS) pollution implementation projects are at various stages of completion.

Within the Chesapeake Bay watershed, projects that maximize reduction of nitrogen, phosphorous or sediment were a funding priority. Projects with the highest pollution reduction relative to dollars requested were given priority. These projects implement pollution control actions that will have a significant and lasting impact on local and state water quality. Overall, pollution reductions are expected to be in line with original reduction estimates.

Funding Needs for Effective Implementation of Agricultural Best Management Practices

The funding projections for the effective implementation of best management plans were determined using a revised formula for FY 2020, and will be updated for inflation in FY 2023 and future years. These projections for the Chesapeake Bay were developed based on a detailed analysis of practices identified in the Chesapeake Bay Phase III Watershed Implementation Plan (WIP). This included a review of progress made in implementing the WIP through 2019 and assumes the practices included in the WIP are implemented.

A FY 2022 estimate of $2.6 billion may be required from state and federal funds as well as farmer financial contributions to meet water quality goals. Approximately 40% of this total ($1.1 billion) 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 2022 allocations from state sources for implementation of agricultural best management practices (BMPs) had the following breakdown:

FY 2022 (Program Name – amount):

VACS Cost-Share program funding - $73.8 million

District Technical Assistance - $9.75 million

District Financial Assistance - $7.1 million

FY 2022 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 BMPs through FY 2020-2030 are estimated in the 2022 Ag Needs Assessment Table on page 22. A comprehensive review of the VACS Program that began in 2019 has led to improved program efficiency, increased flexibility in agricultural practice standards and specifications, and other significant programmatic revisions. Additional efforts are focused on methods to improve tracking of voluntarily installed practices and bundling several practices into one VACS application.

Chesapeake Bay and Virginia Waters Clean-Up Plan Report

During FY 2022, 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 BMPs with a continuing focus on livestock exclusion practices, the reissuance of administratively continued Phase 1 Municipal Separate Storm Sewer System (MS4) permits, and implementing revised Stormwater Management Regulations. Virginia agencies submitted close-out reports for the 2020-2021 WIP milestones period and finalized 2022-2023 WIP milestones.

In FY 2022, DEQ developed 16 Total Maximum Daily Load (TMDL) equations for small watersheds and completed two Implementation Plans covering 28 waterbody impairments. BMP data reported by the NPS program is delayed by one fiscal year due to the limited availability of BMP data at the time of the Clean-Up Plan reporting deadline. In FY 2021, a total of 223 small TMDL Implementation Watersheds saw BMP activity resulting in a total of 3,211 BMPs installed using over $80 million of Federal and State funds as well as 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, state agencies, 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 (BMPs) 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 (SWCDs or 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 Department of Forestry and the Department of Mines, Minerals and Energy (since renamed the Department of 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 Chesapeake Bay Total Maximum Daily Load (TMDL) Watershed Implementation Plans (WIP) developed by the Commonwealth and evaluated by the U.S. Environmental Protection Agency (EPA). The Chesapeake Bay Watershed

Agreement, signed in 2014, renewed the commitments made in the 2010 TMDL to, "By 2025, have all practices and controls installed to achieve the Bay's dissolved oxygen, water clarity/submerged aquatic vegetation and chlorophyll-*a* standards as articulated in the Chesapeake Bay TMDL document."

For watersheds outside of the Chesapeake Bay watershed, 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. DEQ is 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 BMPs 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 SWCDs 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 2022 was approximately $90.7 million.

Conservation Reserve Enhancement Program

WQIF and VNRCF funds support Virginia's commitment for participation in the U.S. Department of Agriculture's (USDA) CREP. Under the USDA-administered CREP, 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 the 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. However, additional funding for the state match has been appropriated during the biennium and the state match for CREP was increased to 35% effective as of July 1, 2019. State CREP match will increase to 50% in FY 2023.

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, SWCDs, Planning District Commissions (PDCs), 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.

2022 WQIF & VNRCF Nonpoint Source Program Funds

Agricultural Cost-Share Allocations

DCR's emphasis for agricultural BMP implementation focuses on efficient nutrient and sediment reduction and includes priority practices such as cover crops, conservation tillage, nutrient management, livestock exclusion from streams, the establishment of vegetative riparian buffers, and animal waste facilities. Historical, annual cost-share totals are summarized below (Table 1).

Annual state cost-share allocations are based upon the Agricultural Nonpoint Source Assessment and VSWCB 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.

Table 1: 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	$15,919,568.08	$7,899,817.01	$6,526,498.00	$1,373,319.01	$2,572,224.08	$5,447,526.99	$810,499.22
2002	$23,091,963.14	$8,341,729.11	$6,578,518.07	$1,763,211.04	$6,506,805.74	$8,243,428.29	$889,771.88
2003	$13,732,546.23	$3,197,822.34	$2,364,969.91	$832,852.43	$4,936,562.95	$5,598,160.94	$985,532.19
2004	$10,016,920.07	$2,771,069.24	$2,391,617.08	$379,452.16	$3,333,439.92	$3,912,410.91	$535,905.53
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	$19,319,573.82	$9,608,506.54	$8,866,687.43	$741,819.11	$2,837,266.06	$6,873,801.22	$856,540.66
2007	$24,533,967.91	$15,236,795.29	$14,198,592.16	$1,038,203.13	$3,524,256.32	$5,772,916.30	$935,415.38
2008	$24,452,862.62	$13,907,309.86	$12,867,038.10	$1,040,271.76	$3,154,319.66	$7,391,233.10	$1,060,397.79
2009	$31,350,056.35	$16,068,967.68	$15,211,981.85	$856,985.83	$5,893,277.13	$9,387,811.54	$1,327,632.62
2010	$36,830,652.05	$23,303,023.96	$22,338,647.13	$964,376.83	$4,448,722.71	$9,078,905.38	$1,433,947.46
2011	$17,775,578.95	$10,723,665.36	$10,275,734.34	$447,931.02	$1,933,530.72	$5,118,382.87	$974,444.39
2012	$32,201,441.80	$21,515,125.78	$21,304,282.41	$210,843.37	$2,834,009.50	$7,852,306.52	$1,387,328.32
2013	$36,822,386.74	$27,981,522.17	$27,678,172.36	$303,349.81	$3,990,091.06	$4,850,773.51	$1,072,903.48
2014	$39,720,443.49	$30,695,494.96	$28,676,566.52	$2,018,928.44	$3,975,330.01	$5,049,618.52	$971,193.35
2015*	$93,727,830.41	$66,673,004.24	$62,650,658.87	$4,022,345.37	$6,116,998.46	$20,937,827.71	$1,074,160.11
2016	$17,063,545.42	$10,277,328.02	$9,911,445.76	$365,882.26	$1,081,809.23	$5,704,408.17	$885,890.75
2017	$27,651,159.07	$18,269,937.08	$17,679,614.12	$590,322.96	$2,585,045.91	$6,796,176.08	$847,279.04
2018	$30,481,086.41	$16,960,678.17	$14,449,557.48	$2,511,120.69	$4,260,207.54	$9,260,200.70	$1,711,166.20
2019	$25,674,835.40	$17,482,770.12	$16,506,493.52	$976,276.60	$1,973,249.51	$6,218,815.77	$961,867.09
2020	$48,644,175.88	$39,762,256.58	$38,691,978.40	$1,070,278.18	$2,211,481.63	$6,670,437.67	$690,950.66
2021	$48,518,006.69	$34,236,228.93	$31,799,384.22	$2,436,844.71	$1,056,808.29	$13,224,969.47	$478,891.33
2022*	$39,758,282.60	$34,552,218.81	$33,542,670.51	$1,009,548.30	$156,717.52	$5,049,346.27	$160,927.87
State Totals	$694,642,582.31	$450,600,535.37	$423,610,243.39	$26,990,291.98	$73,035,974.78	$171,006,072.16	$22,249,035.05

*2015 figures will be adjusted each year as SL-6(T) BMPs that were obligated under the 100% SL-6 funding programs are completed. Significant funding from FY 2016-2022 was transferred to FYs 2013, 2014, and 2015 to cover 100% SL-6s.

**2022 figures do not include approved BMPs carried forward into FY 2023 that are awaiting completion.

Conservation Reserve Enhancement Program

The Virginia CREP is divided into two regions. The Chesapeake Bay CREP targets Virginia's entire portion of the Chesapeake Bay watershed and is aiming to restore 22,000 acres of riparian buffers and filter strips and 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 2022 is provided in the following table (Table 2).

Table 2: CREP Summary FY 2001-2022 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	$331,743.07	1965.40	101.30
Chesapeake Bay	2005	$219,240.64	1130.50	77.93
Chesapeake Bay	2006	$237,156.47	1609.94	84.79
Chesapeake Bay	2007	$227,018.64	545.20	49.43
Chesapeake Bay	2008	$351,833.72	1468.04	94.66
Chesapeake Bay	2009	$467,225.79	1411.70	97.53
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	$437,166.55	131.84	21.65
Chesapeake Bay	2018	$124,649.53	71.53	14.88
Chesapeake Bay	2019	$35,274.75	13.16	2.92
Chesapeake Bay	2021	$9,363.05	5.59	1.60
Chesapeake Bay	2022*	$1,188.00	0.00	0.00
Chesapeake Bay Totals:		**$7,178,561.17**	**19,661.18**	**1,258.30**
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	$343,089.67	295.70	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	$244,332.22	151.80	28.69
Southern Rivers	2015	$314,990.14	228.10	28.78
Southern Rivers	2016	$670,504.24	225.90	30.29
Southern Rivers	2017	$624,115.05	247.81	31.41
Southern Rivers	2018	$247,877.41	87.58	19.60
Southern Rivers	2019	$100,550.01	64.84	5.95
Southern Rivers**	2020	$50,494.01	14.67	0.78

Southern Rivers	2021	$311,630.24	98.67	17.97
Southern Rivers	2022*	$125,011.42	44.81	3.96
Southern Rivers Totals:		**$7,446,871.30**	**16,770.28**	**1,473.22**
Statewide Totals:		**$14,625,432.47**	**36,431.46**	**2,731.52**

*Prior year figures are adjusted each year as CREP practices that were previously obligated are completed.
**Due to the delay in restarting the CREP, 2020 signups were significantly lower than previous years, including no signup in the Chesapeake Bay drainage.

Strategic Water Quality Initiatives

Resource Management Plans

The Commonwealth's Resource Management Plan (RMP) Program provides a voluntary way to promote the use of BMPs that improve water quality and agricultural operations. RMPs are designed to encourage producers to implement a high level of BMPs to reduce pollution and to increase the producer's profitability, in many instances. By participating in the RMP Program and fully implementing an RMP, the producer is considered to be in compliance with any new state nutrient, sediment and water quality standards for a period of nine years. As of June 30, 2022, 188 RMPs, including over 47,000 acres, have been certified as fully implemented. Additionally, 358 RMPs, including nearly 67,000 acres, are included in an RMP that is currently being implemented (*i.e.*, not yet certified). The certified RMPs within the Chesapeake Bay watershed include nearly 35,000 acres. Nearly 70,000 additional acres within the Chesapeake Bay watershed are included in an RMP that is currently being implemented. There are more than 2,200 acres outside of the Chesapeake Bay watershed that are certified and approximately 7,000 acres are included in an RMP that is currently being implemented. Many of the RMPs currently being developed or certified are incentivized through the direct pay initiative DCR began in FY 2021. This successful initiative does not require RMP developers to respond to a Request for Applications (RFA) but instead provides payment for RMP development on a first-come, first-served basis until available funding has been obligated.

Beginning in April 2021, and utilizing Most Effected Basin (MEB) funds provided by EPA, the Department incentivized RMP development and certification in identified basins, including the Bay portion of the Eastern Shore and Great Wicomoco in the Northern Neck. Twenty new RMPs have been written and certified as implemented through this special project, covering just over 6,000 acres. Engineered erosion projects will soon be completed in the Northern Neck, making an additional 800 acres eligible for RMP certification.

Livestock Stream Exclusion in Virginia

Through a sign up that ended June 30, 2015, DCR offered 100% grants for the SL-6 (Stream Exclusion with Grazing Land Management) practice to cost-share applicants. An SL-6 required the installation of a permanent fence, alternative watering systems, other features, and a minimum 35-foot vegetated buffer along streams. The Commonwealth provided nearly $92 million to agricultural producers to install 2,306 SL-6 practices under this initiative. Nearly $48 million of this total was provided to producers within Virginia’s Chesapeake Bay watershed. Pollution reduction towards year 2025 WIP goals resulting from

this initiative include approximately 5.5 million linear feet of stream bank protected and over 64,000 animal units in the Chesapeake Bay watershed excluded (statewide, the impact is over 9.3 million linear feet of stream bank protected and over 114,000 animal units excluded).

Starting in FY 2020, the VACS stream exclusion options were widely expanded, giving farmers a variety of cost-share options including continued funding for up to 100% of the practice cost based upon buffer width and contract lifespan (*i.e.*, 5 to 15 years). Wide width buffers greater than or equal to 35 feet also receive a per acre buffer payment to incentivize the most invaluable practices. The wide variety of options and buffer payment has led to increased farmer sign-ups. In FY 2022, a portable stream fencing practice became eligible for state cost share for the first time.

Whole Farm Approach Pilot Project

DCR, with approval from the VSWCB, developed a Whole Farm Approach (WFA) pilot project that began in 2019. This pilot allows a farmer to submit a single cost share application for a bundle of agricultural BMPs, including their choice of nutrient management, precision nutrient management, and cover crop practices; this significantly simplifies the process for the producer. This pilot has increased producer participation and provides information on all the BMPs implemented or installed on the agricultural operation, not just information on the BMPs funded by WFA. It has been successfully implemented in Essex, King and Queen, and King William counties and is now available in the Chesapeake Bay watershed portion of the Eastern Shore. In the upcoming year, DCR is working with additional SWCDs to further expand the WFA to areas outside of the Chesapeake Bay watershed as well as to animal operations.

Increased Tax Credit

Actions taken during the 2021 Special Session I (HB 1763 and SB 1162) both increased the tax credit amount a producer is eligible to claim for implementation or installing a BMP and created an enhanced tax credit for the implementation of agricultural BMPs that are part of an approved RMP. The credit allows for a 50% tax credit (up to a $50,000 cap) per entity for agricultural BMPs implemented on acreage included in a SWCD-approved RMP. For BMPs not included in an RMP, the producer is eligible to claim 25% (up to $25,000) of the total out-of-pocket expense of the implementation and installation of the BMP. The Virginia Department of Taxation administers an annual cap on these credits of $2 million (for all participants). This additional financial incentive may encourage more producers to implement RMPs on their operations.

Amendments to the Nutrient Management Training and Certification Regulations

On September 23, 2021, the VSWCB approved the initiation of a regulatory action to amend the Nutrient Management Training and Certification Regulations (4VAC50-85) to expand the options available to meet the educational requirements. As of April 1, 2022, an individual who successfully completes a two-year college degree program with a major in an agriculturally related area and one and one-half years of practical experience is eligible to be certified as a nutrient management planner, as long as the individual also passes the nutrient management certification exam administered by DCR. This amendment reflects the increased number of colleges offering two-year degrees in agricultural studies and the value of

practical in-field experiences. An additional amendment also clarifies that an individual who receives a four-year degree will only be required to complete one-year of practical experience in order to meet the education requirements for certification.

Additionally, this regulatory action should result in an increase in nutrient management planners. Expanding the number of certified nutrient management planners will enable planners to provide additional technical assistance to agricultural producers, state agencies, localities, institutions of higher education, and other entities that are required to develop and implement nutrient management plans.

Virginia Conservation Assistance Program

The Virginia Conservation Assistance Program (VCAP) was established to assist the Commonwealth in meeting its reduction targets for urban and residential areas as established in the Chesapeake Bay TMDL, including localities with Municipal Separate Storm Sewer Systems (MS4). Recognizing the importance of this Program, the Virginia General Assembly has provided $2.5 million in state funding for FY 2020 – FY 2022. VCAP provides cost-share and technical assistance to address natural resource and stormwater concerns by assisting in the voluntary installation of certain BMPs on land for which there is no other cost-share program assistance available. VCAP is also intended to retrofit existing infrastructure.

The Virginia Association of Soil and Water Conservation Districts (VASWCD) administers VCAP. Virginia's SWCDs, with qualified, trained, and experienced staff, implement the voluntary stormwater BMPs and cost-share program for public, private, and non-profit landowners. Since March 2016, $4,818,653.24 has been allocated through VCAP and $378,500 has been provided for technical assistance from a total of $6,949,905 in grant funding. Projects have been completed across a wide variety of properties, with the support of partner agencies, educators, and contractors. Most practices are eligible for 75% cost share and some practices provide a flat incentive payment up to the cost of installation.

WQIF Point Source Program

Since 1998, 71 point source WQIF grant agreements obligating $887 million have been signed. The construction project grants range from 35% to 95% cost-share for design and installation of nutrient reduction technology at Chesapeake 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-six of the projects have been completed and are operational.

Since its formation in 1998, the WQIF Point Source Program has received a total of $1.0595 billion 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 2020; authorization was given for up to $100 million in bonds to be issued to support point source nutrient reduction projects in the Chesapeake Bay watershed. Approximately $95.3 million of the $1.0595 billion 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 has been

completed with revised water quality criteria and assessment methods adopted by the State Water Control Board on June 27, 2019. EPA subsequently approved the new criteria and they became effective on January 6, 2020. A relatively small balance of WQIF funds remained after the James River Study ended and were targeted for the Virginia Institute of Marine Sciences (VIMS) for modeling work for the James River. The model has been used, with updated climate change factors, to evaluate point source nutrient reduction scenarios and chlorophyll criteria attainment and is the basis of revised wasteload allocations being considered for selected significant discharges in the James River basin.

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, 2022, the grant amount owed under existing, signed WQIF agreements was $94,931,590.

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.

Legislation enacted following the 2019 General Assembly session added the design and installation of certain wastewater conveyance infrastructure as an eligible project type for WQIF point source funding provided certain conditions established in the *Code of Virginia* are satisfied. DEQ drafted guidance for evaluating and implementing those projects with stakeholder input and provided the guidance for a 30-day public review period. No comments were received and the guidance became effective on August 15, 2021.

WQIF & Virginia Natural Resources Commitment Fund Nutrient Reductions

Estimated Nutrient Reductions from Nonpoint Source WQIF-Funded Projects

During FY 2022, WQIF and VNRCF funding supported agricultural BMPs that are expected to reduce edge of field nutrient and sediment losses by approximately 11.3 million pounds of nitrogen, 4.1 million pounds of phosphorus, and 847,000 tons of sediment (Table 3). 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.

Table 3: 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	2,311,310.44	449,146.30	430,344.62
2001	1,507,850.97	377,639.65	240,639.43
2002	1,650,827.23	363,688.41	282,922.84
2003	1,156,889.80	269,886.84	185,871.04
2004	532,847.28	107,035.77	98,090.74
2005	1,189,873.36	268,783.48	200,792.54
2006	1,998,416.01	436,765.32	354,761.76
2007	4,696,217.54	1,507,301.39	475,458.12
2008	6,102,885.63	1,654,395.74	833,953.66
2009	4,491,208.64	1,181,760.91	609,756.72
2010	6,705,604.41	2,033,814.38	756,961.95
2011	5,991,018.43	1,778,493.12	835,843.71
2012	9,558,935.57	2,904,184.63	1,300,011.03
2013	10,250,752.75	3,084,918.50	1,384,853.19
2014	7,647,439.40	2,612,812.01	718,091.95
2015*	9,486,949.88	3,348,574.61	764,510.33
2016	7,545,792.75	2,928,824.17	439,399.38
2017	10,952,241.30	3,752,927.86	933,180.77
2018	9,620,709.70	3,180,064.17	899,033.39
2019	10,537,146.46	3,692,491.34	853,229.23
2020	14,411,350.61	5,205,497.89	1,107,782.61
2021	11,132,308.93	4,028,307.72	811,462.06
2022**	11,354,470.48	4,147,168.97	846,648.91

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

**2022 figures do not include approved BMPs carried forward 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, 66 of the 71 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 Chesapeake Bay watershed have declined dramatically. From 2009 to 2021, annual nitrogen discharges were reduced by about 10,896,178 pounds; phosphorus annual loads were reduced by almost 694,602 pounds, exceeding the milestone commitments set in Virginia's WIP for both nutrients. Because of these ongoing nutrient control upgrades and facilities operating below their design capacity, point source loads continue to be below the allocations called for in the WIP and TMDL.

Chapter 2 – Water Quality Improvement Fund Requests Estimates Report

The Water Quality Improvement Fund (WQIF) is a special permanent, nonreverting fund established to provide Water Quality Improvement Grants in accordance with the provisions of the Virginia Water Quality Improvement Act of 1997. In accordance with § 10.1-2134.1 of the *Code of Virginia* the Department of Environmental Quality (DEQ), in consultation with stakeholders, including representatives of the Virginia Association of Municipal Wastewater Agencies (VAMWA), local governments, and conservation organizations, is required to annually determine an estimate of the amount of Water Quality Improvement grant funding expected to be requested by local governments for projects that are related to point source pollution and are eligible for grant funding. For FYs 2023 to 2027, an estimate of $896 million may be required from state funds as well as locality financial contributions to meet water quality goals. Approximately 60% of this total ($559 million) could be needed from the WQIF.

In addition to the WQIF funding needs reported in this year's needs assessment, it is important to note the current state of the fund (Table 1). The unobligated WQIF fund balance totals approximately $63 million. There are six active grant agreements and eleven funding applications under evaluation. Based on the significant increase in infrastructure construction costs over the past year, it is estimated that an additional amount of $108 million will be needed to fully fund the six active grant agreements. The estimated grant amount for the eleven WQIF grant applications currently under evaluation totals $149 million.

Table 1: Current WQIF Account Balance

Unobligated WQIF balance	$63 million
Estimated Active WQIF Grant Additional Obligations	$108 million
Estimated WQIF Application Additional Obligations	$149 million
Current Estimated WQIF Shortfall	**$194 million**

Unless additional funds are appropriated to fund WQIF point source projects, the estimated shortfall for FY 2023 is $194 million. Utilizing the WQIF funding needs reported in this year's needs assessment, the estimated shortfall for FY 2024 through FY 2027 totals $385 million, bringing the combined estimated shortfall for WQIF point source projects for FY 2023 through FY2027 to $579 million.

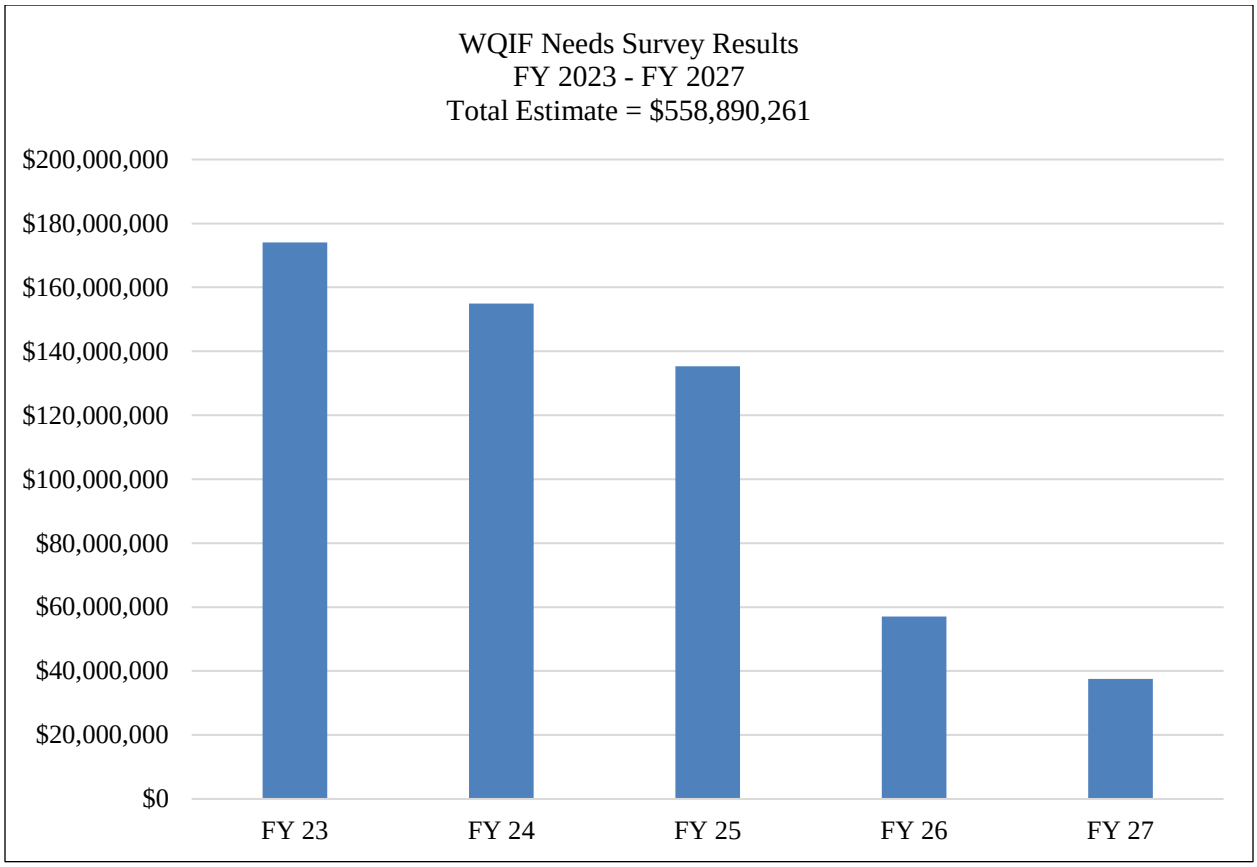

Figure 1: WQIF Needs Survey Results (FY 2023 – FY 2027)

The methodology for estimating the amount of WQIF grant funding expected to be requested by local governments was established by DEQ in consultation with wastewater stakeholders from VAMWA. An electronic survey was created in consultation with stakeholders and distributed to significant dischargers in the Chesapeake Bay watershed. The survey requested: 1) general information, 2) programmatic information, and 3) total project cost with no time horizon. General information included facility name and contact information. Programmatic information was requested on future WQIF funding needs over a five year time horizon (FY 2023 to FY 2027). This timeframe was selected because it generally aligns with the time horizons of typical Capital Improvement Plans (CIP). Total estimated project costs were also requested with no specified time horizon. This amount is assumed to include costs needed for the entire project beyond FY 2027. The survey format will remain consistent for next year to allow for multi-year comparisons, with updated questions relating overall need to new regulatory changes.

A total of 23 survey responses from ten prospective grantees were received identifying a programmatic funding need over the five year time horizon and total project costs (Figure 1). Programmatic funding need amounts were then multiplied by the estimated eligible grant percentage for each survey respondent to determine the WQIF eligible funding need. The grant percentage from the previous WQIF grant for each locality was utilized for the calculation. Total estimated project costs were also multiplied by the estimated eligible grant percentage for each locality to determine the total WQIF eligible funding need.

The eligible project costs for those anticipating to request WQIF funds totals $895,847,125 through FY 2027. Based on the estimated eligible grant percentage for each respondent, the amount of programmatic WQIF point source funding needed through FY 2027 is $558,890,261 (Table 2). The following is a breakdown of WQIF point source funding need by fiscal year:

FY 2023 – $174,072,949
FY 2024 – $154,947,155
FY 2025 – $135,276,789
FY 2026 – $57,043,451
FY 2027 – $37,549,917

These amounts include estimated WQIF funding needed for facilities to complete projects necessary to meet permit limits under the Enhanced Nutrient Removal Certainty (ENRC) Program established in § 62.1-44.19:14 of the *Code of Virginia* (2021 Special Session I Va. Acts Chs. 363 and 364 and amended by 2022 Session Va. Acts Chs. 127 and 128). WQIF funding needs identified for ENRC Program projects total $519,584,453 through FY 2027.

Table 2: 2022 WQIF Needs Survey Results

2023-2024 Biennium		2025-2026 Biennium		2027	Total Need
FY 2023	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**2023 - 2027**
$174,072,949	$154,947,155	$135,276,789	$57,043,451	$37,549,917	$558,890,261
$329,020,104		**$192,320,240**		**$37,549,917**	**$558,890,261**

The total estimated project costs identified by survey respondents both within and beyond the FY 2023 to FY 2027 time horizon total $2,198,740,425 (Table 3). Of that total, the amount of WQIF eligible project costs is estimated to be $912,959,847. Based on the estimated eligible grant percentage for each survey respondent, the amount of WQIF point source funding needed with no specified time horizon totals $566,677,914. The portion of WQIF point source funding needed for ENRC Program projects with no specified time horizon totals $514,219,103.

Table 3: 2022 WQIF Needs Survey Results - Total Project Costs (no time horizon)

Estimated Total Project Costs	WQIF Eligible Project Costs	Estimated Eligible Grant Amount
$2,198,740,425	$912,959,847	$566,677,914

Chapter 3 – Stormwater Local Assistance Fund (SLAF) Requests Estimates Report

The purpose of the Stormwater Local Assistance Fund (SLAF) is to provide matching grants to local governments for the planning, design, and implementation of stormwater best management practices (BMPs). In accordance with § 62.1-44.15:29.2 of the *Code of Virginia*, DEQ, in consultation with stakeholders, including representatives of the Virginia Municipal Stormwater Association (VAMSA), local governments, and conservation organizations, is required to annually determine an estimate of the amount of stormwater local assistance matching grants expected to be requested by local governments for projects that are related to planning, designing, and implementing stormwater BMPs that are eligible for funding from the SLAF. For FYs 2023 to 2027, it is estimated that $200 million could be requested from the SLAF program (Figure 1). Because the SLAF is a matching grant program, this total represents up to 50% of the total funds expended on stormwater BMPs, with the other portion being made up by financial contributions from localities.

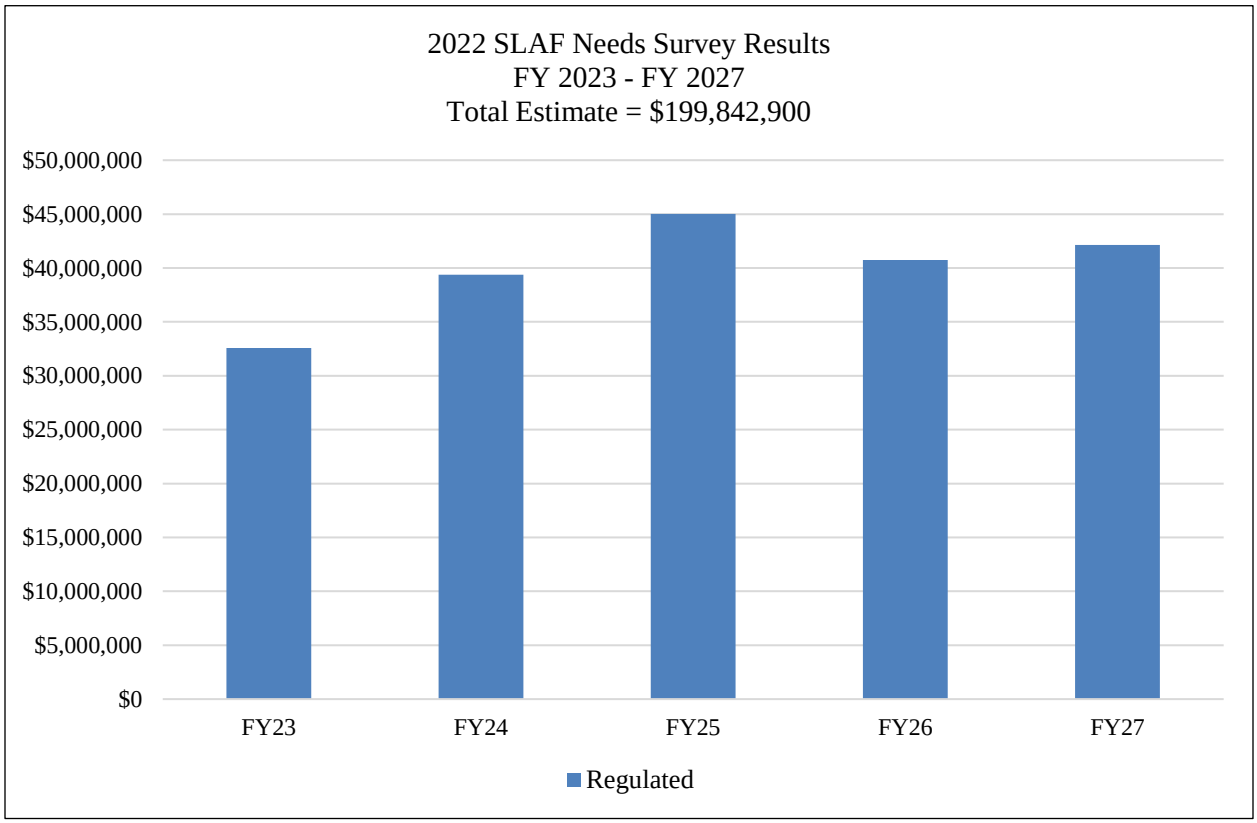

Figure 1: 2022 SLAF Needs Survey Results (FY 2023 – FY 2027)

The methodology for estimating the amount of stormwater local assistance matching grants expected to be requested by local governments was established by DEQ in consultation with stormwater stakeholders, including VAMSA, Virginia Municipal League (VML), Virginia Association of Counties (VACO), Chesapeake Bay Foundation (CBF), Northern Virginia Regional Commission (NVRC), Hampton Roads Planning District Commission (HRPDC) and the James River Association (JRA). An electronic survey

was created in consultation with these stakeholders and distributed to localities. The survey requested: 1) general, 2) programmatic, and 3) project specific information from localities. General information included the locality name and contact information. Programmatic information was requested on future SLAF funding needs over a five year time horizon (FY 2023 to FY 2027). This timeframe was selected because it generally aligns with the time horizons of typical local Capital Improvement Plans (CIP) and Municipal Separate Storm Sewer System (MS4) Permit TMDL Action Plans. Project specific information supporting the FY 2023 SLAF funding need was requested based on the assumption that planning or design information would be available for projects that are likely to be the subject of an FY 2023 SLAF grant application.

A total of 19 complete responses to the survey were received. All 19 localities identified a programmatic funding need over the five year time horizon. Responses from 15 of those localities identified project specific funding needs for FY 2023. Of the survey respondents that identified a programmatic need, all are regulated as MS4s.

The total amount of SLAF funding needed through FY 2027 to fully fund all needs identified in the survey is $199,842,900 (Table 1). The following is a breakdown of funding need by fiscal year:

FY 2023 – $32,576,240
FY 2024 – $39,377,035
FY 2025 – $45,021,125
FY 2026 – $40,746,500
FY 2027 – $42,122,000

Table 1: 2021 SLAF Needs Survey Results

Applicant	2023-2024 Biennium		2025-2026 Biennium		FY 2027	Total Need
	FY 2023*	FY 2024	FY 2025	FY 2026	FY 2027	
Regulated	$32,576,240	$39,377,035	$45,021,125	$40,746,500	$42,122,000	$199,842,900
Unregulated	$0	$0	$0	$0	$0	$0
FY Totals	$32,576,240	$39,377,035	$45,021,125	$40,746,500	$42,122,000	$199,842,900
TOTALS	**$71,953,275**		**$85,767,625**		**$42,122,000**	**$199,842,900**

* Need amount for FY23 was taken from FY23 programmatic data.

For the FY 2023 funding need, four localities either did not provide project specific data or provided programmatic and project specific data that were inconsistent. The total funding need of regulated localities for FY 2023, when calculated based on the FY 2023 input in the project specific section, is $29,576,240. Using programmatic data, the total FY 2023 need is $32,576,240. Because the programmatic data for regulated localities represents the most complete data set, this figure was used to determine the anticipated total need for FY 2023 of $32,576,240.

The survey format will remain consistent for next year to allow for multi-year comparisons, with updated questions relating overall need to new regulatory changes.

Chapter 4 - 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 (SWCDs or Districts), determines the funding needs for effective SWCD technical assistance and implementation of agricultural best management practices (BMPs). 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 Fiscal Years (FY) 2022-2030 a revised estimate of nearly $2.9 billion may be required from state and federal funds as well as farmer financial contributions to meet water quality goals (Figure 1 and Table 1). Approximately 44% of this total (nearly $1.3 billion) 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 SWCDs that implement the VACS program.

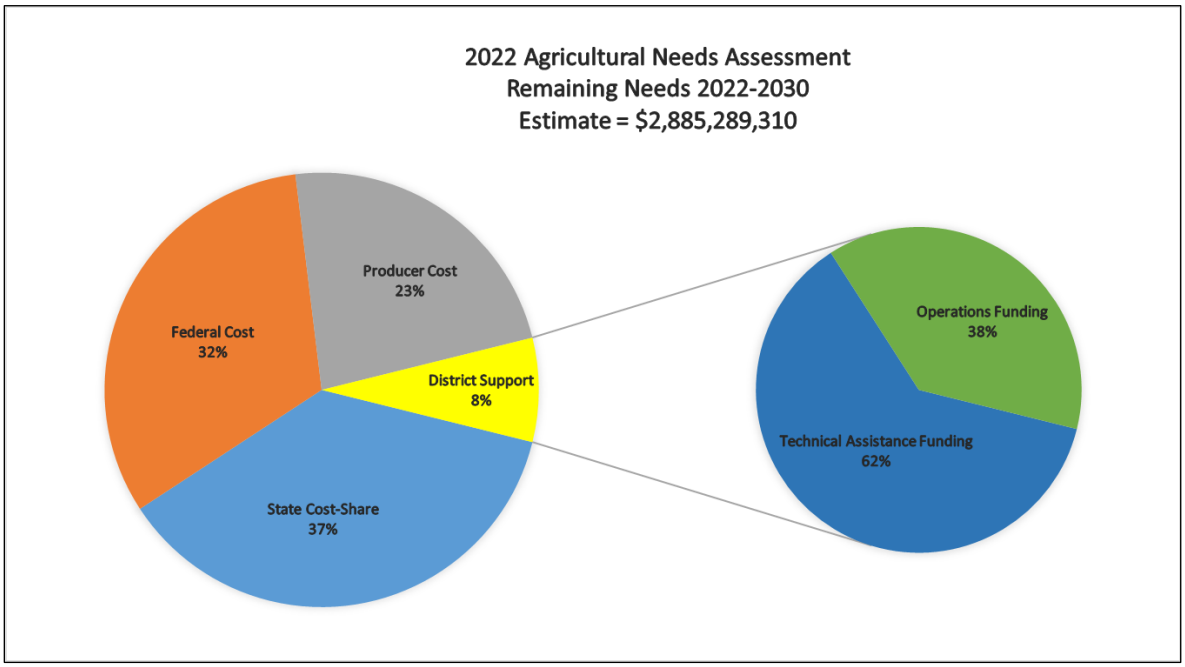

Figure 1: 2022 Agricultural Needs Assessment Summary[1]

Virginia's Phase 3 Chesapeake Bay Total Maximum Daily Load (TMDL) Watershed Implementation Plan (WIP III) was finalized on August 23, 2019. It includes projections through 2025 for BMPs. The methodology for the Agricultural Needs Assessment was revised in 2019 to accurately reflect the commitments made by Virginia in WIP III. Although Virginia made excellent progress towards the 2025

[1]The pie chart reflects progress made against the WIP commitment from FY2021

nutrient reduction goals as of the FY 2021 progress report, a significant increase in agricultural BMP implementation is needed, most notably for nutrient management on cropland, cover crops, animal waste storage, poultry litter transport, conservation planning, including Resource Management Plans, both grass and forested riparian buffers, and additional livestock stream exclusion. Using BMP cost data from Virginia and where BMP data was lacking in Virginia, from the Chesapeake Bay Program (CBP), the following table shows the revised funding needs for agricultural BMP implementation. These funding needs are based on Commonwealth-specific estimated costs and Commonwealth-specific BMP standards and specifications.

For the Southern Rivers areas, the needs assessment is based on the Chesapeake Bay annual cost estimates and a revised split of 70% to the Chesapeake Bay watershed and 30% to lands outside of the Chesapeake Bay watershed (the Southern Rivers watershed). 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 revised 70/30 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.

The total annual implementation costs are then divided between the various funding sources: Federal (35% [assumed]), State (40%) and Agricultural Producer (25%). As planning for FY 2023 was underway, concerns were raised about historically high levels of inflation in 2022, which affected the costs of supplies and labor, and consequently the ability of producers to implement agricultural BMPs. DCR has been requested by stakeholders and the Virginia Soil and Water Conservation Board (VSWCB) to examine the impacts of inflation and to revise the Agricultural Needs Assessment if appropriate.

To address the impacts of inflation, the VSWCB significantly increased VACS Program cost-share rates for a number of practices for FY 2023. Accordingly, DCR revised the Agricultural Needs Assessment for FY 2022 – 2030, using the recently revised VACS Program cost-share payment rates. DCR used the implementation progress made by Virginia through FY 2021, which has been accepted by EPA's CBP, to calculate the additional practices needed to fulfill the WIP III Agricultural BMPs and achieve the expected reductions for the agricultural sector.

Costs through June 2021 were not adjusted; however, estimated costs for all remaining agricultural practices needed through FY 2030 were revised as follows:

- The agricultural BMP implementation "delta" between CBP approved FY 2021 progress and the WIP III Agricultural BMPs was determined.
- Remaining implementation costs for each BMP were divided equally among the four years left of the existing 2025 WIP completion timeline for annual practices and livestock stream exclusion practices. For all other structural practices, implementation was extended through 2030.
- Practices costs were calculated for all remaining implementation using 2020-2022 VACS average costs or the recently VSWCB approved increased practice rates where applicable with an additional 6% inflation adjustment.
- The actual FY 2022-2024 VACS Program funding received and actual federal 2020 and 2021 funding was documented.

FY 2022 CHESAPEAKE BAY AND VIRGINIA WATERS CLEAN-UP PLAN

Table 1: 2022 Agricultural Needs Assessment – Biennial Needs Summary with All Data

2022 Agricultural Needs Assessment - Biennial Needs Summary with All Data

Estimated Costs			2021-2022 Biennium		2023-2024 Biennium		2025 Target Year					Full WIP III Implementation
2019-2030	**FY19 Funding***	**FY20 Funding***	**FY 21 Funding***	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
CHESAPEAKE BAY STATE COST SHARE	**$14,384,534**	**$39,486,279**	**$26,466,959**	**$83,300,746**	**$87,703,694**	**$92,106,642**	**$96,509,590**	**$77,157,633**	**$77,157,633**	**$77,157,633**	**$77,157,633**	**$77,157,633**
CHESAPEAKE BAY TECHNICAL ASSISTANCE	**$2,141,348**	**$6,367,656**	**$3,883,068**	**$10,829,097**	**$11,401,480**	**$11,973,864**	**$12,546,247**	**$10,030,492**	**$10,030,492**	**$10,030,492**	**$10,030,492**	**$10,030,492**
CHESAPEAKE BAY PRODUCER PORTION				$52,062,966	$54,814,809	$57,566,651	$60,318,494	$48,223,521	$48,223,521	$48,223,521	$48,223,521	$48,223,521
CHESAPEAKE BAY FEDERAL PORTION	$15,960,273	$15,401,409	$20,641,081	$72,888,153	$76,740,732	$80,593,312	$84,445,892	$67,512,929	$67,512,929	$67,512,929	$67,512,929	$67,512,929
OCB STATE COST SHARE	**$9,613,603**	**$17,608,120**	**$12,697,099**	**$35,700,320**	**$37,587,298**	**$39,474,275**	**$41,361,253**	**$33,067,557**	**$33,067,557**	**$33,067,557**	**$33,067,557**	**$33,067,557**
OCB TECHNICAL ASSISTANCE	**$1,431,125**	**$2,890,794**	**$1,966,931**	**$4,641,042**	**$4,886,349**	**$5,131,656**	**$5,376,963**	**$4,298,782**	**$4,298,782**	**$4,298,782**	**$4,298,782**	**$4,298,782**
OCB PRODUCER PORTION				$22,312,700	$23,492,061	$24,671,422	$25,850,783	$20,667,223	$20,667,223	$20,667,223	$20,667,223	$20,667,223
OCB FEDERAL PORTION	$18,964,850	$19,008,462	$15,739,229	$31,237,780	$32,888,885	$34,539,991	$36,191,096	$28,934,112	$28,934,112	$28,934,112	$28,934,112	$28,934,112
SWCD OPERATIONS FUNDING	**$6,209,091**	**$6,209,091**	**$6,209,091**	**$6,209,091**	**$9,809,091**	**$9,809,091**	**$9,809,091**	**$9,809,091**	**$9,809,091**	**$9,809,091**	**$9,809,091**	**$9,809,091**
	* Actual state and federal funding in FFY19-21 has been updated.											
TOTALS	$68,704,824	$106,971,811	$87,603,458	$319,181,894	$339,324,399	$355,866,904	$372,409,409	$299,701,340	$299,701,340	$299,701,340	$299,701,340	$299,701,340
CS + TA STATE NEEDS	**$27,570,610**	**$66,352,849**	**$45,014,057**	**$134,471,204**	**$141,578,821**	**$148,686,437**	**$155,794,053**	**$124,554,465**	**$124,554,465**	**$124,554,465**	**$124,554,465**	**$124,554,465**

Chesapeake Bay Implementation Total Costs					
Cost of BMPs Needing Single Implementation	**$1,009,071,720**	**FY22…30**			
Total Cumulative Cost of Annual BMPs implemented	**$226,337,203**	**FY22…25**			
Annual Cost of 100% Annual BMPs implemented	**$73,095,356**	**FY26…30**			
		per year cost			
Stream Exclusion BMPs	**$ 290,279,363**	**FY22 - 27**	**$48,379,894**		
Animal Waste	**$ 621,615,788**	**FY22 - 27**	**$103,602,631**		
Cost of Other Non-Annual BMPs	**$97,176,568.63**	**FY22 - 27**	**$16,196,095**		

	FY22 VACS	**FY23 VACS**	**FY24 VACS**
	Actual	**Actual**	**Estimated**
Bay CS	**$48,860,000**	**$170,834,889**	**$6,090,000**
OCB CS	**$20,940,000**	**$73,214,953**	**$2,610,000**
Bay & OCB TA	**$9,750,000**	**$27,007,479**	**$5,850,000**
Total CS+TA	**$79,550,000**	**$271,057,321**	**$14,550,000**
Admin & OPS	**$6,209,091**	**$9,809,091**	**$9,809,091**

Includes VNRCF deposits and recordation revenue appropriation

NOTE: FY23 VNRCF deposit will be used for both FY23 and FY24

Revised state cost share and technical assistance (13% of CS) needs and federal funding need will be adjusted annually based on actual budgets and gaps.

OCB Implementation Total Costs	
2022 - 2030 using 70/30 split	**$798,652,326**

AG BMP FUNDING NEEDED TO MEET WIP III	**FY22**	**FY23**	**FY24**	**FY25**	**FY26**	**FY27**	**FY28**	**FY29**	**FY30**	
CHESAPEAKE BAY 1X BMP COST	**$168,178,620**	**$168,178,620**	**$168,178,620**	**$168,178,620**	**$119,798,726**	**$119,798,726**	**$119,798,726**	**$119,798,726**	**$119,798,726**	Bay Total Costs based on 2021 Progress and WIP III
CHESAPEAKE BAY ANNUAL BMP COST	**$40,073,245**	**$51,080,616**	**$62,087,986**	**$73,095,356**	**$73,095,356**	**$73,095,356**	**$73,095,356**	**$73,095,356**	**$73,095,356**	calculated in 2022
CHESAPEAKE BAY STATE SHARE 40%	$83,300,746	$87,703,694	$92,106,642	$96,509,590	$77,157,633	$77,157,633	$77,157,633	$77,157,633	$77,157,633	
CHESAPEAKE BAY PRODUCER PORTION 25%	$52,062,966	$54,814,809	$57,566,651	$60,318,494	$48,223,521	$48,223,521	$48,223,521	$48,223,521	$48,223,521	
CHESAPEAKE BAY FEDERAL PORTION 35%	$72,888,153	$76,740,732	$80,593,312	$84,445,892	$67,512,929	$67,512,929	$67,512,929	$67,512,929	$67,512,929	
TOTAL OCB BMP COST	**$89,250,799**	**$93,968,244**	**$98,685,688**	**$103,403,133**	**$82,668,892**	**$82,668,892**	**$82,668,892**	**$82,668,892**	**$82,668,892**	Total OCB cost based on 30%/70% WIP need calculated
OCB STATE SHARE 40%	$35,700,320	$37,587,298	$39,474,275	$41,361,253	$33,067,557	$33,067,557	$33,067,557	$33,067,557	$33,067,557	in 2022
OCB PRODUCER PORTION 25%	$22,312,700	$23,492,061	$24,671,422	$25,850,783	$20,667,223	$20,667,223	$20,667,223	$20,667,223	$20,667,223	
OCB FEDERAL PORTION 35%	$31,237,780	$32,888,885	$34,539,991	$36,191,096	$28,934,112	$28,934,112	$28,934,112	$28,934,112	$28,934,112	

Annual BMPs include cover crops, nutrient management, poultry litter transport

DCR has two Professional Engineers (PE) and two Engineering Specialists to assist SWCDs and farmers. The total cost related to providing these services is part of the DCR budget and therefore has been excluded from the revised agricultural needs assessment. A third Engineering Specialist will be hired in FY 2023.

A study committee established in 2012 and continued in 2013 supported the concept that a base "technical assistance funding" amount should be added to the administrative and operational funding support provided by the General Assembly and the total amount should be considered base funding. This base funding would include administrative and operational support including Directors' travel, resource management plan support, environmental education support, dam maintenance, and a baseline amount for technical assistance staff.

In 2017, a stakeholder advisory group was established pursuant to the Appropriation Act. The stakeholder group was charged with evaluating methods to stabilize the fluctuations in funding for agricultural BMPs. One of the recommendations of the stakeholder group was that the VACS program be maintained at a minimum $35 million baseline funding level. If the VACS Program received $35 million in funding, Districts would need a minimum of $4.55 million in technical assistance funding to provide adequate technical assistance to agricultural producers.

During the 2020 General Assembly, a base technical assistance amount of $4.55 million was provided to Districts as part of the Districts' reoccurring base budget. This budget action recognized consistent funding is necessary for Districts to adequately provide technical assistance to their agricultural producers. During the 2022 General Assembly Special Session 1, an additional $3.6 million in administration and operational funding was provided to SWCDs. These stable funds will allow Districts to hire additional employees, including administrative employees, provide appropriate training for employees, and address increased expenses related to the day-to-day operations.

Chapter 5 - 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 and Historic Resources to plan for the cleanup of the Chesapeake Bay and Virginia's waters designated as impaired by the U.S. Environmental Protection Agency (EPA). 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

2022 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 (WLAs) 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, January 1, 2017 and January 1, 2022. Upgrades implemented to date have reduced the annual point source nutrient load delivered to the Chesapeake Bay and tidal rivers by approximately 10.9 million pounds of nitrogen (54% reduction) and 695,000 pounds of phosphorus (51% reduction) compared to the 2009 loads.

The current Chesapeake Bay Watershed General Permit includes additional nutrient reductions for significant dischargers in the James River 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 75% of the statewide point source nitrogen loads and 79% of the statewide point source phosphorus loads in 2021.

Appendix X of the TMDL identified two phases of additional Total Nitrogen (TN) and Total Phosphorous (TP) reductions necessary in the James River Basin to meet the dissolved oxygen (DO) criteria. These reductions have been implemented in the last two phases of the Watershed General Permit and are currently incorporated in 9VAC25-820-80. It should be noted that through a combination of facility upgrades, over performance and flows remaining below design capacity, the Virginia point sources have met the DO-based WLAs in aggregate since 2012.

Appendix X to the TMDL also included a staged implementation strategy to give the Commonwealth time to identify what additional point source reductions would be necessary to meet water quality criteria for chlorophyll-*a* in the tidal portions of the James River Basin. DEQ took the opportunity provided by the staged implementation schedule to further evaluate and refine the existing chlorophyll-*a* criteria.

On September 20, 2018, the State Water Control Board gave approval for DEQ to go to public hearing and comment on amendments to the Water Quality Standards Regulation (9VAC25-260-310 (bb)),

addressing the numeric chlorophyll-*a* criteria applicable to the tidal James River. The proposed amendments were the outcome of a seven-year-long effort to update the regulation with best available science, evaluating the protectiveness of the current criteria and determining if revisions were appropriate, as well as modifying the methods used to assess criteria attainment. The new criteria and assessment method take into consideration the recommendations of a scientific advisory panel (SAP) and a regulatory advisory panel (RAP). The final chlorophyll criteria amendments were presented to the State Water Control Board for adoption at its June 27, 2019 meeting with additional text included, in response to comments received, to describe additional lines of evidence that would be examined to render an appropriate assessment determination for the aquatic life use if "back-to-back" seasonal mean exceedances were to occur. EPA subsequently approved the new James River numeric chlorophyll criteria and they became effective on January 6, 2020.

In addition, during the James River chlorophyll study an enhanced water quality model was developed to simulate chlorophyll concentrations in response to varying levels of point source nutrient reduction. Through the spring and into the early summer of 2020, the model was updated with adjusted climate change factors and a set of point source nutrient reduction scenarios were re-run to test chlorophyll criteria attainment. Results indicated that water quality conditions protective of the revised chlorophyll criteria can be attained with the point sources controlling total phosphorus to near state-of-the-art treatment levels. Numerous scenarios evaluating various levels of phosphorus reductions in the tidal fresh and free flowing portions of the James River were evaluated by DEQ with input from a RAP. In December 2020, the State Water Control Board authorized DEQ to publish a notice of public comment and hold a public hearing on Scenario “3-B(i)” which reduces phosphorus WLAs for six publicly owned treatment works (POTWs) and one industry discharging to the tidal freshwater estuary in order to meet the newly adopted chlorophyll-*a* water quality criteria. The reduced phosphorus WLAs were subsequently approved by the State Water Control Board in December 2021 following a public hearing and comment period.

The Water Quality Management Planning (WQMP) Regulation (9VAC25-720) amendments authorized for public notice in December 2020 also included implementation of floating WLAs for 36 significant municipal wastewater treatment plants. The floating WLAs were proposed to meet the commitment to achieve additional nutrient reductions from the wastewater sector included in Initiative #52 of Virginia’s Chesapeake Bay TMDL Phase III WIP. The floating WLA approach was subsequently superseded by HB 2129 and SB 1354, which were enacted following Special Session 1 of the 2021 General Assembly (2021 Special Session I Va. Acts Chs. 363 and 364). HB 2129 and SB 1354 eliminated the floating WLA concept and established the Enhanced Nutrient Removal Certainty (ENRC) Program. The ENRC Program includes established schedules for nutrient upgrades and/or consolidation projects at 13 POTWs and reduced WLAs at 7 Hampton Roads Sanitary District (HRSD) treatment plants in the James River and York River Basins. The State Water Control Board approved amendments to the WQMP Regulation (9VAC25-720) to incorporate the reduced WLAs in June 2021. The General Assembly expanded the ENRC Program to include the expansion and upgrade of the Fredericksburg WWTP with the passage of HB 1067 and SB 355 in the 2022 Session (2022 Va. Acts Chs. 127 and 128).

TMDL development and implementation for waters impacted by toxic contamination

2022 Progress Report

Bluestone River: The Virginia portion of the Bluestone River watershed has impairments for Polychlorinated Biphenyls (PCBs) in fish tissue and violations of the total PCB water quality criterion in water. To address these impairments, Virginia and West Virginia are in the early collaborative stages for 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. More recently, Virginia performed a PCB source identification component of a TMDL study that included instream monitoring during base flow and high flow conditions. The results provided compelling evidence that the PCBs may be originating from West Virginia. The project should begin during the fall of 2022.

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 2024 will establish reductions needed to attain the fish consumption use within these impaired waters. A PCB source investigation study is almost complete and will tabulate prospective PCB sources from each category, or conveyance, 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 contributions from atmospheric deposition and PCB loads from above the fall-line are also considered for this study. In order to synthesize all the information as well as link available PCB sources to the contaminated fish, a PCB fate and transport model is under development by the Virginia Institute of Marine Science (VIMS). PCB loadings from the upstream (non-tidal) James River, which is currently under development, are vital to completing this study.

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 2020. Initial TMDL studies to delineate the geographic distribution and possible sources of the PCB contamination were initiated in 2017 and continued through 2019. The purpose of this intensive monitoring effort was 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 has begun and is planned for completion in late 2022.

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 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 Virginia Pollutant Discharge Elimination System (VPDES) permitted facilities identified as possible contributors of PCB loads have developed and are in the process of implementing pollutant minimization plans (PMPs).

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 performed during 2017 into 2019. The purpose of the monitoring was to identify sources of PCBs throughout the TMDL watershed plus inform the fate and transport model. EPA approved the TMDL in early 2022. A current implementation effort is underway to help identify potential sources of previously unidentified PCB contamination within the Lewis Creek watershed.

Mountain Run: The Mountain Run PCB impairment extends from the Route 15/29 bridge crossing near Culpeper 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 1970s. 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, 2018, and 2021 with the results pointing toward the identification of prospective source areas in the Culpeper area, as well as an old waste disposal site. A PCB TMDL is scheduled for completion during the fall of 2022.

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 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 TMDL that was developed to restore the fish consumption use was completed during the summer of 2018. As allowed by available resources, DEQ intends to develop a TMDL implementation approach to identify and reduce PCB loadings from non-point source TMDL 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. Beginning in 2018, EPA performed additional instream mercury monitoring under the Superfund Program as a step in assessing on-going mercury loadings from the Olin plant site to the river. EPA continues oversight of additional and on-going remediation of the former Olin site.

Potomac River: A multi-jurisdictional PCB TMDL was completed in 2007. TMDL implementation activities have been ongoing within the Virginia embayments. The VPDES municipal wastewater treatment facilities that discharge to the embayments have been monitored for the presence of PCBs. PMPs continue to be utilized at those VPDES permitted facilities where reductions are needed to meet the assigned TMDL allocations.

Roanoke (Staunton) River: 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% 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 VPDES permits throughout the watershed. A growing list of PMPs to address identified contamination have been submitted to DEQ from known, active point sources. PMP implementation will continue until appreciable PCB reductions identified within the TMDL are met.

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 to reduce or eliminate mercury contamination continue through DEQ's TMDL and Resource Conservation and Recovery Act (RCRA) and Natural Resource Damage Assessment (NRDA) regulatory programs, and a significant non-regulatory science-based initiative through the South River Science Team that has been in place since 2000. As part of a $50 million settlement approved by a federal court in August 2017, DuPont has agreed to mitigate the environmental harm, including water quality, caused by the mercury contamination. Corrective actions on the DuPont site, which included soil removal, capping, sewer abandonment, cleaning and lining, were completed in October 2021 and the Corrective Measures Implementation Report was approved by DEQ on June 15, 2022. On-going off-site activities have included bank stabilizations and soil removal and capping. Remediation has been completed in the first two miles of river with the completion of removals and bank stabilization of 4,000 feet of riverbank. Modeling has predicted this work will reduce mercury loading from the riverbanks in this part of the river by 90%. Monitoring is occurring to assess the effectiveness of this work on reducing mercury concentrations in the river and biota. Preliminary data is showing decreases in young of the year smallmouth bass mercury concentrations. Investigations are occurring to evaluate riverbanks two to four miles downstream of the former DuPont facility for potential remediation activities. NRDA activities to date have included land protection, habitat restoration, bank stabilizations,

stream exclusion and animal waste control projects, mussel restoration and improving and creating new access for recreational fishing.

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 (VDH) 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 (Figure 1):

- 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.

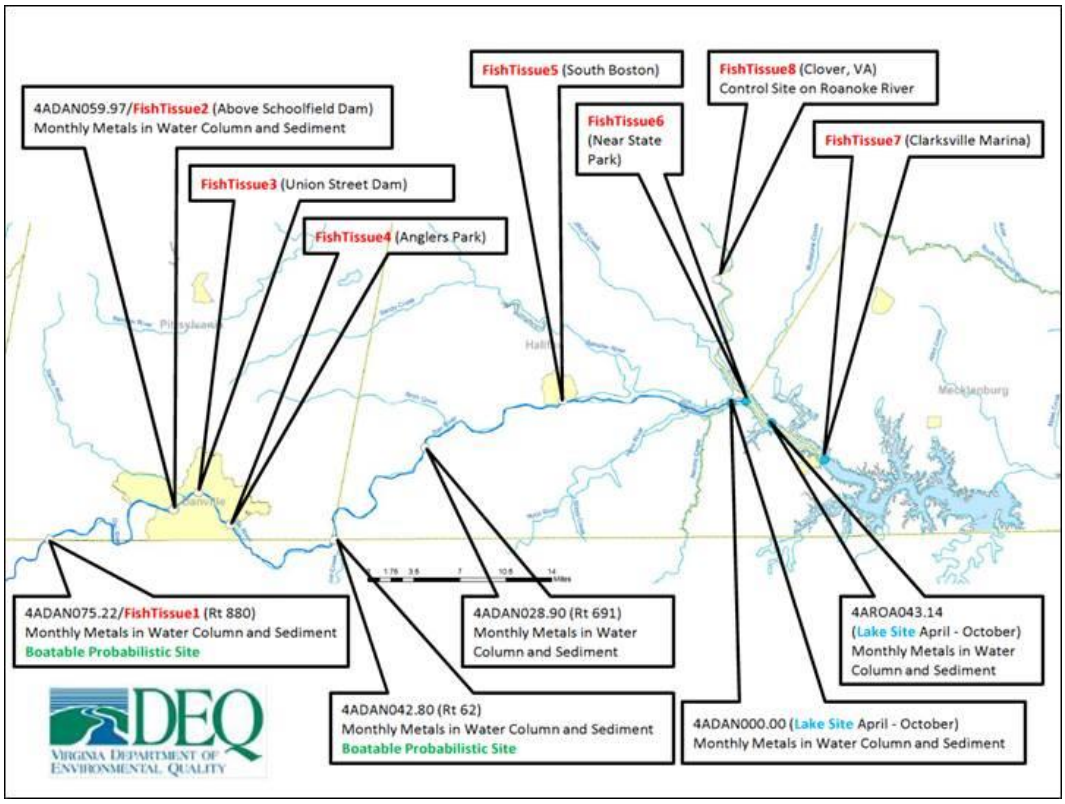

Figure 1: Map of Dan River Monitoring Program Sites

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 (through 2022) 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 2014-2021 monitoring program:

- Sediment monitoring occurred from 2014 to 2017 only. Sediment metals levels remained low, below thresholds of potential concern, and the ash continued to be mixed and covered by native sediment to non-detectable levels in the biologically active layer throughout the river.
- Water column dissolved metals monitoring occurred from 2014 to 2017 only. Water column dissolved metals levels remained below water quality standards for both aquatic life and human health protection.
- Fish tissue collection and analysis has been completed for all samples taken (897 total) from 2014 through 2021. 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 six 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 was confirmed.

- The uptick in chromium concentration observed during the 2017 monitoring season was not present in 2018, 2019, 2020, or 2021.

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 was 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 finalized an early-restoration plan and solicited public input on specific projects that Duke Energy could undertake for environmental improvement and enhancement in the Dan River basin. A report entitled "Restoration Plan Environmental Assessment for the Dan River Coal Ash Spill" was released for public review in April 2019 and was finalized in June 2019. This report provides information on quantifying the injuries to natural resources and resource services (*e.g.*, human recreation) resulting from the ash release, as well as a summary of restoration alternatives that have either been completed or are under way, including:

- Mayo River Park Expansion and Land Protection – land along the Mayo River corridor conserved and transferred to the State Park Systems in North Carolina (404 acres) and Virginia (214 acres).
- Pigg River Power Dam Removal – this 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. Environmental monitoring is ongoing to assess the effect dam removal has on the watershed.
- Abreu-Grogan Park Improvements – completed; added a bathroom, deck, handicap access pier, bank stabilization and other enhancements to expand river-centered opportunities for public recreation and wildlife viewing.
- Public Boat Ramp (location to be determined, planning in progress) – improve recreational access to the Dan River for motor boats, canoes, and kayaks.

The proposed NRDAR Consent Decree was lodged with the federal court on July 19, 2019. The Trustees held two information sessions regarding the Restoration Plan on August 6, 2019 and August 7, 2019 in Danville, Virginia and Eden, North Carolina. The sessions provided an overview of the proposal and projects and held in conjunction with the public comment period for the proposals. Approximately 15-25 citizens attended each event with one media outlet at each session. On September 21, 2020, the Trustees filed a Motion to Enter the Consent Decree with the court for final approval.

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. 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.

There are currently 17 active coal ash impoundments located at nine facilities. The map below identifies the locations and owner/operators of these units. DEQ shares regulatory oversight with 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

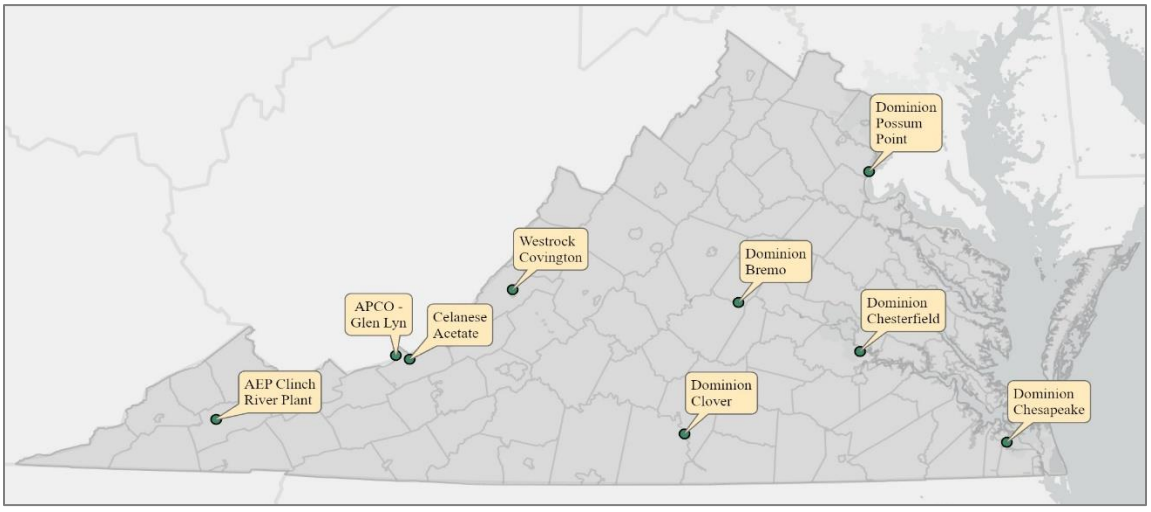

Figure 2: Map of Coal Ash Impoundments in Virginia

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 or retrofit of existing wet ash handling impoundments at six electric generating utilities in Virginia (AEP's Clinch River Plant and Dominion's Clover, Bremo, Possum Point, Chesterfield and Chesapeake Plants) (Figure 2). 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. Additionally, the General Assembly has passed legislation regarding the closure of coal ash units (including impoundments) in the Chesapeake Bay Watershed. HB 2786 and SB 1355 (2019 Va. Acts Chs. 650 and 651) effective July 1, 2019, require that coal ash impoundments at power stations in the Chesapeake Bay Watershed (Bremo, Chesterfield, Chesapeake, and Possum Point) must be closed by removal and the coal ash either recycled or disposed of in a modern, lined landfill. Additionally, the legislation requires that a minimum of 6.8 million cubic yards must be recycled from at least two of the four sites. The legislation also includes additional requirements related to transportation, public water connection, and continued efforts to recycle. The General Assembly passed additional legislation regarding the closure of coal ash units (including impoundments) located in Giles and Russell counties. House Bill 443 (2020 Va. Acts Ch. 563) effective July 1, 2020 requires that coal ash units at power stations in the named counties (Clinch and Glen Lyn) must be closed by removal and the coal ash either recycled or disposed of in a modern, lined landfill, unless all units completed closure prior to January 1, 2019. The legislation also includes additional requirements related to transportation, public water connection, and continued efforts to recycle. Solid waste staff are in contact with facilities impacted by these legislative actions and working to issue permits covering these required actions. Other ash impoundments have either received solid waste permits related to closure (Celanese Acetate) or are in the process of evaluating final closure.

No Discharge Zone (NDZ) designations

2022 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 2021, EPA provided an affirmative determination for the establishment of an NDZ for Sarah Creek and Perrin River in Gloucester County, Virginia. The NDZs were finalized in Virginia regulations in June 2021. Implementation efforts in the form of signage and outreach continues in 2022.

DEQ is in the process of completing an NDZ application for many of the tidal waters in the four counties of Virginia's Northern Neck: Richmond, Lancaster, Northumberland, and Westmoreland. The tidal waters included are tributaries of the Rappahannock River, Potomac River, or Chesapeake Bay.

DEQ is currently investigating options for additional NDZs in the Chesapeake Bay's tidal tributaries as a part of the strategy in Virginia's Phase III WIP, which provides that "[t]he Commonwealth, in consultation with stakeholders, will consider options available under the Clean Water Act to apply to the Administrator of the EPA for a No Discharge Zone (NDZ) for all or portions of the Chesapeake Bay mainstem and its tributaries." This investigation includes the collection of data of various forms and performing targeted stakeholder outreach to gain an understanding of options that may exist for increasing the number of NDZs in Virginia and, in particular, the smaller tributaries of the Chesapeake Bay.

On-site septic systems

2022 Progress Report

The Virginia Department of Health (VDH), through its Office of Environmental Health Services and 35 local health districts, implements and oversees the state onsite wastewater program to protect public health and groundwater quality. Across the state, there are approximately 1.1 million onsite sewage systems, including approximately 32,000 alternative onsite sewage systems (AOSS). Roughly 550,000 of the total onsite sewage systems in Virginia are located in the Chesapeake Bay watershed.

During the 2022 General Assembly session VDH presented an agency bill to transition oversight authority of onsite sewage system pump-outs within certain localities in Virginia. HB 769 (2022 Va. Acts Ch. 486) was passed by the General Assembly and signed by Governor Youngkin in April 2022. Effective July 1, 2023, VDH will manage and enforce onsite sewage system pump-out compliance for Accomack, Essex, Gloucester, King and Queen, King William, Lancaster, Mathews, Middlesex, Northampton, Northumberland, Richmond, and Westmoreland counties and the incorporated towns within those counties. Licensed operators conducting pump-outs in these localities will be required to provide a report on these system visits using the online O&M portal developed by VDH. Additionally, this bill tasks the Board of Health with establishing a schedule of civil penalties for violations of these pump-out requirements in these localities.

A critical piece of legislation, SB 1396 (2021 Special Session I Va. Acts Ch. 382), was passed by the 2021 General Assembly. This legislation has four primary components: (i) establishes the Commonwealth's policy prioritizing universal access to wastewater treatment that protects public health and the environment and supports local economic growth and stability; (ii) establishes in the Code of Virginia the Wastewater Infrastructure Working Group, (iii) provides VDH with authority to include in the Sewage Handling and Disposal Regulations (12VAC5-610) consideration for the impacts of climate change; and (iv) provides VDH authority to use the onsite sewage system indemnification fund for grants and loans to repair failing onsite sewage systems.

The action to establish a Commonwealth policy to prioritize access to fully protective wastewater treatment is a significant milestone in reducing the impacts of onsite sewage systems on the Chesapeake Bay watershed. Affected agencies will seek to improve public education regarding adequate treatment as part of this policy. Agencies will also collaborate and coordinate grant opportunities to seek projects that provide a combination of public health, environmental, and positive economic impacts. The legislation also established a preference for community-based and regional projects, as opposed to the historic practice of wastewater infrastructure needs on a site-by-site basis.

In 2019, the Secretaries of Natural and Historic Resources, Health and Human Resources, and Commerce and Trade worked together to form a Wastewater Infrastructure Work Group (Work Group) consisting of representatives of DEQ, VDH, Virginia Department of Housing and Community Development, and Virginia Resources Authority. This legislation codifies that Work Group and ensures it will remain in place until 2030. The legislation also includes additional partners to sit at the table to assist the Work Group in assessing wastewater infrastructure needs in the Commonwealth. An associated budget amendment to the legislation also provides for additional funding to Center for Coastal Resource

Management at the College of William & Mary VIMS to expand the Virginia Wastewater Data Viewer tool to include all portions of the Chesapeake Bay watershed west of I-95. The tool uses septic repair permitting data to create a map identifying areas with high rates of septic system failure. The tool also allows VDH staff working in localities throughout the Commonwealth to geographically identify communities with wastewater infrastructure needs.

Climate change is already having an impact on wastewater infrastructure throughout the Commonwealth, especially onsite sewage systems located on some waterfront parcels in rural Coastal Virginia. Currently, the Sewage Handling and Disposal Regulations only require that current conditions be assessed when permitting an onsite sewage system. While systems permitted today may meet minimum standards and setbacks from surface waters, they could have negative impacts in the near future as sea level and groundwater levels rise. In 2021 and 2022, VDH held five meetings with a broad group of stakeholders to begin the process of developing considerations for the impacts of climate change to minimize future impacts of onsite sewage systems on Virginia's waterways. These considerations are part of the broader overall revisions to the Sewage Handling and Disposal Regulations. The stakeholder group used a hazard analysis and critical control point (HAACP) process to develop a list of draft critical control points within onsite sewage system designs that correlated with hazards presented by climate change. Once a Notice of Intended Regulatory Action process is complete for the regulations, VDH will work with the stakeholder group to finalize draft language for revising the regulations.

VDH received the Strengthening Environmental Health Capacity grant from the United States Centers for Disease Control and Prevention's Agency for Toxic Substances and Disease Registry (CDC-ATSDR) in order to 1) use environmental health (EH) data and information for data-driven decision making, (2) identify and address EH hazards, and (3) assess the effectiveness and impact of EH services and interventions. One component of this grant involved the creation of a GIS mapping tool to locate private and community wells that are vulnerable to EH hazards like pollutants or climate change hazards like flooding and sea level rise. This tool is currently limited in scope to the following five counties: Lancaster, Mathews, Middlesex, Northumberland, and Westmoreland. It will be shared with local health district staff, planning district commissions (PDCs), and other partners in order to identify vulnerable wells and plan for safe and equitable future drinking water supplies. VDH also included onsite septic system locations in this GIS mapping tool, so these septic systems can also be assessed to see if they are vulnerable to EH or climate change hazards.

In 2018, VDH was awarded $300,000 from the Virginia Environmental Endowment (VEE), with an additional $200,000 from the Smithfield Foundation, the philanthropic arm of Smithfield Foods, Inc., for a total of $500,000, to assist in the repair of failing onsite sewage systems. These funds are targeted to repair failing septic systems and remediate illicit sewage discharges (*i.e.*, straight pipes) from homes in portions of James City, Isle of Wight, and Surry counties within the James River watershed. VDH has provided reimbursement for 15 projects thus far totaling $227,209 for the installation of nitrogen reducing repair systems, and has obligated over $450,000 in total funding to date. The COVID-19 pandemic and related impacts to supply chains has created a delay in the installation of systems currently obligated funding under the program.

In August 2021, the General Assembly also approved $11.5 million in funding from the American Rescue Plan Act (ARPA) for improvements to private well and septic systems for homeowners at or below 200%

of the federal poverty guidelines. VDH will receive $5,750,000 in each of the next two years for these improvements. Funding at this scale will have tremendous positive impacts on public health and the environment throughout the Commonwealth and in helping Virginia meet its goal of prioritizing universal access to wastewater treatment that protects public health and the environment and supports local economic growth and stability. VDH has established the Septic and Well Assistance Program (SWAP) to distribute these funds to approved applicants, and as of August 8, 2022, has received 213 direct project applications for 224 projects (some owners apply for both well and septic assistance) totaling an estimated $5,022,895. VDH has also provide nearly $600,000 in funding to local government partners to implement the SWAP program in their area, and has received an additional $600,000 in local partner funding requests.

VDH has continued to maintain and modify the online O&M portal for uploading AOSS maintenance reports. VDH has also developed an interface to upload maintenance reports from Carmody and Online RME, which are databases used by septic system operators and other professionals.

VDH is in the process of filling gaps in its inventory of septic systems using real estate data that includes septic information. This data is collected from local county governments and compared with the existing inventory of septic systems to identify any new septic systems and confirm the accuracy of records found in both datasets. As of July 2022, VDH has collected and analyzed real estate data from 67 counties in the Chesapeake Bay watershed and identified over 1,095,000 new potential septic system locations not in the septic inventory. The real estate data consists only of the location of a septic system without any information on the system itself, but with more funding VDH can collect this information with fieldwork, surveys, and other techniques and confirm the validity of the real estate data. Additional funding would also allow VDH to upload these real estate records into the existing septic system database maintained by VDH. Collecting these datasets is still ongoing, but there are some limitations, as not all county governments collect septic information when performing their real estate assessments. In addition, not all land parcels have data in the real estate datasets, leaving some addresses with unknown septic/sewer information remaining. VDH also continued to develop its predictive model to estimate if a given property would have a septic system or a public sewer connection. This model was tested in the City of Roanoke, where it was 95.75% accurate in its predictions, in line with the 94.2% accuracy in previously tested Henrico County. VDH will continue to develop and test this model as an alternative methodology for identifying potential septic systems when other data sources are unavailable or incomplete.

In order to improve compliance with maintenance required for AOSS systems, VDH sent 6,659 AOSS maintenance reminder letters to homeowners that have not performed the required annual maintenance on their systems according to VDH’s records. The goal of these letters is to raise awareness of the maintenance requirements for homeowners with AOSS, preventing the loss of BMPs from older systems that have not received maintenance in the last 10 years. In preparation for sending these letters, VDH performed an audit of the AOSS O&M reports submitted by OSS operators in order to ensure VDH’s records were up to date and accurate. Staff increased effort to review any reports that were pending review and request payment for operators who had outstanding pending payment reports. As a result, a total of 17,439 O&M reports were reviewed and approved in the second half of FY 2022 (January to June 2022, when the letters were being sent), compared to 4,798 reports approved in the first half (July to December 2021).

Additionally, VDH also used funding to purchase 33,000 educational fridge magnets with reminders on the importance of septic system care and maintenance and tips on how to prevent septic system failures. These magnets will be distributed to the public at VDH events and at local health districts. These magnets had been previously purchased in 2018 and were popular with homeowners and stakeholders.

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

2022 Progress Report[2]

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 2021, DEQ provided $889,332 from State and Federal funding and landowner contributions to address failing or failed septic systems (Table 1). Please note that the information covered here does not include septic activity associated with the Chesapeake Bay Preservation Act.

Table 1: Residential Septic Program – Grant Funded BMPs (7/1/2020 – 6/30/2021)

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 Pump-out	180	505	3.47+E16	$36,327	$37,022	$73,349
RB-2/2P	Connection to Public Sewer/Connection with Pump	9	277	4.48+E11	$83,160	$83,160	$166,320
RB-3	Septic Tank System Repair	48	1109	1.79+E12	$61,171	$48,766	$109,937
RB-3R	Conventional Onsite Sewage Systems Full Inspection and Non-permitted Repair	12	277	4.48+E11	$5,393	$2,740	$8,133
RB-4	Septic Tank System Replacement	33	762	1.23+E12	$134,800	$103,103	$237,903
RB-4P	Septic Tank System Installation/Replacement with Pump	9	208	3.36+E11	$56,128	$76,504	$132,632
RB-5	Installation of Alternative Waste Treatment System	7	162	2.61+E11	$106,156	$54,902	$161,058

[2] Due to the availability of BMP data at the time of this reporting deadline, the NPS program is not able to provide a FY 2022 programmatic report. The FY 2021 report included the first two quarters of FY 2021 data (7/1/2020 - 12/31/2020) due to the same deadline issue. The program data included in this report is for the full FY 2021 activity (7/1/2020-6/30/2021).

Total		**298**	**3,300**	**5.41E+12**	**$348,470**	**$406,197**	**$889,332**

*CFU = colony forming units

The grant funds were utilized in seven different river basins throughout Virginia. Generally, SWCDs facilitate septic repair and replacements along with overall TMDL implementation; however, in a few cases, not-for-profits, PDCs and localities assisted with the projects.

Adoption of cost-effective agricultural best management practices

2022 Progress Report

Agricultural Cost-Share Programs

DCR administers funds for conservation programs that SWCDs 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 SWCDs are summarized in Chapter 4 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 Virginia Department of Agriculture and Consumer Services (VDACS) implemented Agricultural Stewardship Act (ASA) and DEQ's TMDL programs utilize modules of the BMP tracking program to administer these programs. During the last fiscal year, DCR continued to upgrade this application. This Conservation Data Suite has integrated modules that now have the added capacity to interface with those state agencies that protect cultural and historic resources as well as threatened and endangered species.

Agricultural Stewardship Act Program

The ASA program is a complaint-based program by which the Commissioner of Agriculture and Consumer Services receives information alleging water pollution from agricultural activities. The Commissioner receives complaints alleging that a specific agricultural activity is causing or will cause water pollution. If a complaint meets the criteria for investigation, the Commissioner (through the ASA program staff) contacts the appropriate SWCD about investigating the alleged water pollution problem. If the SWCD declines, the ASA program staff conducts the investigation on behalf of the Commissioner. In most cases, a joint investigation involving local SWCD 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 SWCD 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, 2021, through March 31, 2022. Fifty of these cases became official complaints. The official complaints fell into 17 categories according to the type of agricultural activity: beef (24); equine (5); dairy (4); cropland (2); land conversion (2); other (2); cropland, other (1); sod (1); goats, poultry, swine (1); beef, goats, poultry (1); poultry (1); slaughter house (1); beef, goats, poultry, sheep (1); Christmas trees (1); Christmas trees, land conversion (1); beef, sheep (1); and vineyard (1).

The ASA addresses water pollution problems caused by nutrients, sediment, and toxins entering state waters from agricultural activities. The ASA program received complaints based on the following five pollution categories during the program year of April 1, 2021, through March 31, 2022: nutrients, sediment (18); sediment (12); nutrients (10); bacteria, nutrients, sediment (8); and bacteria, nutrients (2).

During the program year, 17 (34%) of the 50 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 (34%) of the 50 official complaints received during the program year were determined to be unfounded because there was either insufficient evidence or no evidence of water pollution. In some instances, farmers involved in the unfounded complaints voluntarily incorporated BMPs into their operations to prevent more complaints or to prevent potential problems from becoming founded complaints.

Sixteen (32%) of the 50 official 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 completion of the investigation process. Others were cases in which the ASA program had no jurisdiction in the matter, were withdrawn by the complainant, or were dismissed because insufficient information was provided by the complainant.

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

2022 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 VDOF'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 of the *Code of Virginia*. 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 2022, the VDOF was involved in 69 water quality actions initiated under the Silvicultural Law. Of these actions, two resulted in a Special Order being issued and one Emergency Special Order was issued during the period for violations of the law. In addition, there were 27 failure to notify violations by timber harvesting contractors during the fiscal year.

Forestry Best Management Practices (BMPs) for Water Quality

VDOF has been a leader in the conservation 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 2021, 95.7 percent of the timber harvest acres in Virginia conducted within the boundaries of the Chesapeake Bay watershed were under BMPs and 94.4% of the timber harvest acres statewide were under BMPs. The audit also showed that only one (0.42%) of the sites visited had any sign of active sedimentation present after the closeout of the harvesting operation. The BMP goal for WIP III is to achieve a 95% implementation rate by 2025.

Harvest Inspection Program

VDOF'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 2022, VDOF field personnel conducted 6,584 inspections on 1,503 timber harvest sites within the Chesapeake Bay watershed on 72,982 acres (Figure 3).

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.

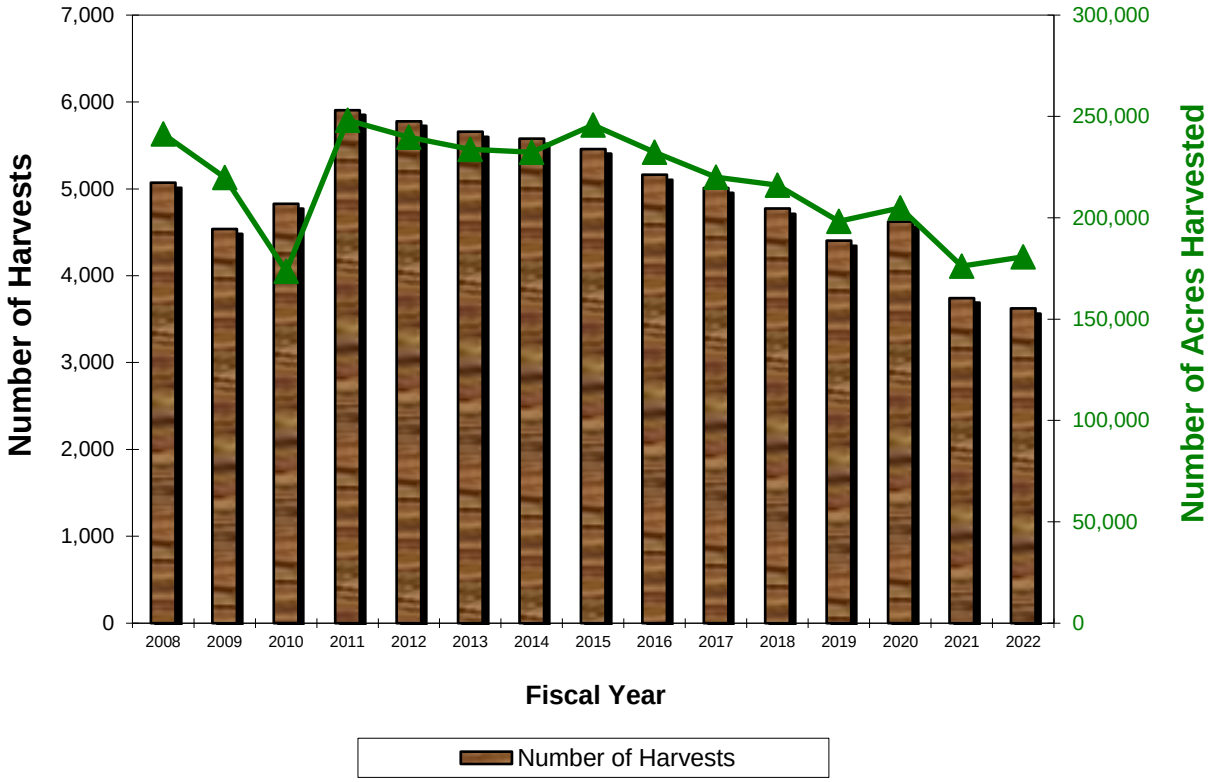

Figure 3: Number of harvests inspected and total number of acres harvested: 2007 through 2022

Cost-Share Assistance

VDOF offers cost-share assistance to timber harvest operators through a program funded by the WQIF. This program shares the cost of the installation of forestry BMPs on timber harvest sites by harvest contractors. Thirty-one stream protection projects were funded using FY 2021 funds that are using portable bridges to provide stream crossing protection across the site during and after harvesting.

VDOF also offers tree-planting grants using the Virginia Trees for Clean Water (VTCW) Program promoted through an RFP process. The 2021 cycle allocated $441,419 to 71 projects utilizing funds from the WQIF, DEQ's CBRAP, and United States Forestry Service's (USFS) Chesapeake Bay Stewardship funds. The majority of the projects completed are in the Chesapeake Bay watershed with a smaller percentage of planting projects completed outside the watershed. Technical assistance and application review was provided by VDOF ISA Certified Arborist staff and community engagement is required as part of the review process. Projects funded include establishing riparian forest buffers, school and park plantings, re-greening efforts to combat urban heat islands, and stormwater retrofits that incorporate the use of trees. Another RFP for the VTCW Program was distributed in July 2022 and applications are due

in late August to allocate the new allocation of WQIF money. VDOF has assisted in completing 327 projects resulting in more than 112,000 trees being planted in Virginia communities since the program's inception. These tree-planting activities are being tracked using VDOF's "My Trees Count" application.

James River Buffer Program

The James River Buffer Program was established in December 2018 and is funded through the Virginia Environmental Endowment's (VEE) James River Water Quality Improvement Program. The Commonwealth specifically targeted the James River to meet Virginia's 2025 WIP III goals. To meet these goals, riparian forest buffers need to be installed in the James River basin in the coming years. The James River Buffer Program will help meet goals through forest buffer establishment along streams and associated land and through BMPs to mitigate concentrated flow bypassing those buffers. The Buffer Program is designed to work in tandem with existing programs and seeks to target currently unengaged landowners that have not participated or who do not qualify for existing programs. The Buffer Program provides essential BMPs and more flexibility and to meet the targets set by the Phase III WIP.

Two partners, the VDOF and the James River Association, carry out the James River Buffer Program within the Middle James River Watershed. In spring of 2021, a new partner, the Chesapeake Bay Foundation, joined as a partner to serve landowners in the Upper James River watershed.

In FY 2022, the VDOF has carried out thirty-two buffer projects, adding 162.22 acres of riparian buffers within the Middle James River watershed. The table below shows the associated pollutants and sediment reductions linked to these established buffer acres.

Table 2: Riparian buffer accomplishments by the Virginia Department of Forestry's James River Buffer Program for FY 2022

Total Buffer Acres	Approx. no. of trees planted	lbs. of N	lbs. of P	lbs. of TSS
162.22	51,769	12,186.96	657.7	442,986.7

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; provides assessments; and provides 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 resources 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. VDOF also collaborated with VDOT in identifying potential projects on public lands in the Shenandoah/ Potomac River watershed where VDOT could undertake conservation projects to offset the TMDL impact of proposed road project construction. In the first quarter of 2021, VDOF also coordinated a series of four meetings to discuss a desire to create a path for renewable energy projects (solar) that would minimize the impacts on land use and forest conversion of the Commonwealth's natural resources. The group was comprised of Fellows from the Virginia Natural Resources Leadership Institute (VNRLI) and was a cross representation of people from non-profits, non-governmental organizations, and state agencies. The group, titled the "Policy Action Work Group" or PAWG, had a shared goal to ensure the balanced and equitable development of solar energy to meet Virginia's clean energy goals while incorporating environmental justice, protecting Virginia's natural resources, addressing land ownership concerns, and supporting local economic benefits. The University of Virginia's Institute for Engagement and Negotiation facilitated these meetings and activities. The final report is not yet completed.

Logger Education

VDOF was involved in 16 Logger education programs in FY 2022 educating 454 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 offer 371 programs related to water quality protection with a cumulative attendance of 11,143 at these

classes. Figure 4 exhibits historical levels of participation in VDOF logger education programs since 2005.

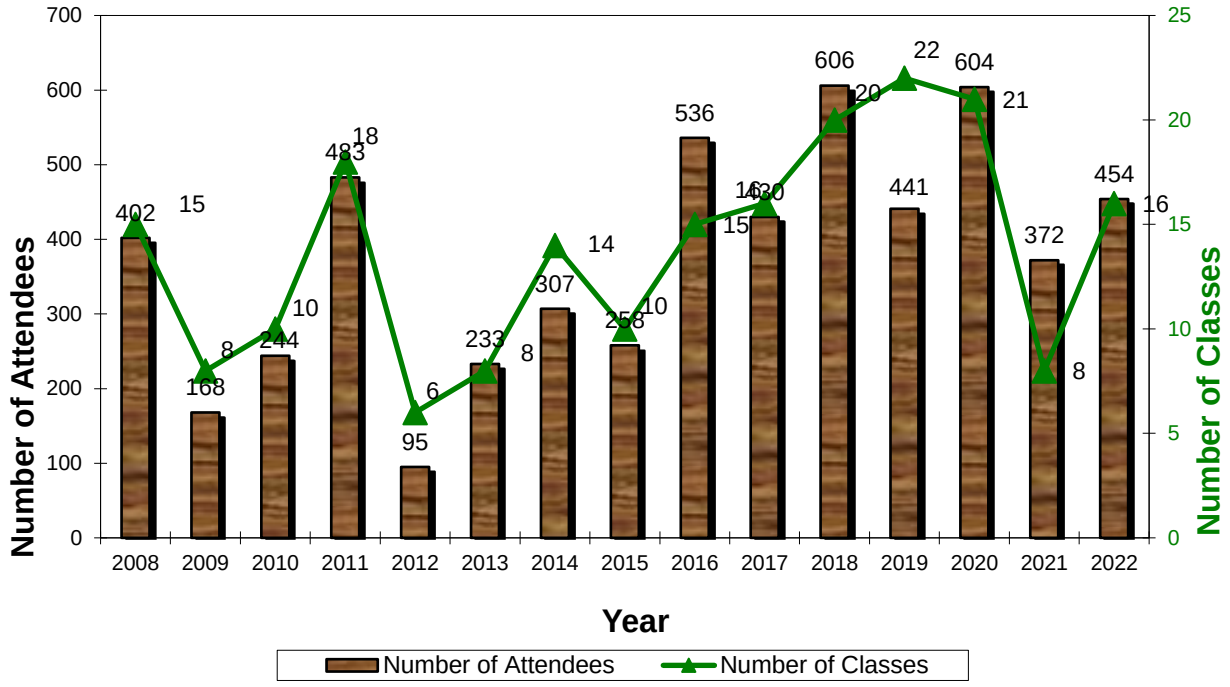

Figure 4: VDOF logger education 2007 – 2022

Riparian Forest Buffers Technical Assistance

Riparian forest buffers (RFB) provide particular and critical protection for Virginia's waters. They provide shade that cools water, capture sediment, store and utilize nutrients, mitigate floodwaters, and provide essential food and habitat for both aquatic and terrestrial life. Riparian forest buffers serve as one of the most effective and cost-effective water quality improvement practices. Because of this, state and federal agencies, landowners, and contractors work together to establish and expand buffers for multiple values. VDOF has technical assistance responsibility for planning, coordination, and certification of riparian forest buffer establishment in federal, state, and privately funded programs. VDOF foresters meet with landowners, assess sites, develop site-specific recommendations, and coordinate with contractors and owners to establish buffers through tree planting or natural means. As of August 2022, VDOF recorded riparian forest buffer establishment on 65 sites for a total of 302.2 acres within the Chesapeake Bay watershed. This number is expected to increase slightly as VDOF field staff complete their annual reporting in September 2022.

Riparian Forest Buffer Tax Credits

For Tax Year 2021, VDOF issued Riparian Forest Buffer tax credits on 73 applications covering 1,292 acres of retained forested buffers. The tax benefit to forest landowners was $462,596.26 on timber valued at $2,356,689.40.

Flexible Riparian Buffer Program

VDOF is specifically tasked under § 10.1-1105 of the *Code of Virginia* with the "...prevention of erosion and sedimentation, and maintenance of buffers for water quality." The implementation of forested, vegetated riparian buffers is therefore a priority. Efforts in Virginia to retain forest land and promote riparian forest buffers must rely on an array of alternatives that assist and encourage landowners to retain their forests rather than convert them to other uses and to restore forest cover where it has been lost. A number of landowner assistance programs have been in place that have resulted in positive improvements in RFB establishment. However, these have not reached, or are not suitable for every owner and the Commonwealth is not reaching all potential RFB candidate landowners.

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

The effort is funded by two grants: one from the VEE and the other from the National Fish and Wildlife Foundation through the Chesapeake Bay Foundation. The VEE program is focused on the middle portion of the James River and the second is focused on the Shenandoah/Potomac watershed. The goal in each will be to deliver tangible, measurable, and meaningful results, at substantial cost savings, on lands that have been difficult to reach through existing programs (gaps) and that will help meet the WIP III goals associated with the James River and the Shenandoah/Potomac watersheds. VDOF has long and extensive experience in tree planting and has found that costs to establish trees can typically be much less than has been customary with forest buffer establishment programs. Planning for and effecting the establishment of naturally regenerated forests cost even less. With these flexible programs, VDOF will serve in the role of the general contractor, which will help control costs even more. A project goal is that sites selected should not compete with existing federal or state buffer programs.

Easement Program

VDOF administers a conservation easement program to assure a sustainable forest resource. Because larger blocks of forest potentially provide the greatest range of functions and values, VDOF easements focus on keeping the forest land base intact, unfragmented, keeping the forest in larger, more manageable and functional acreages. VDOF holds 199 conservation easements in 62 counties and the City of Suffolk that permanently protect over 90,000 acres of vital forest and farmland. Of these, 120 easements consisting of 33,328 acres lie within the Chesapeake Bay watershed.

In FY 2022, VDOF permanently protected 1,970 acres of open space and more than 15.6 miles of water courses through four conservation easements. Three of the easements, comprising 1,527 acres and protecting approximately 10.4 miles of water courses, were within the Chesapeake Bay watershed.

Forest Management Planning

VDOF has a strong role in forest management planning for Virginia landowners. Forest management plans are a foundational element in meeting the needs of landowners and meeting the broader resource objectives of the Commonwealth. Because forests are long-term by nature, proper planning and implementation of plans will help meet a variety of goals, including water quality. Specifically, VDOF professional foresters prepare multi-resource forest management plans that address forests, timber, wildlife habitat, water quality, soils, and recreation. One of the flagship programs for these plans is the Forest Stewardship Program, a cooperative effort with the USFS Cooperative Forestry section. It is delivered by VDOF to non-industrial private landowners, who own the majority of Virginia's forests. Private consulting foresters prepare similar, equivalent plans, like the American Tree Farm Program certification, or plans assisted by USDA, Natural Resources Conservation Service. All of these multi-resource management plans address forests and water quality as a required element. Additionally, VDOF and private foresters prepare forest stand-level practice plans for more direct landowner needs for specific forest management projects, and land use plans that meet county and state requirements for the use-value taxation program. VDOF field staff also prepare pre-harvest plans to assist loggers in planning and strategies for specific areas to be harvested. These all aid in comprehensive resource and watershed management. In FY 2022 VDOF recorded over 1,790 plans exceeding 93,000 acres in the Chesapeake Bay watershed.

Forest management plans lead to implementation of forest management practices. These practices are the very essence of forestry and natural resource management in Virginia. They are action-based, designed to meet landowner and resource needs and include harvesting, tree planting, preparing sites, improving forests, controlling erosion and sedimentation, establishing new forests, controlling invasive species, and helping to heal streams and watersheds. VDOF field staff provide technical assistance and administer financial assistance programs in implementing some of these practices. In FY 2022, VDOF recorded over 1,267 forest management projects on approximately 43,000 acres in the Chesapeake Bay watershed. More specifically, VDOF reported tree planting on 457 sites on 18,000 acres in the Chesapeake Bay watershed. Of this, nearly 350 acres were established on previously non-forested open land.

VDOF manages 26 State Forests that cover 74,968 acres. These operational, working forests are managed for multiple uses including demonstration, research, watershed protection, timber, wildlife, and recreation. They have recently been certified by SFI® and the American Tree Farm System standards, which includes rigorous water quality and BMP Standards. Additionally, VDOF operates two tree seedling nurseries, offering over 40 species of trees and shrubs that meet Virginia's needs for reforestation, afforestation, water quality, wildlife, and aesthetics. Each year, the nurseries produce approximately 30 million seedlings. In the FY 2023 Virginia State budget, VDOF received $3,236,290 in general funds to reopen the New Kent Nursery. When it is fully operational, this nursery is expected to add approximately 3 million hardwood seedlings per year.

Urban Tree Canopy Program

The Virginia Urban Tree Canopy program assists communities by providing both cost-share funding and technical assistance to plant and maintain more trees on both public and private land. These trees provide green stormwater infrastructure benefits, thereby improving water quality across Virginia and specifically, in the Chesapeake Bay. The USFS Urban and Community Forestry Program (U&CF) also financially supports and provides technical assistance for Urban Tree Canopy (UTC) analyses, tree inventories, and urban forest management plans to give communities better data and encourage better management of existing canopy. With the newly added Tree Planting – Canopy BMPs for the WIP III, a tracking platform for both communities and private citizens has been developed to make it easier to report these plantings using ESRI® software. This tracking application, known as "My Trees Count" is serving a valuable function of tracking planting projects on multiple scales from individual trees to partner group multi-acre projects. Funding is used to educate communities on how to use the platform for tracking and reporting. The U&CF Program is also supporting citizen-science based urban heat island studies across the state. VDOF has supported studies in 11 communities across the Commonwealth in 2020 and 2021. VDOF will also be providing financial support to these communities to plant trees and combat their heat islands.

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 and landowners 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 CBP Management Board to credit forestland retention as a BMP 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 continued for two years. Funding is provided by the CBP through the Chesapeake Bay Trust and the U.S. Endowment for Forests and Communities. Phase III has three tasks: (1) work with three primary Virginia counties (Fauquier, Orange and Essex) to revise policies and ordinances to incentivize retention of forest and agricultural lands; (2) create a working financial model to incentivize private sector investment ($50 million+) in land conservation on a landscape scale and on a long-term sustainable basis: and (3) coordinate with other CBP workgroups to integrate findings with those of other initiatives to institutionalize results across all Bay jurisdictions.

Carbon values have been selected as a water quality proxy to provide income streams and incentives for landowners and rural localities. Carbon offers the potential for aggregating interested landowner holdings so they can be offered at scale and with the market convenience required to attract large-scale private capital investments. Further, the project is focusing on Virginia's Economic Development Authorities (EDAs) as an aggregating mechanism. Adapting the EDA structure to carbon as a proxy for water quality enables a role for counties, combined by choice, into a regional (watershed basin) entity to exercise the authorities granted within the EDA. The General Assembly passed legislation signed by the Governor following the 2019 legislative session to enable EDAs to serve such an aggregating role.

The findings and recommendations of the Healthy Watersheds/Forest project have been incorporated into Virginia's WIP III strategies. Outcomes in 2021 are the creation and inclusion of the legal framework in order to complete the aggregation of landowners within the EDA as well as the addition of Fauquier County to the process. Additional changes to the *Code of Virginia* were identified and deemed necessary to remove barriers to implementation of the program. In the 2021 General Assembly session, SB 1343 was introduced and passed. The bill, titled "the Virginia Freedom of Information Act; proprietary records and trade secrets; carbon sequestration agreements" excludes from the mandatory disclosure provisions of the Virginia Freedom of Information Act proprietary information, voluntarily provided by a private business under a promise of confidentiality from a public body, used by the public body for a carbon sequestration agreement. The bill requires the private business to specify the records for which protection is sought before submitting them to the public body and to state the reasons why protection is necessary. This bill took effect July 1, 2021. In support of this effort and in the interest of sustainable management and market expansion, VDOF hosted a Forest Carbon Symposium. This symposium brought speakers from around the nation to share information about their programs, market forecasts and the role of Carbon Verification Standards.

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.

Implementation of Nutrient Management Planning

2022 Progress Report

Currently, over 404,015 active nutrient management planned acres in the Commonwealth were developed by DCR staff (Table 3).

Table 3: DCR Nutrient Management Planning

	Crop Acres	Hay Acres	Pasture Acres	Specialty Acres	Total Acres
Chesapeake Bay Watershed	155,507	56,867	44,362	587	257,323
Outside the Chesapeake Bay Watershed	86,630	30,955	28,741	366	146,692
Totals	**242,137**	**87,822**	**73,103**	**953**	**404,015**

As required by § 10.1-104.5 of the *Code of Virginia*, all golf courses have obtained and are implementing nutrient management plans. DCR continues to work with the golf courses to ensure the nutrient management plans are updated and revised as required by law.

Total urban areas with nutrient management now exceed 31,837 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 115,000 acres. The VDACS acreage combined with the acreage reported through DCR nutrient management planner annual activity reports for required nutrient management plans on golf courses, localities with DEQ municipal separate storm sewer system (MS4) permits, and state-owned land, covers the majority of fertilization of nonagricultural land in the state that is managed by professionals.

During the 2019, 2020, and 2021 General Assembly Sessions, funding was provided for nonpoint source reduction projects including the poultry litter transport incentive program. Utilizing the additional funding provided, DCR has expanded the transport program to include Accomack County while still maintaining programs in Page and Rockingham counties. An agreement with the Virginia Poultry Federation allows DCR to leverage the state funding provided. As a strategy in WIP III, poultry litter transported from these three key counties needs to increase from 5,000 – 6,000 tons annually to approximately 89,000 tons annually by year 2025. For FY 2022, 3,792 tons of litter were transported out of Accomack County, totaling $75,848 in payments. Out of Rockingham County 13,788.07 tons of litter were transported,

totaling $203,928 in payments. FY 2022 contracts totaled just over 39,000 tons of litter that will be moved, however to date there has been no participation in Page County.

In order to continue progress toward meeting goals for the Chesapeake Bay TMDL, DCR has dedicated two certified nutrient management staff to work exclusively with small dairies and other small farms to develop nutrient management plans. There are 376 dairies in Virginia, a reduction from more than 500 in recent years. Thirty-six of these permitted operations have current nutrient management plans. DCR staff develops nutrient management plans for the majority of the animal operations in the Commonwealth. All nutrient management plans involving the use of biosolids meeting specific criteria must be approved by DCR as well as many of the nutrient management plans that utilize manure as a fertilizer.

DCR has developed a new module, the Nutrient Management Planning (NMP) Module, which is completely integrated with the existing Conservation Application Suite. This new module collects data in a more systematic and thorough manner, and allows for more accurate reporting and data collection on nutrient management. All DCR nutrient management planners utilize the NMP Module; DCR is currently discussing ways to expand the Module's use to private sector planners.

From FY 2019 - 2022, funding, via both federal grants and the state, provided approximately $1.23 million for the development of nutrient management plans through a direct pay initiative for nutrient management planners. This initiative pays nutrient management planners for the development, revision, and implementation of nutrient management plans, particularly in counties within the Chesapeake Bay watershed with fewer plans on cropland; this emphasis on ensuring that nutrient management plans are implemented on cropland will assist the Commonwealth in reaching its water quality goals. Payments are made to the planners on a first-come, first-served basis until available funding has been obligated. This is a far simpler process for planners to receive payment than responding to a Request for Applications (RFA). To date, approximately 152,557 agricultural acres of nutrient management plans have been developed through this initiative.

Implementation of and compliance with erosion and sediment control programs

2022 Progress Report

From July 2021 through June 2022, the continued focus of DEQ central and regional office staff has been assisting local governments with the implementation of their 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 central office staff performed one local government erosion and sediment control program audit during the reporting period. DEQ regional office staff continued to visit small and large construction activities to perform site inspections for compliance with the 2019 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 programs

2022 Progress Report

During the reporting period, 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. In addition, DEQ central office staff and local governments continued to process coverage under the 2019 Construction General Permit 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 2021 through June 2022, new (*i.e.*, first-time) coverage under the 2019 Construction General Permit was approved for 369 land-disturbing activities where DEQ is the local Virginia Stormwater Management Program (VSMP) authority and new coverage under the 2019 Construction General Permit was approved for 1,393 land-disturbing activities statewide. DEQ regional office staff continued to visit small and large construction activities to perform site inspections for compliance with the 2019 Construction General Permit. On July 1, 2019, the 2019 Construction General Permit became effective replacing the 2014 Construction General Permit. The 2019 Construction General Permit expires on June 30, 2024.

Authorization of Stormwater Local Assistance Fund 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 SLAF 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. For the FY 2019 solicitation, the General Assembly made $20 million in bond funds available that resulted in 15 localities with 24 projects being authorized. In FY 2020, DEQ authorized $18,000,000 in funding for 22 projects and 1 nutrient credit purchase from 15 localities utilizing $10,000,000 in bond authorization from the General Assembly and $8,000,000 in

carryover funds. In FY 2021, DEQ authorized $34,330,827 in funding for 47 projects and 3 nutrient credit purchases from 25 localities.

As of June 30, 2022, the seven funding cycles of SLAF grants have resulted in 36 localities that signed grant agreements to implement 153 projects, totaling $69,714,468 in cost-share. Additionally, 44 projects authorized for funding from the solicitations (19 from the first cycle, ten from the second cycle, two from the third cycle, seven from the fourth cycle, six from the fifth cycle and two from the sixth cycle) have been withdrawn by the localities.

Virginia Clean Water Revolving Loan Fund

For FY 2022, the Virginia Clean Water Revolving Loan Fund (VCWRLF) allocated roughly $346 million in loan funds to 32 localities for wastewater and stormwater infrastructure projects, sanitary sewer evaluation surveys, one living shoreline, and onsite septic local program. The VCWRLF was created in 1987 and DEQ, on behalf of the State Water Control Board, manages the VCWRLF. The VCWRLF provides financial assistance in the form of low-interest loans to local governments for needed improvements at publicly owned wastewater treatment facilities and collection systems. In 1999, 2001, 2003, 2010 and 2016, the State Water Control Board expanded the scope of VCWRLF activity and DEQ implemented additional programs to provide low interest loans related to agricultural and other non-point source water quality issues.

From 1988 to 2021, under the VCWRLF Program, DEQ has authorized over 1,300 projects, providing over $4.33 billion in subsidized loan funds for projects in the Chesapeake Bay watershed and Southern Rivers. Eligible costs include the planning and design to upgrade, rehabilitate, and/or expand wastewater treatment plants; the remediation of brownfields; purchase of land for the purpose of conservation; installation of living shorelines; and construction of stormwater BMPs and agricultural BMPs.

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

2022 Progress Report

Chesapeake Bay Preservation Act (CBPA) compliance reviews continue to be conducted for the Tidewater localities subject to the CBPA. DEQ Local Government Assistance Program staff have been working to ensure that a periodic (every five years) compliance review is completed for all local programs in the 84 CBPA localities. With 80 localities now through the compliance review process, and being found fully compliant or working to resolve conditions under a Corrective Action Agreement, four localities remain scheduled to undergo a compliance review in the near future. If a DEQ review reveals conditions that must be addressed by a locality in order for its program to come into compliance with the CBPA 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.

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 are met. As part of the compliance review process, localities are required to submit annual reports on their continued implementation of the CBPA. Based on the 2021 annual report cycle (January 1, 2021 – December 31, 2021), 191 soil and water quality conservation assessments on agricultural land were conducted and 20,288 septic systems were pumped out.

Chesapeake Bay Total Maximum Daily Load Implementation

2022 Progress Report

The following graphs show the modeled annual nitrogen, phosphorus, and sediment loads reaching the Chesapeake Bay from Virginia based on the Phase 6 Chesapeake Bay Watershed model (Figures 5-7). Each of the bars represents the estimated annual loads reaching the Chesapeake Bay from Virginia for 2009-2021. The last bar on the right shows the model estimated annual loads that would result from full implementation of the BMPs identified in Virginia's Phase III WIP in 2025. Each of the colors stacked in the bars represents the annual loads from the various sectors (natural, agriculture, developed, septic and wastewater). The green line on each graph represents the 2025 planning target.

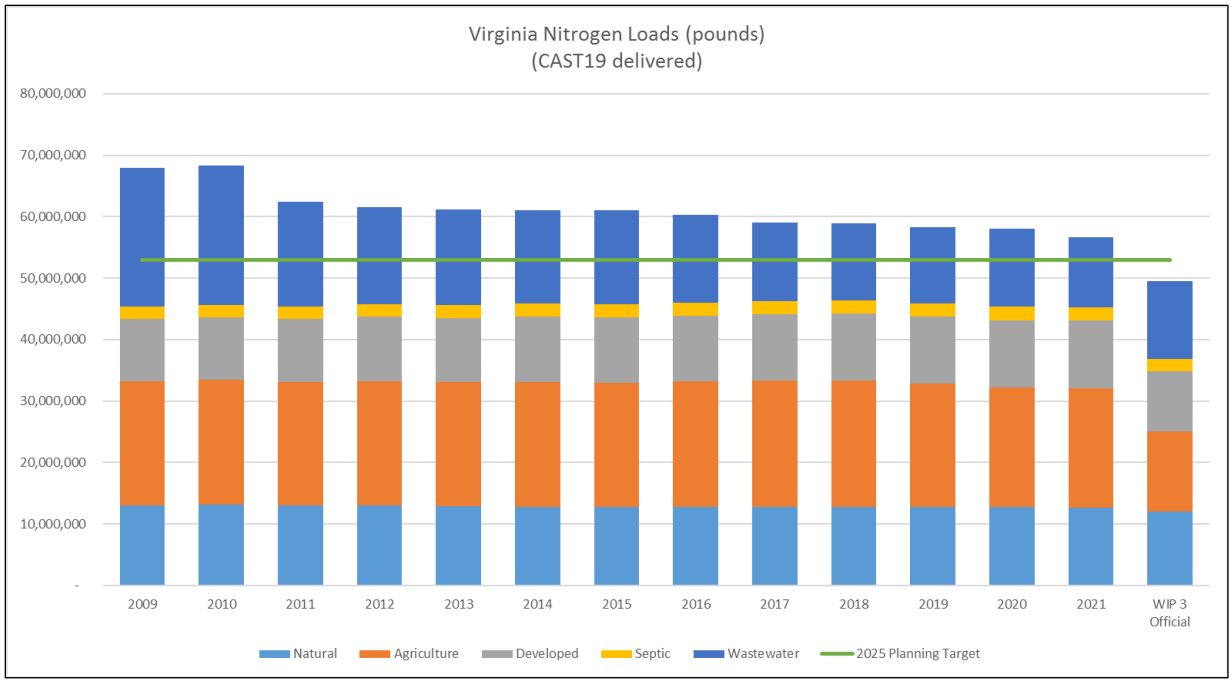

Figure 5: Virginia's Annual Nitrogen Progress Loads for 2009-2021 with WIP III Planned 2025 Loads

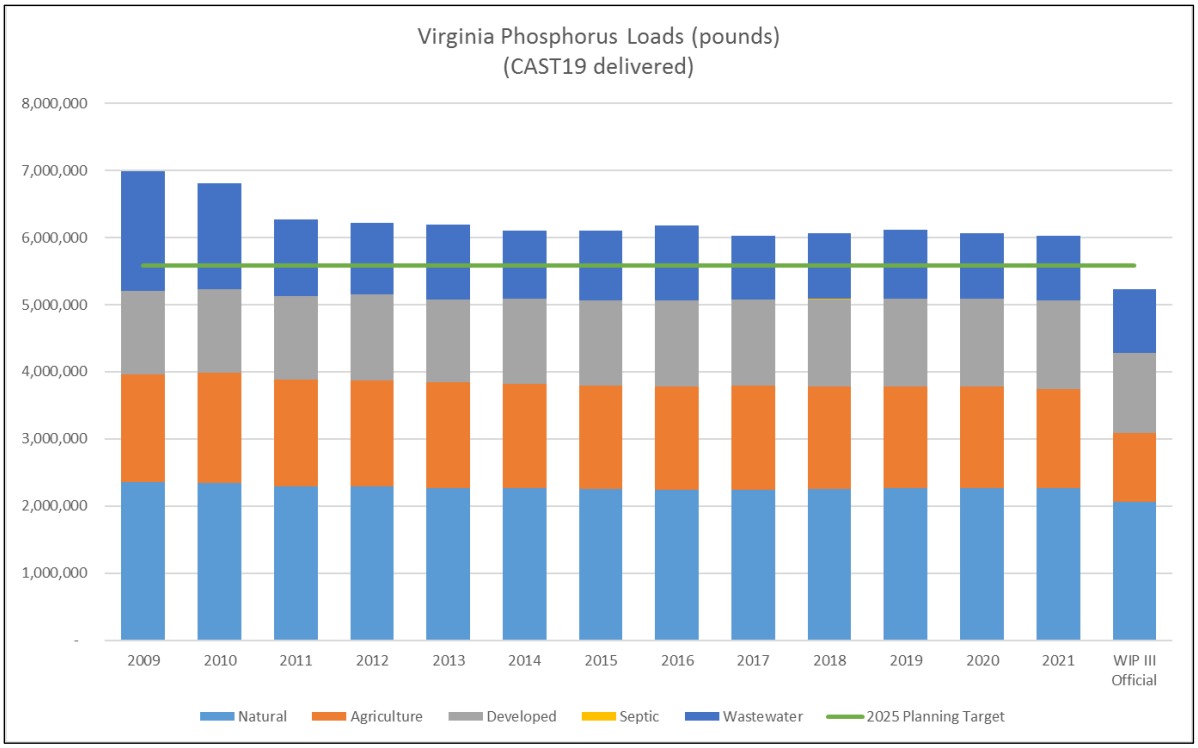

Figure 6: Virginia's Annual Phosphorus Progress Loads for 2009-2021 with WIP III Planned 2025 Loads

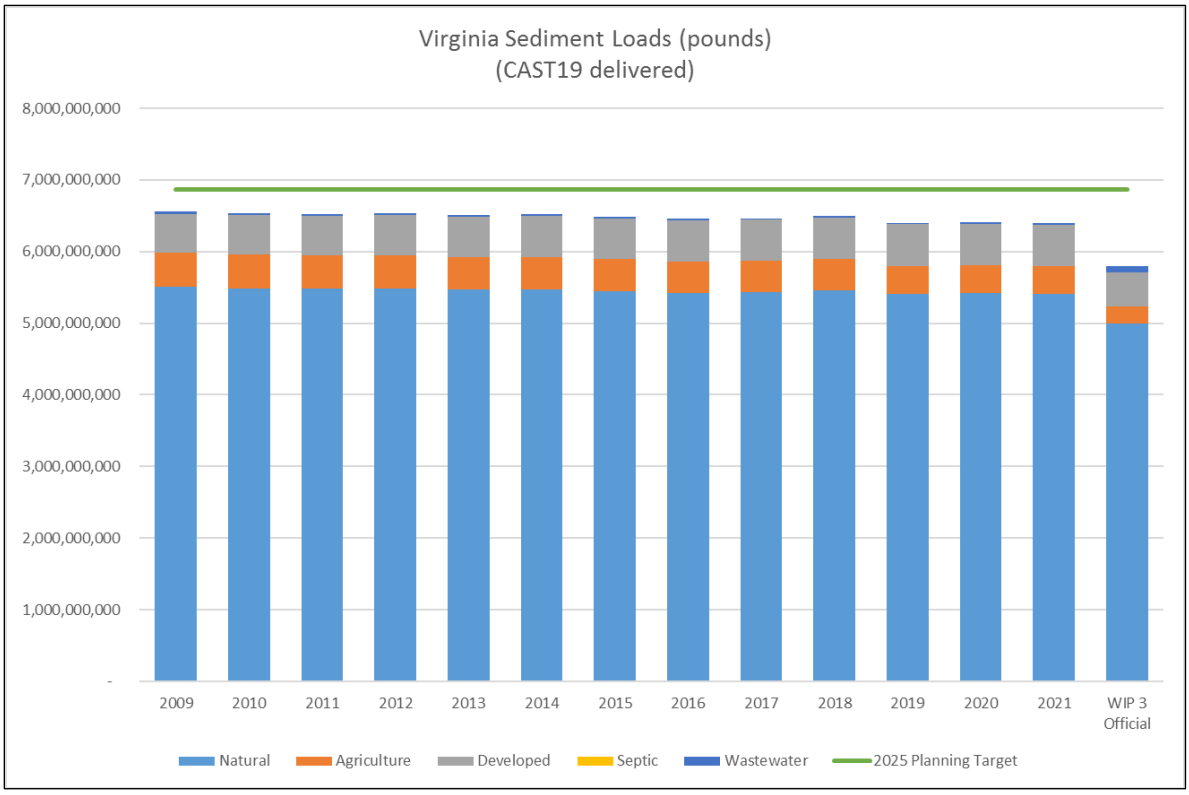

Figure 7: Virginia's Annual Sediment Progress Loads for 2009-2021 with WIP III Planned 2025 Loads

For additional information on the Chesapeake Bay TMDL, associated implementation efforts and progress, please visit the DEQ Chesapeake Bay Programs webpage and the Chesapeake Bay Program's ChesapeakeStat website.

Development of TMDL reports, implementation plans, and implementation projects

Development of Total Maximum Daily Load Reports

2022 Progress Report

As of June 2022, 16 new TMDL equations, each representing a watershed area draining to impaired surface waters, have been approved by EPA. The figure below shows the number of TMDL equations by pollutant set across Virginia since the inception of the TMDL program (Figure 8).

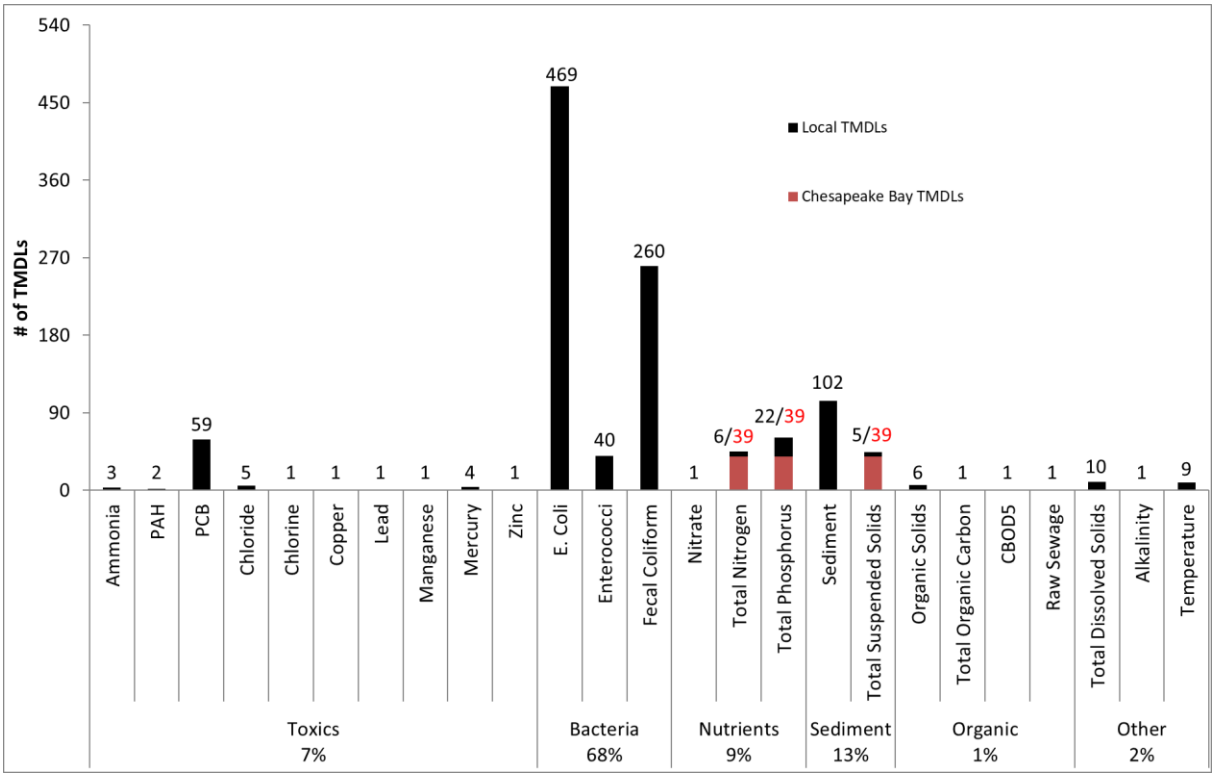

Figure 8: TMDL Equations by Pollutant[3]

Based on the 2022 Integrated Report, Virginia estimates that 8,470 miles of rivers, 85,368 acres of lake, and 2,060 square miles of estuary will require TMDL development in the coming years. To maintain a robust pace of TMDL development with level funding, Virginia has developed several strategies including: a) developing TMDLs using a watershed approach to address multiple impairments in watersheds with similar characteristics; b) developing TMDLs in-house; c) identifying non-TMDL solutions, such as plans that outline BMP implementation strategies in predominantly nonpoint source (NPS) polluted watersheds; and d) developing TMDLs that are more easily implemented. Virginia continues to explore tools and options for restoring and protecting water quality, both for environmental benefit and efficient program management.

Starting in the winter of 2014, states, including Virginia, began prioritizing watersheds for TMDL or TMDL alternative development for the approaching six-year window (2016-2022). Watersheds are prioritized for TMDL development based on types of impairment, public interest, available monitoring, regional input, and available funding. DEQ embarked on data analysis to identify highest priority watersheds, particularly those that appear to be valued for the impaired designated use. All of the prioritized watersheds for TMDL or TMDL alternative development during 2016-2022 were assembled into a list and public noticed for public comment on July 27, 2015. Only one comment was received and addressed by DEQ. It did not result in any changes to the priorities list that was then finalized following 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. 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 4, 2018 with no comments received. Following the close of the public comment period, the list of priorities was finalized and submitted to EPA. Most recently, EPA granted a final opportunity to adjust state priorities. In May 2019, DEQ revised (and EPA approved) its priorities to promote all benthic impairments that were previously internal priorities, not committed to EPA, to be formal priorities that are committed to EPA. The bacteria priorities that were previously formal priorities were then moved to be internal priorities. This revision was necessary to reflect changes in program resources. The remaining 2016-2022 TMDL program priorities can be found in Appendix 1 of the 2020 Integrated Report.

Most recently, DEQ initiated the planning process to prepare for the next cycle of priorities that is anticipated to run through 2032. At the beginning of this process, DEQ solicited input from the public in September 2020 to help identify water quality impairments of interest to the public. Planning for this next

[3] 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.

cycle is ongoing and awaiting final national guidance from EPA. In the meantime, EPA collaborated with the states to provide an interim approach to prioritization of impaired waters for TMDL or TMDL alternative development in the 2023-2024 window. Under this approach, DEQ developed a prioritization of watersheds that includes the development work that is ongoing from the 2016-2022 prioritization window as well as additional priority waters selected using a strategy similar to that used for the selection of priorities for the 2016-2022 cycle. That list of priorities can be found in Appendix 1 of the 2022 Integrated Report.

Development of Implementation Plans

2022 Progress Report

Virginia law (1997 Water Quality Monitoring, Information, and Restoration Act, §§ 62.1- 44.19:4 through 62.1-44.19:8 of the *Code of Virginia*, or WQMIRA) requires the development and implementation of a plan (including a TMDL when appropriate) to achieve fully supporting status for impaired waters. The development of an Implementation Plan (IP) is Virginia's mechanism for addressing nonpoint pollutant sources in impaired watersheds. The IP report includes: water quality goals, control measure goals, a schedule of corrective actions, monitoring strategy, and associated costs and benefits of implementation. DEQ, along with other agency and non-agency partners, continues to develop and implement IPs throughout Virginia. In FY 2022, DEQ and partners completed 2 IPs covering 28 impairments. In addition, 24 IPs covering 16 impairments were under development at the end of the fiscal year. The map below shows areas that are covered under an IP (Figure 9).

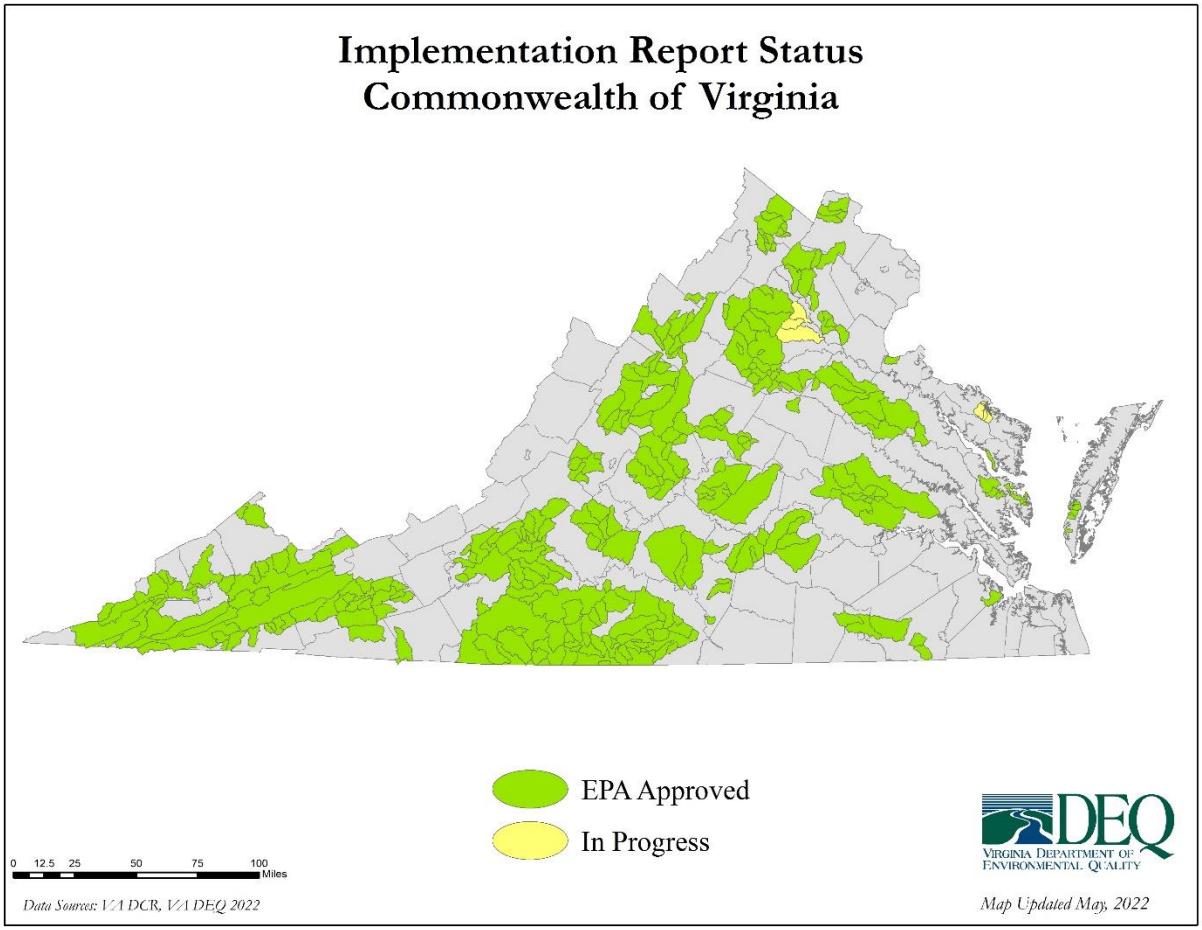

Figure 9: Implementation Report Status

The graph below summarizes implementation planning progress since the program inception. Since 2001, Virginia has completed 99 IPs, addressing 635 impairments (Figure 10).

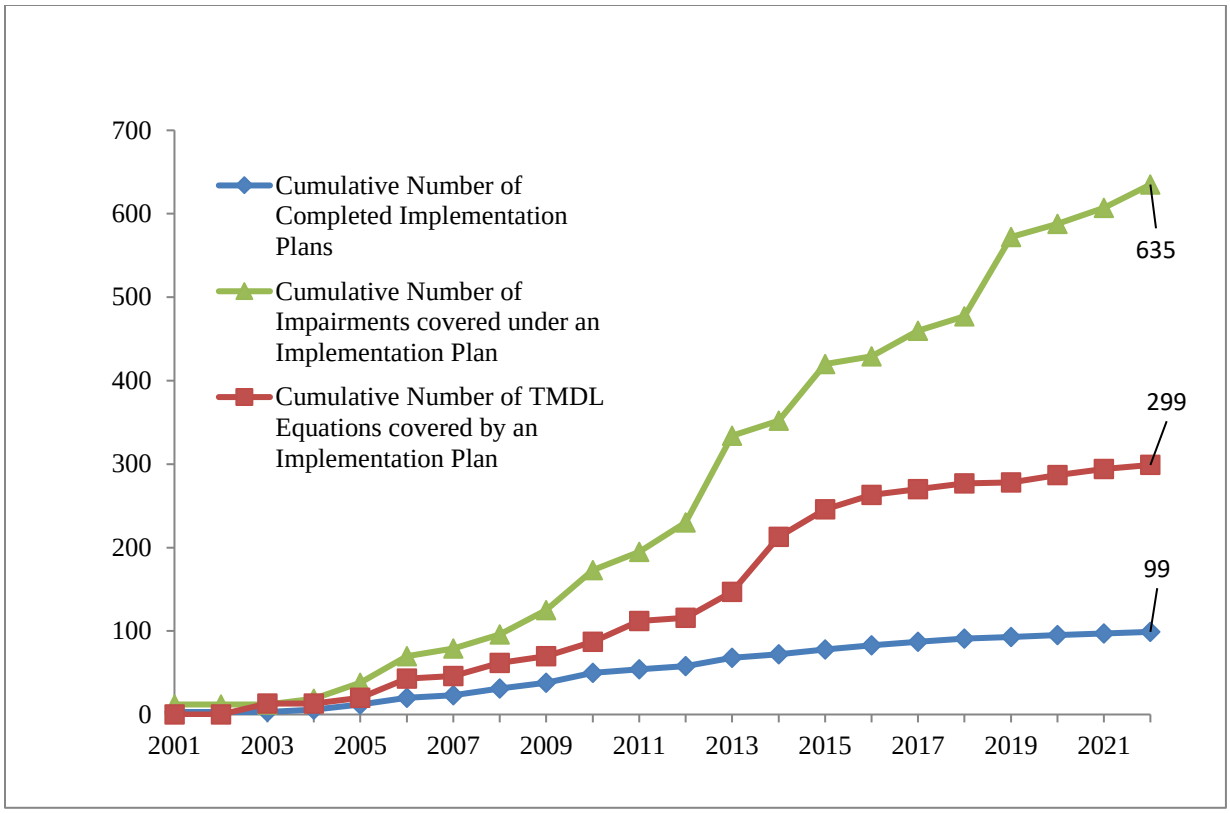

Figure 10: Cumulative Summary of Implementation Plan Development (July 2001 – June 2022)

As funding limitations have continued over the years, it has become increasingly important to evolve the implementation planning program. DEQ is continuing to evaluate the prioritization methods of developing implementation plans, as well as how these plans are written. More efforts are being placed on producing joint TMDL-IP reports, exploring TMDL alternatives, evaluating larger watershed areas, pursuing more watershed-based plans and simplifying modeling efforts. These efforts have allowed the implementation planning program to seek new opportunities, including performing more development work in-house. Sediment/benthic impairments were prioritized in FY 2021 in the development of IPs following suit to FY 2021 TMDL priorities. Bacteria impairments continue to be the most common pollutant to Virgina waterbodies and addressed through many already approved IPs developed since 2001.

More information on IPs (under development or approved) can be found on DEQ's Implementation Planning webpage.

Watershed Restoration and TMDL Implementation

2021 Progress Report[4]

The goal of the TMDL Implementation Program is to implement targeted, on-the-ground activities, identified in TMDL IPs, 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, 2020 through June 30, 2021 DEQ managed 24 implementation projects funded partially or fully with Federal Section 319(h) funds. Additional information and data on the Commonwealth's overall Non-Point Source Management Activity can found in DEQ's 2021 annual Nonpoint Source Point Report submitted to EPA.

The map below depicts the overall status of nonpoint source (NPS) TMDL implementation in Virginia since 2001 (Figure 11). It includes watersheds where TMDL implementation plans have been developed and TMDL implementation projects have been active that have received strategic funding. It should be noted that DCR administers a statewide agricultural cost-share program that resulted in BMP installation and implementation in various implementation plan areas and although not reflected on the maps, the information is presented in the remaining part of this section.

[4] Due to the availability of BMP data at the time of this reporting deadline, the NPS program is not able to provide a FY 2022 programmatic report. The FY 2021 Clean-Up Plan Report had the same deadline issue. Subsequent reports will cover the period one year delayed. The program data included in this report is for FY 2021 activity (7/1/2020-6/30/2021).

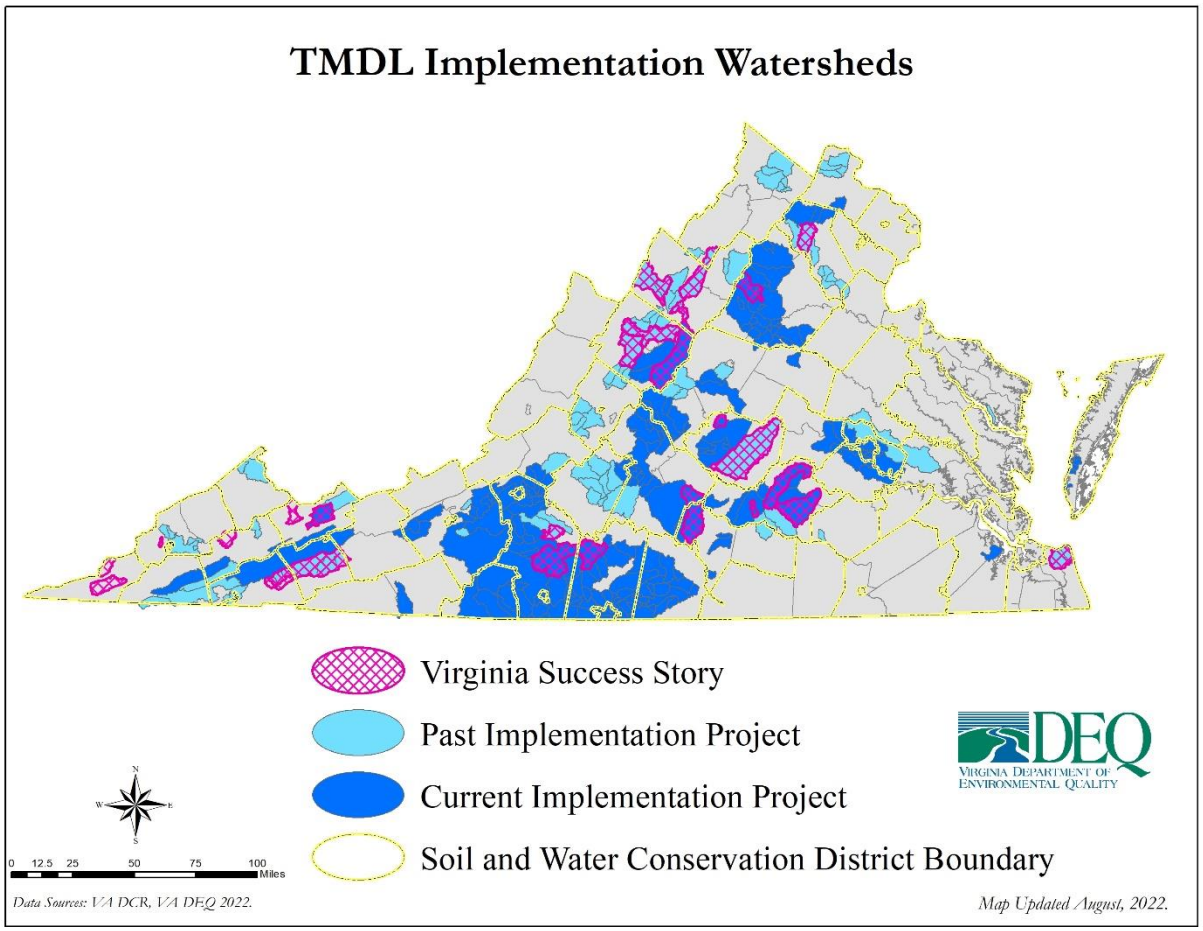

Figure 11: Status of NPS TMDL Implementation Projects by Watersheds in Virginia (2001 – October 2021)

The map below identifies the specific watersheds where there were section 319(h) funded active NPS implementation projects in Virginia in FY 2021 (Figure 12).

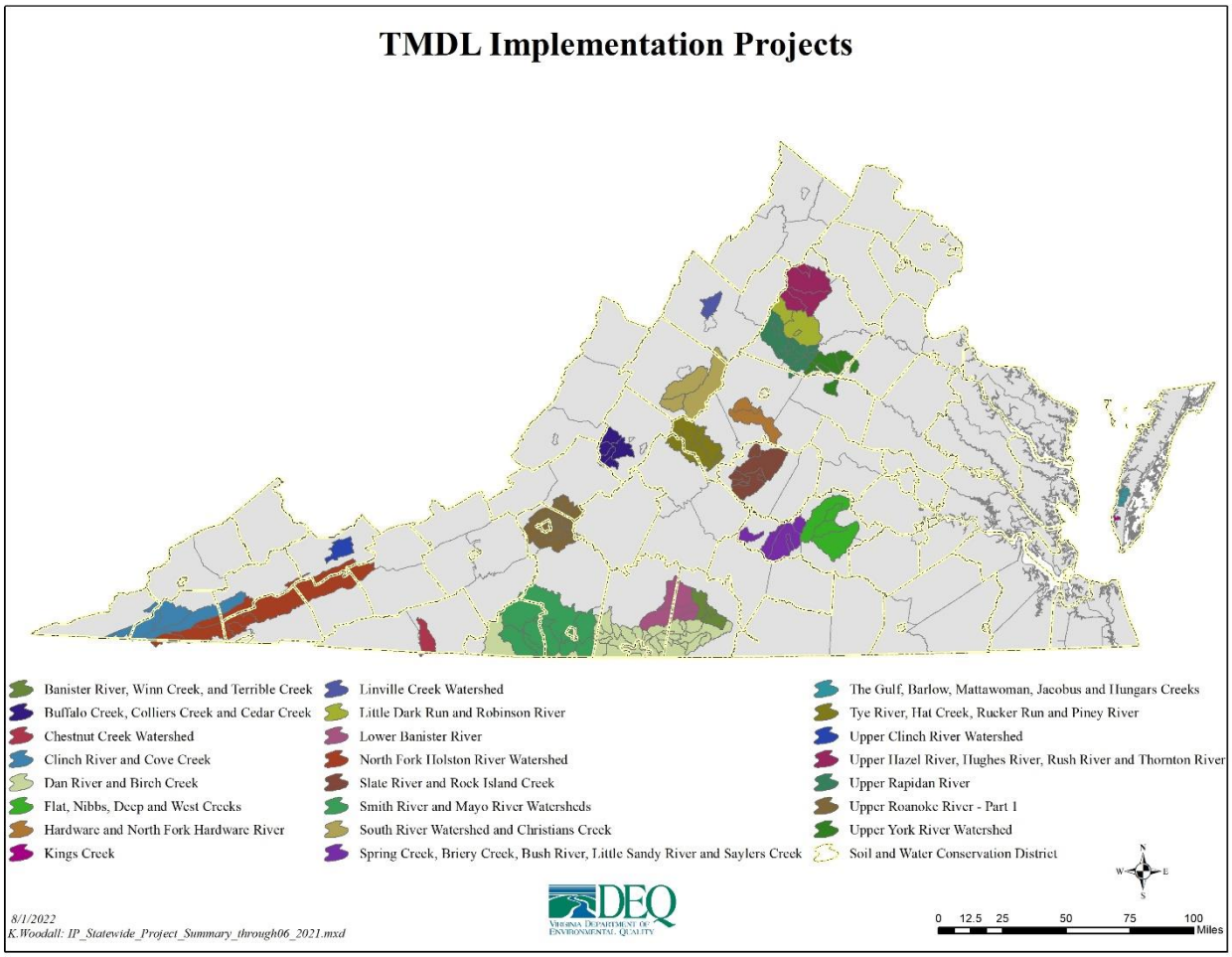

Figure 12: 319(h) funded NPS TMDL Implementation Projects in Virginia as of June 30, 2021

Past TMDL Implementation Projects with Continued Implementation Activity during FY 2022

Funding of Implementation

As the lead agency in TMDL implementation, DEQ utilizes both federal section 319(h) and Chesapeake Bay Implementation Grant (CBIG) Program grant funds to pay for staff 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 (section 319(h) and CBIG) grants and state resources (from the WQIF, the Virginia Natural Resources Commitment Fund, and the Virginia Agricultural Cost-Share program).

Overall, DEQ and its agency partners utilized over $80 million of state and federal (excluding federal Natural Resource Conservation Service (NRCS)) sources of funding to implement BMPs throughout the Commonwealth.

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.

The residential septic and agricultural BMPs implemented within IP areas in FY2021 resulted in the protection of streams and the exclusion of livestock access. In addition, hundreds of homes had their septic systems pumped or had straight pipes or failing septic systems addressed.

The tables below provide a summary of BMP related information, pollutant reductions achieved and a detailed accounting of the type of BMPs installed in TMDL watersheds (Tables 4 and 5).

Table 4: Summary of BMP related information achieved in TMDL Implementation Plan Areas (7/1/2002 - 6/30/2021)

Metric	VA FY 2021	FY 2002-2021
#BMPs Installed	3,211	35,531
Stream Protected (Linear Feet)	969,275	11,982,466
Stream Exclusion Buffer Created (Acres)	1,635	12,001
Animal Units Excluded	37,724	547,114
Residential Septic Systems	383	5,418
Bacteria (CFU) Reductions	4.20E+16	5.48E+17
Total Nitrogen (lbs/yr) Reductions	2,563,374	17,780,790
Total Phosphorous (Lbs/yr) Reductions	46,539	336,177
Total Sediment (Tons/yr) Reductions	49,915	402,401

Table 5: BMPs Installed in TMDL Implementation Areas (7/1/2020 – 6/30/2021)

BMP Name	# BMPs	Extent Installed	Unit
Alternative or Extension of Watering System	31	1,425	Acres
Animal Waste or Composter Facilities	26	26	Count
Cover Crops	2,048	96,322	Acres
Farm Road, Animal Travel Lane, Heavy Use Area Stabilization	3	0.72	Acres
Loafing Lot Management System	0	0	Count
Long Term or Permanent Cover	57	1,285	Acres
No-Till or Minimal Till	282	9,007	Acres
Pasture or Grazing Land Management	30	2,440	Acres
Pasture Management Calculated from Grazing Stream Exclusion	n/a	11,261	Acres
Stand-alone Riparian, Forested or Vegetated Buffer Created	55	180.06	Acres
Riparian Buffers Created from Stream Exclusion Practices	n/a	1635	Acres
Roof Runoff Management System	0	0	Sq. Feet
Sediment Retention, Erosion or Water Control Structures	0	0	Count
Septic Connection to Public Sewer	10	10	Count
Septic System Alternative system	12	12	Count
Septic system Repair	63	63	Count
Septic System Replacement	46	46	Count
Septic Tank Pump-out	252	252	Count
Sod Waterway	1	0.22	Acres
Stream Crossing and Hardened Access	1	1	Count
Stream Exclusion, Grazing Land Management or Stream Protection and Stream Exclusion Maintenance	270	966,931	Lin. Feet
Streambank Stabilization	1	344	Lin. Feet
Tree Planting (crop, hay and pasture)	23	302	Acres

While BMP implementation activity occurs across Implementation Areas, many of these areas are within the Chesapeake Bay watershed and supported by DEQ and agency partner funding. For example, Eighty-eight percent (88%) of the septic BMPs funded by DEQ were funded within local NPS IPs with 84% of the septic BMPs installed outside of the Chesapeake Bay watershed being within an IP area.

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 34 success stories that address delisting and/or water quality improvement of 53 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. The map below shows the location of success stories in Virginia (Figure 13).

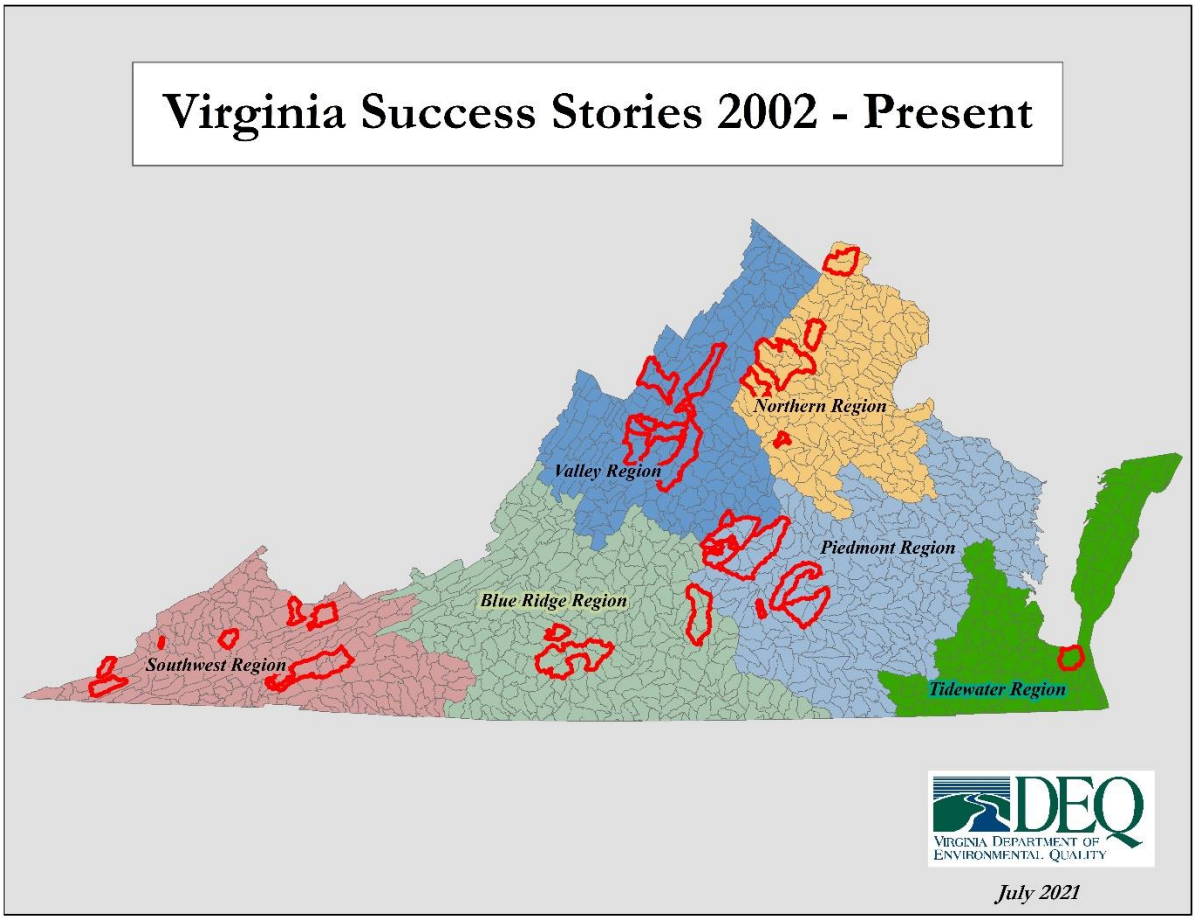

Figure 13: Virginia Success Stories (2002 – Present)

Healthy Waters

2022 Progress Report

The Commonwealth of Virginia defines ecologically healthy waters and 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 mission of DCR's Natural Heritage Program (NHP) is to conserve Virginia's biodiversity through inventory, protection, and stewardship. The Virginia Natural Area Preserves Act, §§ 10.1-209 through 217 of the *Code of Virginia*, was passed in 1989 and codified DCR's powers and duties related to statewide biological inventory: maintaining a statewide database for conservation planning and project review, land protection for the conservation of biodiversity, and the protection and ecological management of natural heritage resources. The NHP leads Virginia's efforts in the identification, monitoring and protection of unique aquatic and terrestrial communities and rare plant and animal species that contribute important ecosystem services or represent significant ecological resources or rare biodiversity from plant and animal species, population and exemplary natural communities. Virginia is a member of the NatureServe Network of 80 Natural Heritage Programs through North, Central and South America, with a common goal of advancing biodiversity

conservation, using consistent methods of data management, mapping and modeling. The Virginia Natural Heritage Program is a leading program in the network, with a well-established record of identifying, prioritizing, and achieving protection for rare species and terrestrial communities. The DCR Healthy Waters Program (HWP) at NHP, collaborates with Virginia Commonwealth University (VCU) and DEQ, to provide a key component for aquatic community classification, prioritization, and conservation. The challenges associated with these important efforts, specifically as they relate to aquatic communities, include:

- Developing an application of objective, quantitative, and diagnostic stream assessment protocols which are consistent statewide assessments to identify communities with intact aquatic integrity; that includes 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.
- Conducting ongoing assessment and expansion to all stream reaches of the Commonwealth to define measurable goals for protection efforts.

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.

NHP manages the HWP and provides program administration; data management and tool development; assistance with field data collection; programmatic oversight; and coordination with land trusts, local governments and others toward conservation of identified Healthy Waters. DEQ has provides significant data and funding from section 319 funds, CBIG funds, and CZM to support the HWP with ongoing partnerships with VDOF, non-governmental organizations (NGOs), and the private sector assisting in broadening the applicability of the program. VCU provides significant technical, field data collection, model development, and data management services. The HWP collaborates with DEQ, VCU, EPA, the Albemarle-Pamlico National Estuary Program, the Nature Conservancy, the North Carolina Department of Natural Resources, conservation partners, and private land brokers to advance the identification and conservation of natural resources. The HWP is continually self-evaluating to fine tune the direction of the Program.

The HWP and partners made significant progress on improving the utility of the program and forging stronger partnerships. This has included the watershed-based conservation planning model to guide the protection of aquatic integrity; continued research to designate and map stream catchments as a possible replacement to the buffer-based approach for identifying priority Stream Conservation Units; enhancements to the *ConserveVirginia* tool to improve the function of planning tools for watershed protection and agricultural BMP targeting and facilitating inter-state coordination to advance shared watershed priorities. The NHP maintains an agreement with the USDA USFS to provide field biologic assessments. Those data inform the development of a high gradient modification to models used by the HWP.

The HWP, in a coordinated effort of DCR NHP, VCU and CZM, evaluated the need for programmatic capacity to support on-the-ground implementation of the HWP. The HWP has benefited from diverse funding sources to support the program, model development, and data development. There are ongoing data development needs but a key program deficiency is the ability to influence conservation outcomes

for identified HW sites, including meeting the CB Healthy Waters Goal. A HWP Field Coordinator (HWPFC) position has been approved to increase HWP field capacity. The position will be supported by CZM, section 319, and CBIG funding, and will work closely with conservation partners to advance conservation implementation. The HWPFC will implement agricultural or forestry BMPs to meet local TMDL WIP measures in impaired but ecologically healthy waters. The HWPFC may leverage the work of the eight (8) Coastal PDCs to assist coastal communities, SWCDs, VDOF, Land Trusts, Nature Conservancy and coordinate with other agencies on HWP community-based natural resource identification and protection.

Virginia has more than 400 ecologically healthy streams, creeks, and rivers throughout the state. Healthy streams are identified by 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 HWP uses high-quality archival data, combined with extensive, new data collected by the VCU stream assessment team, often with assistance from the DCR NHP 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), as "outstanding," "ecologically healthy," "restoration candidate" or "compromised." INSTAR is designed to assist individuals with planning and land use decisions by identifying healthy streams in their communities and encouraging their protection.

While the Chesapeake Bay watershed has been and continues to be a priority, statewide data collection is necessary for the HWP to make a long lasting impact on the natural resources of the Commonwealth. The *ConserveVirgini*a tool is Virginia's data-driven, statewide, land conservation strategy that identifies high value lands, waters, and conservation sites across the Commonwealth of Virginia. Categories in the *ConserveVirginia* are Agriculture & Forestry; Natural Habitat & Ecosystem Diversity; Floodplains & Flooding Resilience; Cultural & Historic Preservation; Scenic Preservation; and Protected Landscapes Resilience, which identify 6.3 million acres of high priority conservation areas representing the best of each category. The *ConserveVirginia* tool helps guide a long-term land conservation strategy for Virginia by serving as a "menu" to guide and inform state land acquisitions, environmental mitigation projects and Virginia Land Conservation Foundation Grants. As previously reported, the NHP and DEQ developed enhancements to the tool by adding the Water Quality Improvement Areas category. This category identifies 790,112 acres of the highest priority lands for conservation in the interest of water quality improvement, which are now part of the *ConserveVirginia* tool. Water Quality Improvement Areas were developed by DCR and DEQ using estimates of nitrogen, phosphorus, and sediment loadings from agricultural sources from the CBP Phase 6 Watershed Model (CAST-2017d) and the Virginia Water Quality Assessment, and Chesapeake Bay WIP III goals. The approach identifies HUC12 watersheds in the 90th percentile in terms of nitrogen, phosphorous, or sediment loadings from any of the assessments used, and then identifies within those watersheds riparian areas along streams, creeks, and rivers for conservation. Buffers were mapped for these waterways, where buffers ranged from 100 feet to 400 feet, depending on steepness of slope of adjacent lands.

ConserveVirginia was identified in Objective 9 of Virginia's Chesapeake Bay WIP III to play an important role in meeting the Commonwealth's water quality goals with a specific focus on advancing the identification and protection of Healthy Waters. New inputs to *ConserveVirginia*'s Water Quality Improvement Category utilize INSTAR data to identify areas for conservation and as well as those agricultural areas that would benefit from additional protections. These areas are classified by INSTAR as Restoration Candidates or Compromised. *Healthy Waters Conservation Opportunity Areas* identify those highest priority lands for conservation in the interest of improving water quality to maintain confirmed healthy waters. These include the identification of HUC12 watersheds in the 50th percentile for nitrogen, phosphorous, or sediment loadings from any of the assessments used, and to identify those watersheds containing confirmed healthy waters.

Within these watersheds, topographic position, stream catchments, stream networks, land cover, and other datasets may be used to model and target lands that could be conserved and improved with riparian buffers to maintain confirmed healthy waters. Once conserved, natural vegetation would need to be established and protected in perpetuity under easement to qualify as a success for *ConserveVirginia*.

The second input to the Water Quality Improvement Category can be used as a management tool to identify the highest priority lands for targeting agricultural BMP efforts to improve water quality for lower-scoring INSTAR reaches with the goal of elevating those scores to facilitate possible, eventual inclusion in the healthy waters dataset. The improvement and protection of water quality is essential for increasing the diversity and integrity of these systems, which in turn may lead to higher INSTAR scores for these vulnerable reaches. Focusing on those agricultural areas that would benefit from cattle exclusion and riparian buffers, utilize INSTAR (historic or new) data as baseline to determine if aquatic integrity could be improved from the application of agricultural BMPs. The process identified where pasture and cropland occur in the landscape relative to INSTAR reaches as indicated by land cover data from the Virginia Geographic Information Network (VGIN). These are areas where agricultural practices might impact the quality of water flowing into INSTAR reaches. To maximize improvement efforts, areas that were likely to have pollution inputs from non-agricultural sources (*e.g.*, urban/suburban NPS or industrial/municipal point source pollution) were excluded from the analysis. The process developed a modeled output that used available data to determine the feasibility of predicting and prioritizing the best agricultural lands for restoration efforts. The relationships between agricultural lands and INSTAR reaches were cross-referenced using Random Forests and the predictor variables mentioned above. Because randomness is introduced for each step and each iteration of the ensemble model, Random Forests is excellent at finding multiple solutions and it is not necessary to ensure predictor variables are uncorrelated. The product highlights pastures where cattle exclusion, and pastures or cropland where riparian buffers, might improve water quality for downstream INSTAR reaches and be used to supplement the data as SB 704 and HB 1422 advance.

Among the tools NHP has developed for conservation planning and environmental review are Natural Heritage Conservation Sites (ConSites), the Predicted Suitable Habitats Summary (PSHS), and *ConservationVision*. ConSites are a tool for representing key areas of the landscape worthy of protection and stewardship action because of the natural heritage resources and habitat they support. Terrestrial sites are boundaries that contain one or more rare plant, animal, or natural community. Sites are designed to include the element (*i.e.*, tracked species and exemplary natural communities) and, where possible, its

associated habitat and buffer or other adjacent land needed for the element's conservation. For rare aquatic species, Stream Conservation Units (SCUs) identify stream reaches that contain aquatic natural heritage resources, including upstream and downstream buffers and tributaries associated with these reaches. There are more than 1,800 terrestrial and SCU site records in the ConSites layer. These sites encompass all reliable, extant element occurrences (EOs) (*i.e.*, mapped locations of elements) documented in the NHP data system. ConSites are given a biodiversity significance ranking based on the rarity, quality, and number of natural heritage resources they contain. The highest ranked ConSites are included in *ConserveVirginia*. With the Program residing in NHP, 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. Streams identified as "healthy" or "outstanding" via INSTAR are integrated into the Natural Heritage Data Explorer and Biotics database at NHP as EOs and SCUs. The continual update of the existing INSTAR point data also delineates Healthy Catchments, a clarification has been made to improve the identification of Healthy Watersheds and the DCR NHP Biotics database reflecting those new SCUs and EOs. The development and addition of field capacity permits the program to leverage those resources through agricultural cost-share, TMDL WIP or other watershed improvement programs to achieve multiple beneficial results in conservation actions for the maintenance of aquatic integrity.

The NHP maintains Virginia's *ConservationVision* as a digital atlas for green infrastructure planning. Green infrastructure is a strategically planned and managed network of natural lands, working landscapes, and other open spaces that conserves ecosystem values and functions and provides associated benefits to human populations. *ConservationVision*, different from *ConserveVirginia*, consists of a suite of maps and spatial data, intended as a resource for guiding strategic conservation efforts by government agencies, private conservation organizations, and regional and local planners. The NHP and its partners use Geographic Information Systems (GIS) to develop spatially explicit models evaluating the importance of areas for diverse interests. The seven models are the Virginia Natural Landscape Assessment, Agricultural Model, Forest Conservation Values (developed by VDOF), Cultural Resource Preservation Index (developed by the Department of Historic Resources (DHR)), Recreation Access Model, Watershed Model, and Development Vulnerability Model. The *ConservationVision* Watershed Model includes four primary components: Watershed Integrity, Landscape Position, Soil Sensitivity, and Land Cover.

The Virginia Healthy Waters Program Manager serves as the Chair for the CBP Goal Implementation Team Four (GIT4; Healthy Watersheds). The team includes various state Healthy Waters programs and partners in the Chesapeake Bay watershed. The Chair leads discussions to improve and develop strategies to advance resource protection in the Chesapeake and encourages the sharing of data and information among partners.

Vulnerable sites identified by the HWP partnership are shared with DEQ's Water Planning Division where TMDLs may be matched to apply protection measures and restoration approaches in areas with overlapping goals, based on the characterization of ecological health. Virginia has committed to a CBP goal of 100 percent of state-identified, currently healthy waters and watersheds to remain healthy, as identified in 2014, by 2025. This goal was set by the Healthy Watersheds GIT and, for Virginia, is based on VCU collected INSTAR data, and the identified Healthy Waters and subsequent SCUs in the Chesapeake Bay watershed. However, in 2015 when the Commonwealth submitted the watershed

associated with the HW site data, the scale of those identified watersheds varied greatly based on watershed position and may range from first or second headwater catchments to fourth order watersheds. To achieve that goal and refine a practical area for on-the-ground conservation, NHP has continued to develop a watershed-based conservation model to protect aquatic integrity at a finer scale. The model has identified 2, 5, 7 and 10km upstream distances from a known HW point to outline the contributing drainage areas based on the United States Geological Survey's National Hydrology Dataset Plus High Resolution (NHDPlus HR) catchments. Those areas are applied to a suite of land use and water quality metrics to predict stream health and areas for conservation opportunity, as confirmed by the assessed INSTAR data. The HWP is employing a watershed-based conservation modelling process to refine the identification of areas that will be priorities for protection ensuring long-term protections might be applied. For the long-term and to meet objectives under the Chesapeake Bay Agreement, NHP is resubmitting to the CBP newly defined areas that would revise the catchments based on those aforementioned criteria. This refinement will permit a more manageable and equitable area to focus on the ground conservation efforts in Virginia by NHP staff, DEQ, SWCDs, land trusts, NGOs, and other on the ground conservation partners. The ecologically healthy watershed-based conservation model and *ConserveVirginia* tools will be matched with the HWP *Criteria for Ecologically Healthy Watershed Conservation* to advance the protection of those ecologically healthy streams.

SCUs identify stream reaches that contain aquatic natural heritage resources or EOs, and include a two-mile upstream and one-mile downstream buffer and tributaries associated with these reaches. However, the linear buffered area that delineates the SCUs has little informative value for land conservation purposes and often misses those terrestrial areas that may be adjacent to the aquatic EO but outside the riparian buffer. Therefore, for conservation planning, prioritization, and project review, if a drainage area delineated to a specific pour-point is identified, it permits the clear identification of riparian and terrestrial resources most relative to the EO. Based on a similar approach as outlined above, the NHP continues to evaluate changing the area to an NHDPlus-HD catchment-defined area. This would be similar to that used in the watershed-based conservation planning model to focus those areas to be considered as part of project review. That new area is being considered to be called the Stream Conservation Site (SCS). Pre-delineated, high-resolution catchment data provide a roadmap of opportunities for project review and for the conservation of critical resources to ensure long-term protection of aquatic ecological integrity. The challenge that this presents is the significant increase in the number of projects that would fall under requirements for review, pushing the limits of capacity to the Environmental Review Team. A decision matrix and transparent dichotomous key approach is being developed to streamline project review for those projects that could be affected by this changed area.

The *Criteria for Ecologically Healthy Watershed Conservation* are an adaptation of EPA's Nine Key Elements of Watershed Planning to a create Healthy Watersheds Conservation Plan. This iterative approach adapts the planning elements with a focus on protection. As the lead nonpoint source agency, DEQ was directly engaged in the development of these planning elements. There are fundamental differences between conservation-based planning and restoration-based planning. One consistent difference is the need to integrate ecosystem-based principles into the conservation elements. This approach moves beyond physical and chemical water quality parameters and considers a holistic, systems-based approach, consistent with the INSTAR assessment. There are also differences between monitoring, resource assessment and the actions typically taken to conserve natural resources that may

differ from corrective actions taken to restore degraded water quality. Conservation measures such as land use plan and ordinance development are strong factors for consideration. The uniqueness of the conservation criteria are the ability to integrate with the existing watershed planning process to address TMDLs. Since any of those sites identified as impaired are also ecologically healthy, the criteria knit with similar concepts. Applying the criteria to guide conservation actions is based on integrating Natural Heritage terrestrial data with the INSTAR assessment and land use characterizations conducted through the *ConservationVision* Watershed Mode to result in protection of identified ecologically healthy waters. The A-I *Criteria for Ecologically Healthy Watershed Conservation* are as follows:

A. Quantify and verify the empirical basis for aquatic communities identified with high ecological integrity

B. Identify conditions needed to maintain existing ecological integrity (*e.g.*, sediment loadings)

C. Identify best management practices and other preventative actions to achieve and maintain the system with high ecological integrity

D. Estimate needed technical and financial resources

E. Provide information, education, and public participation component

F. Include schedule for implementing Non-Point Source (NPS) management measures

G. Identify interim measurable milestones for implementation

H. Establish criteria to determine high ecological integrity is maintained (*e.g.*, land cover as related to sediment)

I. Provide a monitoring component to evaluate effectiveness

The Office of the Secretary of Natural and Historic Resources requested the NHP and the Healthy Waters Program Manager facilitate the development and implementation of a revised Memorandum of Understanding (MOU) for the continued and expanded coordination and cooperation among the North Carolina Departments of Environmental Quality, Natural and Cultural Resources, and Agriculture and Consumer Services, and the North Carolina Wildlife Resources Commission, the Secretary of Natural and Historic Resources, and the Secretary of Agriculture and Forestry and other key partners as named in the Albemarle-Pamlico National Estuary Partnership (APNEP) Comprehensive Conservation and Management Plan (CCMP) toward the conservation and restoration of water and ecosystem resources throughout the Albemarle-Pamlico watershed and estuarine system.

The MOU acknowledged continued support for the "Cooperative Conservation and Management Objectives of the Albemarle-Pamlico Region" signed by the North Carolina Department of Environmental Quality, the North Carolina Department of Natural and Cultural Resources, and the Virginia Secretary of Natural Resources on November 1, 2017.

Specific goals and actions were identified to advance program development towards maintaining high ecological integrity systems. The MOU was signed and implemented on August 31, 2020. The agreement emphasizes interagency and interstate collaboration and coordination of related activities to accelerate environmental and natural resource identification, conservation, and restoration. The MOU also requires a progress report on partnership progress since the 2017 MOU and the development and implementation of a Governor's Agreement between the states and EPA to ensure long-term attention to the region.

Chapter 6 - 2014 Chesapeake Bay Watershed Agreement Progress Report

State of the Chesapeake Bay Program Report to the Chesapeake Bay Executive Council, August 2022

Pursuant to § 2.2-220.1

The Chesapeake Bay Program (CBP) is a regional partnership that works across state lines to protect and restore the Chesapeake Bay watershed. The partners include the U.S. Environmental Protection Agency, the Chesapeake Bay Commission, the District of Columbia and all six watershed states. Through the Bay Program, federal, state and local agencies, non-profit organizations, academic institutions and citizens come together to secure a brighter future for the Bay region. Learn more at www.chesapeakebay.net.

The CBP is guided by the goals and outcomes of the *Chesapeake Bay Watershed Agreement*. Signed on June 16, 2014, this agreement commits the partners to protecting and restoring the Bay, its tributaries, and the lands that surround them. Our environment is an interconnected system and achieving the goals and outcomes of this agreement will support improvements in the health of the watershed and the people who live here. Track progress toward the *Chesapeake Bay Watershed Agreement* at www.chesapeakeprogress.com.

The Chesapeake Bay watershed is a dynamic ecosystem. Tracking changes in its health over time allows scientists to understand the effects of management actions and progress toward meeting health and restoration goals. The data in this report reflect just some of the conditions that are monitored to better understand the Bay and how to protect and restore it.