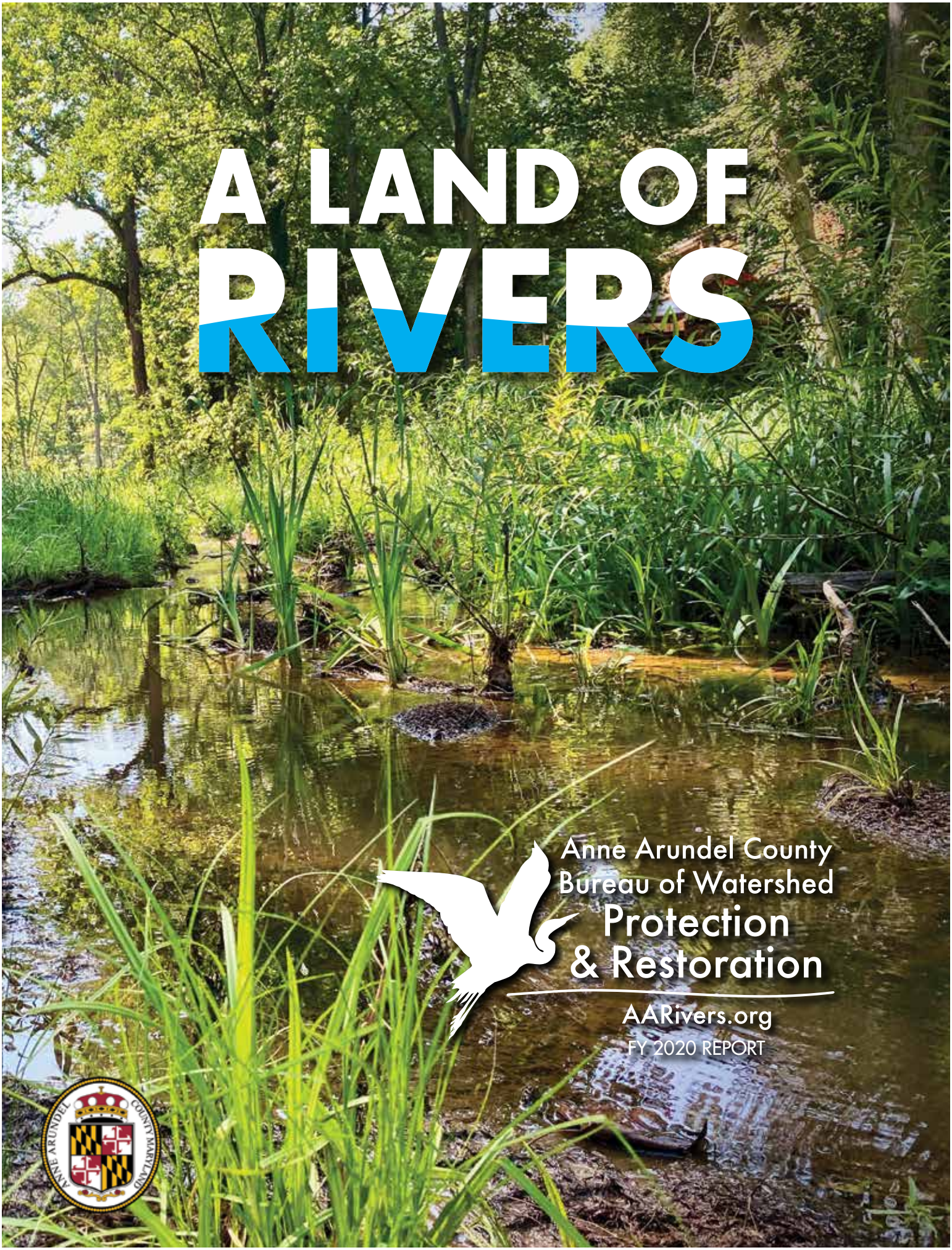

A LAND OF
RIVERS
Anne Arundel County
Bureau of Watershed
Protection
& Restoration
AARivers.org
FY 2020 REPORT
ANNE ARUNDEL COUNTY MARYLAND

Introduction

Dear Anne Arundel County Resident,

Furnace Creek, Dividing Creek, Broad Creek, Marley Creek, Cowhide Branch, Sawmill Creek and Towsers Branch are just a few of the 79 named creeks that make up the over 1,700 miles of streams in our County. These tributaries, along with our major river systems have been the lifeblood of our County since the first settlers arrived over 400 years ago. They are also impaired streams that are being restored through significant County investments.

Since colonial times, human activities have had a profound impact on the streams and rivers that flow across our landscape. From the removal of upland forests to make way for a burgeoning agricultural economy, to the damming of streams that ushered in water-powered mills, to the land development and construction of transportation corridors over the last century, land cover changes have always had tremendous impacts on our waterways.

After centuries of change, our streams are suffering. Many stream reaches have been relocated, straightened and paved with concrete to convey floodwaters and facilitate development. Others have been disconnected from their floodplains and formed deep, incised channels that funnel polluting sediment to the Chesapeake Bay during large rainstorms. However, with the right investments, leadership and community actions, we can reverse the centuries of damage and restore our streams to fully functioning systems once again.

Created in 2013, the Watershed Protection and Restoration Program, has been tasked with assessing and restoring the County's impaired streams, as required by the County's clean water obligations under its Municipal Separate Storm Sewer System (MS4) permit and the Chesapeake Bay Total Maximum Daily Load (TMDL). To date, the County has completed over 120 restoration projects to preserve our waterways as a special place for future generations. This year, my administration recognized the need for continued strong County leadership in these restoration efforts and elevated the Watershed Protection & Restoration Program to its own Bureau within the Department of Public Works.

This Bureau's 2020 Anne Arundel County *A Land of Rivers* report summarizes the watershed protection and restoration actions initiated by the County and our partners during fiscal year 2020 (July 1, 2019 – June 30, 2020). These actions, combined with those from previous years and work by countless community groups and individual residents, will continue to reduce nutrient and sediment pollution to our waterways so we can achieve the water quality goals prescribed in Anne Arundel County's 2012 Watershed Implementation Plan (WIP) for the Chesapeake Bay.

Our community, economy, and culture are inexorably tied to these streams and rivers, and always will be. This *A Land of Rivers* report continues to document the conditions of our waterways, describe solutions and communicate the urgent need to protect our County's waters, and live up to our promise to make Anne Arundel County *The Best Place – For All*.

Sincerely,

Steuart Pittman
County Executive

Watershed Health

Over the last few decades, Anne Arundel County residents have consistently made clear that they want healthy watersheds, rivers, and streams. At the same time, regulatory mandates have increased pressure to address evolving ecological problems. As Anne Arundel County continues to grow, it will be possible to protect and restore water quality and habitat and prevent further degradation of our waterways through a watershed-based approach to protection and restoration.

Solutions that promote healthy watersheds while also addressing other infrastructure objectives are often the most cost-effective approaches. The County defines a healthy watershed as one where hydrology, water quality, and habitat are suitable to protect human health, maintain viable watershed and other ecological functions and processes, and support healthy populations of native aquatic and terrestrial species. Improving watershed health is truly a county-wide effort. Anne Arundel County is committed to managing County operations in a manner that sustains our quality of life and economy while protecting the viability of our natural resources.

This watershed-based approach reflects and implements core Anne Arundel County values. In addition to protecting and improving watershed functions such as providing clean water and habitat, these projects promote improved public safety, economic vitality, and community stewardship. This approach relies on integrating the activities of multiple County departments, and maximizes the use of limited resources by implementing solutions that meet multiple objectives. The County works with regional watershed groups, community associations, business organizations, and individual citizens to accomplish its goals. This collaborative approach enables entities to share resources, combine efforts, and address watershed issues that require a comprehensive approach. By prioritizing improvements that achieve multiple benefits to watersheds and infrastructure, we can cost-effectively meet our regulatory obligations while also achieving a net benefit to the long-term health and livability of our County.

Solutions that promote healthy watersheds while also addressing other infrastructure objectives are often the most cost-effective approaches.

Regulatory Drivers

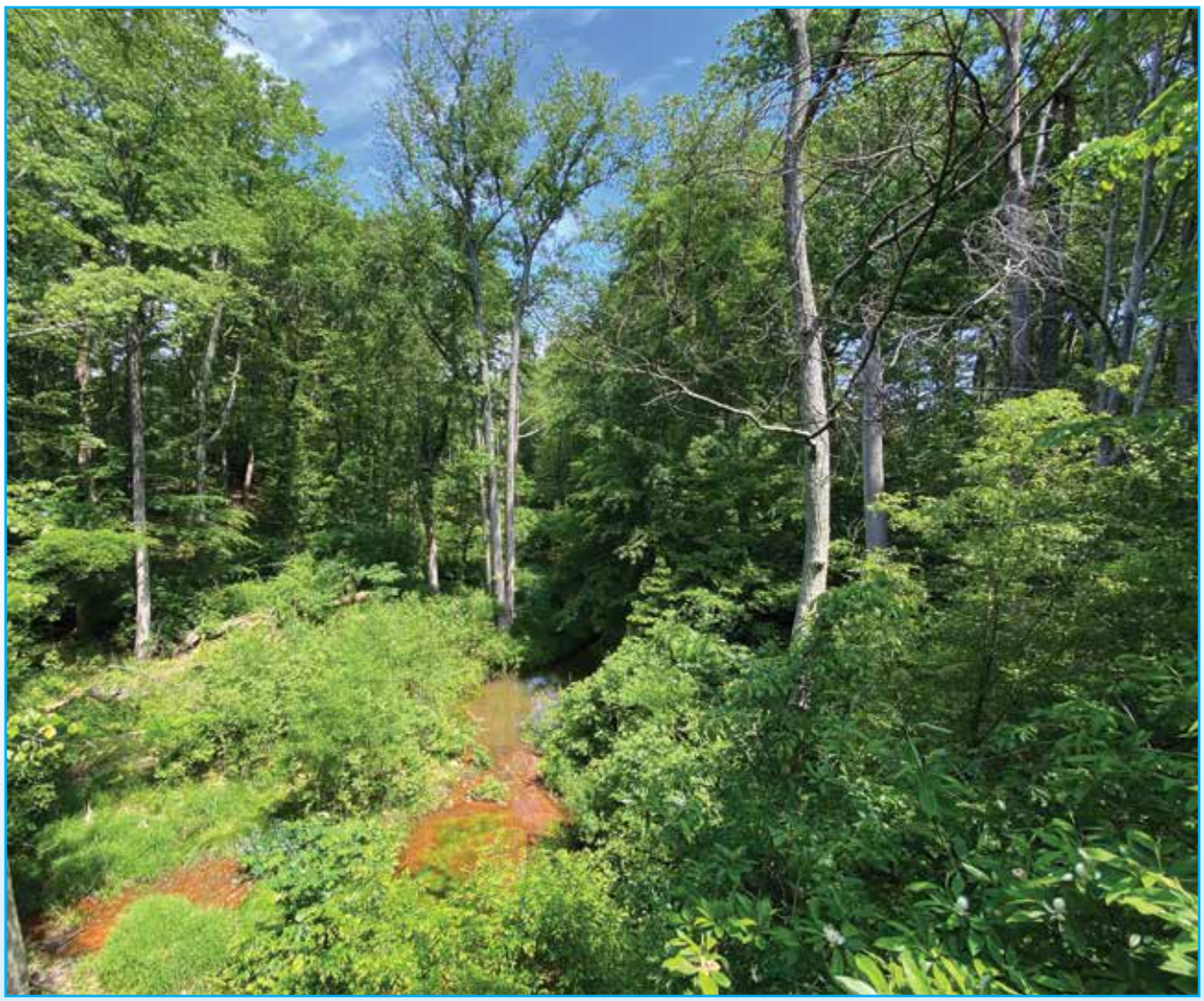
Anne Arundel County's National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System (NPDES-MS4) permit and the Chesapeake Bay Total Maximum Daily Load (TMDL) set forth rigorous goals for controlling stormwater pollution and improving water quality. The NPDES-MS4 attainment goal tracks the restoration of 20% of Anne Arundel County's impervious surface area, such as roads, sidewalks, and driveways, which have little or no stormwater management. The County's Phase III Watershed Implementation Plan (WIP) tracks the nutrient and sediment load reductions allocated to the County by the State for achieving the Chesapeake Bay TMDL. Progress toward meeting the Chesapeake Bay TMDL is reported as 2-year milestones to the Maryland Department of the Environment.

The seven jurisdictions (Delaware, the District of Columbia, Maryland, New York, Pennsylvania, Virginia, and West Virginia) in the Chesapeake Bay Program (CBP) partnership agreed to develop Watershed Implementation Plans (WIPs) in three phases to provide a framework for reducing nitrogen, phosphorus, and sediment loads to meet water quality standards in the Chesapeake Bay and its tidal tributaries. The Phase 3 WIPs provide a road map for the numeric and programmatic commitments the jurisdictions intend to implement between 2019 and 2025 so that all practices are in place by 2025 to achieve the Bay's dissolved oxygen, water clarity/submerged aquatic vegetation, and chlorophyll-a standards.

2019 – 2020 2 Year Milestone Highlights (Stormwater, Wastewater, Septic)

- **19** – BWPR stormwater management restoration projects completed
- **6** – NGO stormwater management projects funded
- **6** – NGO stormwater management projects completed
- **139** – culverts and storm drains repaired or replaced
- **6,779** – curb miles swept
- **204** – nitrogen reducing septic systems installed
- **15** – septic systems connected to sewer

The Restoration Plan

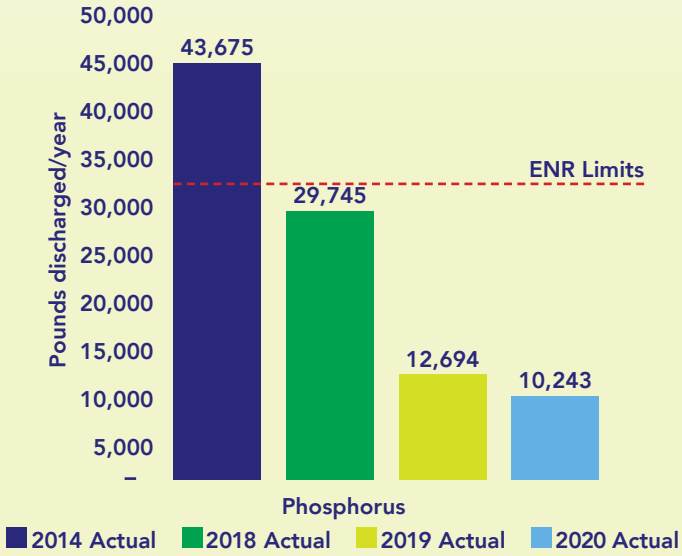


Anne Arundel County is committed to helping Maryland meet its Chesapeake Bay clean-up goals by 2025. The County has already upgraded its six Water Reclamation Facilities (WRFs) to the highest level of wastewater treatment technology, dramatically reducing the amount of nitrogen and phosphorus to local waterways and the Chesapeake. In addition, the BWPR continues to provide treatment for stormwater runoff from those areas of the County developed prior to modern stormwater management regulations. Finally, the County is pursuing innovative strategies to deal with additional wastewater pollution from the septic sector, in concert with the Anne Arundel County Health Department and Maryland Department of the Environment.

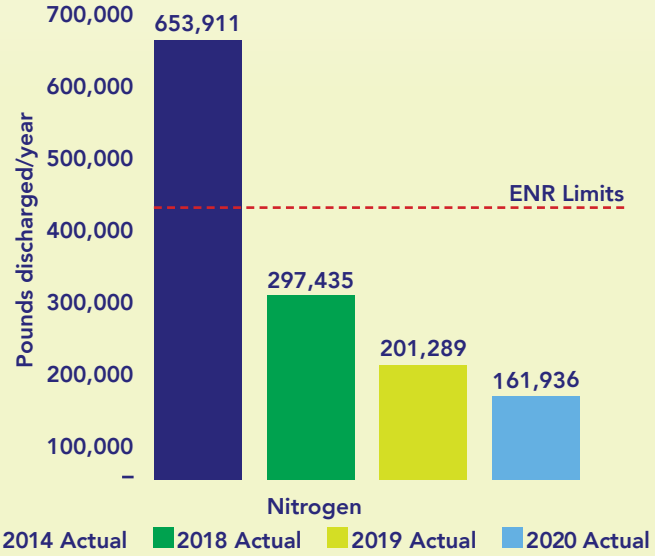
Water Reclamation Facilities – Enhanced Nutrient Removal
Anne Arundel County's $249 million investment to upgrade each of its six Water Reclamation Facilities (WRF) with Enhanced Nutrient Removal (ENR) technology was completed in July 2017. These ENR upgrades have enabled each plant to remove a far greater amount of nutrients, like nitrogen and phosphorus, from treated wastewater discharged to our rivers, creeks, streams, and Chesapeake Bay after the treatment process.

All County-owned facilities have been upgraded to achieve annual average nutrient goals of wastewater effluent quality of Total Nitrogen (TN) at 4 mg/l and Total Phosphorus (TP) at 0.3 mg/l. Over the past two years, the new facilities have been performing at a level well below the required limits for Total Nitrogen and Total Phosphorus discharge rates.

Anne Arundel County Permitted Phosphorus Discharge Limits



Anne Arundel County Permitted Nitrogen Discharge Limits



Stormwater Remediation

As of the end of FY20, the County had achieved over 81% of the restoration requirements under its current MS4 permit, with the rest of the required work in the procurement, design, and construction pipeline. The County was able to use the over performance of its WRF's to generate "Nutrient Credits" to trade in time with the stormwater sector and achieve permit compliance.

Septic System Conversions

There are approximately 41,000 septic systems in Anne Arundel County. Of these, several thousand are located within the "Critical Area," land within 1,000 feet of tidal waters. The typical septic system does not remove nitrogen, instead delivering about 23.2 pounds of nitrogen per year to the groundwater, which eventually makes its way to our streams and rivers.

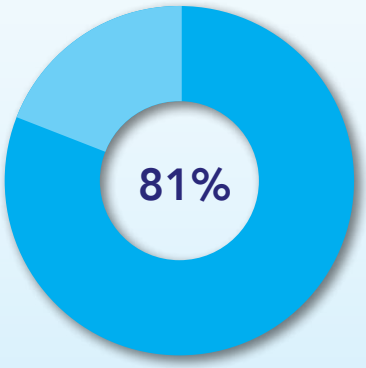
The Anne Arundel County Department of Health locally administers the Bay Restoration Fund (BRF). The BRF is a state-supported initiative that provides funding to replace

conventional septic tanks with nitrogen-reducing technology. The units reduce the amount of harmful nutrients, such as nitrogen, that septic systems discharge into the Chesapeake Bay and its tributaries. An upgraded, nitrogen-removing septic system cuts a system's nitrogen load in half. The Department of Public Works and Health Department continue to work closely together to direct Bay Restoration Funds for septic conversions and septic-to-sewer connections, as revenues a re available.

In FY20 the Department of Health improved water quality through the BRF, which cost-shared 204 pretreatment units and 15 connections to public sewer. For more information on the BRF grant program, visit www.aahealth.org.

WPRP MS4 Attainment Goals

(acres to date/required acres)



MS4 Permit Progress Tracking
4038 out of 4996 Completed

Funding History

Through fiscal year 2020, the majority of the County's stormwater-related work was funded through the Watershed Protection and Restoration Fee (WPRF), an impervious surface-based fee on properties throughout the County. That work includes not only the County's clean water restoration projects, but also the maintenance and replacement of existing drainage infrastructure, the inspection of public and private stormwater facilities, and key programmatic efforts around environmental education, illicit discharge detection and elimination (IDDE), and monitoring of restoration projects to evaluate their success. As detailed in this report, the WPRF supports staff in the Department of Inspections and Permits, Department of Public Works Bureau of Highways, Anne Arundel County Soil Conservation District, and the Department of Public Works Bureau of Watershed Protection and Restoration working to protect and restore the County's watersheds.

In February of 2019, the BWPR submitted a Financial Assurance Plan to MDE detailing the past, present, and anticipated expenditures required to satisfy its current MS4 permit. That plan is available at aarivers.org and will be updated again in 2021.

How is the fee calculated?
The Department of Public Works utilized Geographic Information Systems (GIS) technology along with parcel data collected from the Consolidated Property File and County Zoning Maps to estimate the imperviousness of residential properties in the various zoning districts. This information was used to determine a baseline Equivalent Residential Unit (ERU) of impervious surface of 2,940 sq. ft. An ERU is the base unit for calculating the annual charge for residential and non-residential properties. Currently the charge is $89.25 per ERU, per year.

The fee structure varies between land use type and intensity as seen in the table below:

ANNUAL WATERSHED PROTECTION AND RESTORATION FEE RATES		
Zoning	Rate Calculation	Current Fee
R10, R15, R22	$89.25 x .4	$35.70
R1, R2, R5	$89.25	$89.25
RA, RLD	$89.25 x 2	$178.50
Non-Residential	Actual sf of impervious surface divided by 2,940 x $89.25	Varies

To view the WPRF for your property, visit www.aarivers.org

Healing Our Rivers

The health of Anne Arundel County's waterways is tied to the health of its watersheds. While the health of the Chesapeake Bay itself is integrally tied to inputs from the region's largest waterways, such as the Susquehanna and Potomac Rivers, the health of our rivers and creeks has been demonstrated to be largely driven by activities – both past and present – in our own, local watersheds. Nutrient discharges from our water reclamation facilities and septic systems, and sediment and nutrient runoff from our businesses and homes are the drivers of our local impairments. Our restoration work, paired with that being required of the other bay jurisdictions, can ensure that our creeks and rivers, as well as the Chesapeake Bay, are on the path to recovery.

Bureau of Watershed Protection and Restoration - Carrying Out the Plan

The Bureau of Watershed Protection and Restoration develops and delivers technical environmental assessment, restoration planning and implementation information and regulatory support to the Departments of Public Works, Inspections and Permits, and the Office of Planning and Zoning. This support enables these agencies to carry out their responsibilities for successfully managing delegated programs outlined in the County's NPDES-MS4 Permit, the State's Critical Area program, and the State Forest Conservation Act, as well as their responsibilities for land use decisions set forth in the County Code.

Implementation of the BWPR stormwater restoration strategy is focused on three key areas:

- **Stormwater Pond Retrofits -** Existing facilities, such as dry ponds, detention ponds, or infiltration basins that have failed or are outdated are rebuilt to optimize their pollution reduction capacity and provide an array of ecosystem benefits.

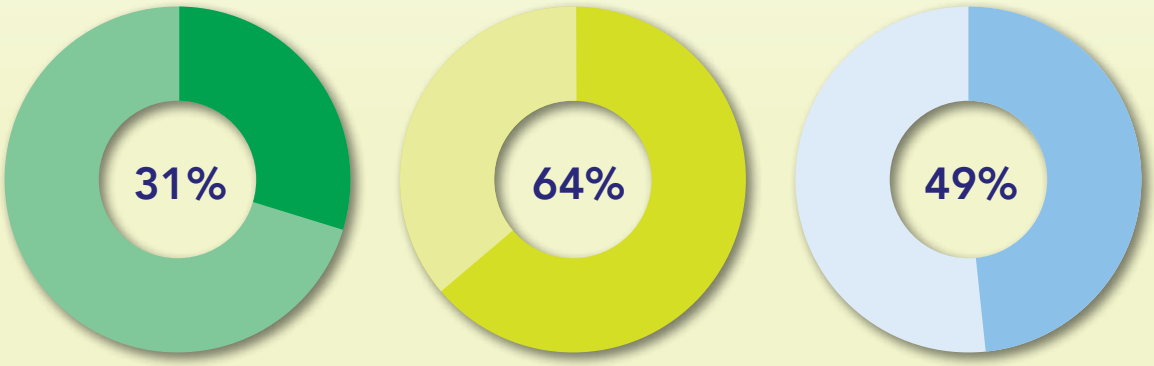
- **Stormwater Outfall Repairs -** Eroded or failing stormwater outfalls – locations where drainage systems discharge onto erosive soils – are reconstructed into systems that can both safely convey high flows as well as provide water quality benefits and habitat.

- **Stream & Wetland Restoration -** Stream erosion is the largest contributor of sediment and phosphorus to our local rivers, and the County's strategy to stabilize and re-hydrate valley bottoms through restoration will provide water quality, flood plain connection, and ecological benefits on a broad scale.

In addition to the work above, funds from the WPRF are used to address a $40+ million backlog of stormwater infrastructure repairs and replacement, ensuring that the County's culverts and drainage infrastructure are functioning properly and are not a threat to public health and safety.

BWPR Restoration Project Goals

(Number of projects completed/anticipated)



Stream & Wetland Restoration
15 out of 49 Completed

Stormwater Pond Retrofits
87 out of 1437 Completed

Stormwater Outfall Repairs
19 out of 39 Completed

Highlighted BWPR Projects Completed in FY20

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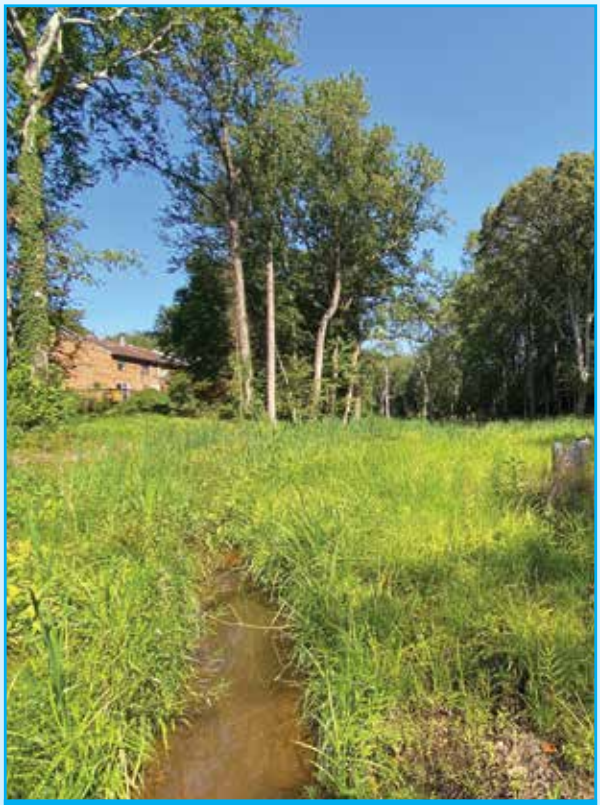
Cat Branch Stream Restoration: Cat Branch was highly incised with four to six feet high stream banks, likely caused by the effects of historic farm ponds and altered hydrologic regime due to development prior to modern stormwater management regulations. The project included raising and reconnecting the entire reach to the floodplain through stream and valley restoration with a stable low flow channel and valley-wide wetland complex. In addition a riffle grade control structure was constructed just downstream of an exposed sewer line to protect the utility crossing from erosion, by bringing the stream bottom up.

The project design approach included stream and valley restoration to provide a functional low flow channel and an active, well connected floodplain to maximize surface-groundwater exchange and promote improved nutrient retention and removal. Combination log-stone riffles, a valley grade control structure, and a clay groundwater dam were installed upstream to stabilize active head cuts, provide long term grade control, and raise groundwater hydrology which will enhance adjacent wetland areas.

Millrace Pond Retrofit: This stormwater management facility was originally designed in 1981 as a detention basin to provide flood control for the surrounding community. However, the old facility was outdated and contributed no water quality benefits, despite its generous footprint. Installed in its place was a constructed wetland design which combines a wet pond with high and low marsh wetland areas that will maximize pollutant removal and provide habitat for native faunal species. The high and low marsh wetland benches surrounding the pond were planted with native wetland species to maximize pollutant removal efficiency and provide habitat for native faunal species.

In addition to the ecological and environmental function provided by the constructed wetland, the design also features a 75' by 175' recreation field for the Millrace community. By



Cat Branch Stream Restoration

Millrace Pond Retrofit

incorporating this recreation area into the proposed design, the Millrace constructed wetland is notable in that it satisfies the modern trend of creating mixed-use and sustainable living areas.

Furnace Creek Stream Restoration: Furnace Creek was infamous for its long, winding concrete channel created in the 1960's to help control flooding in downtown Glen Burnie and the surrounding community. A large scour pool used to exist at the downstream limit of the concrete channel dropping the water surface elevation by approximately 4 feet at the end of the concrete. Where the concrete ended was primarily wooded, and the natural stream was incised and had near vertical stream banks in most areas.

Unique to the project was the removal of 1,000 ft and burial of 1,000 ft of the concrete channel and the creation of 6 acres of riparian wetlands. The design created a highly-connected, low energy wetland floodplain system that reduces floodplain shear stress to sustainable levels. The project maintains a riparian wetland floodplain system through the reach and creates a stable restored stream channel that enhances water quality and wildlife habitat.

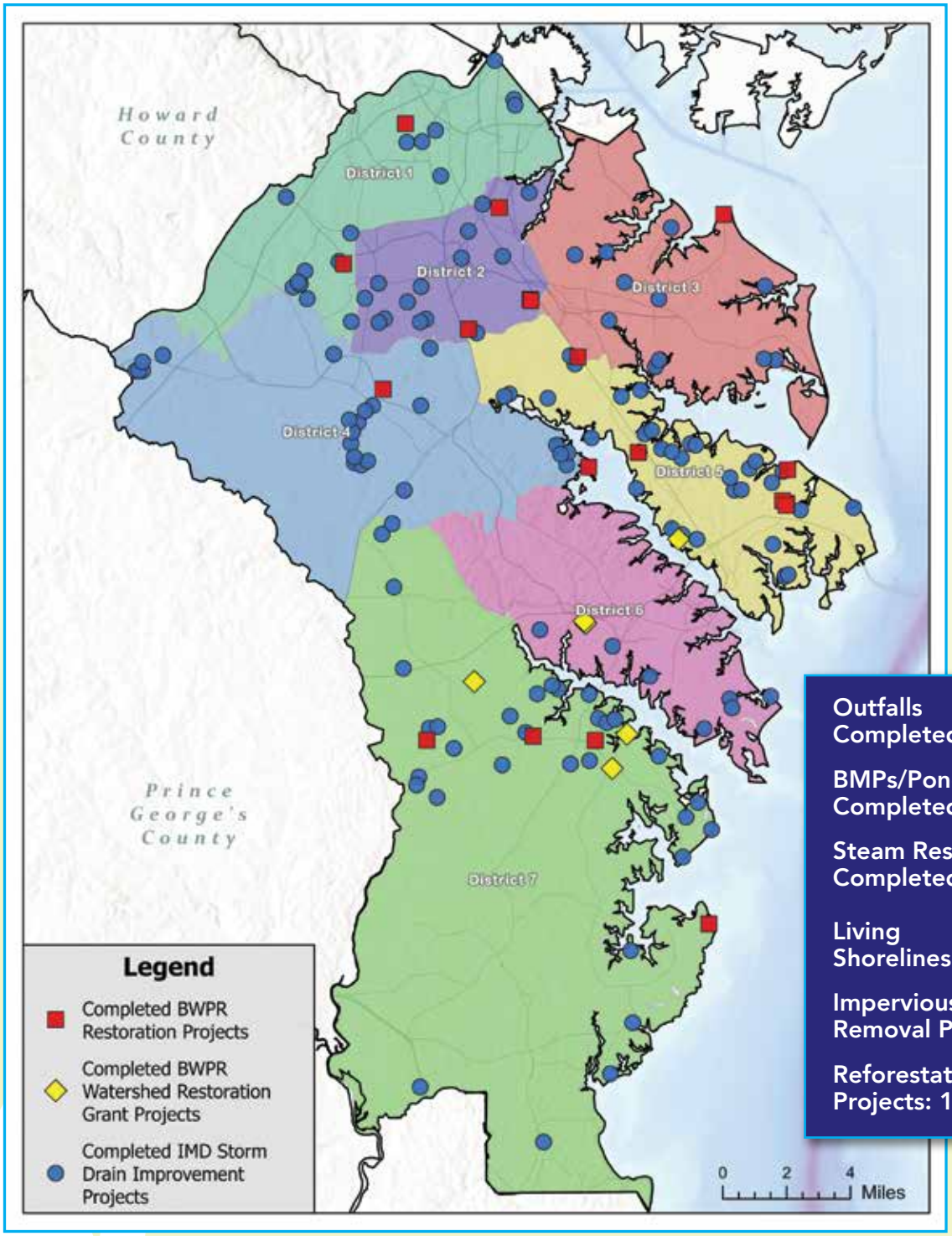
Additionally, the detailed design approach elevates groundwater to help sustain the extensive riparian wetland system throughout the floodplain, increase carbon sources to benefit water quality, promote greater filtration of surface water nutrients through the expanded riparian wetland system, enhance the hyporheic exchange zone to improve groundwater treatment and base flow, and provide opportunities for ecological uplift.

Furnace Creek Pre-Restoration

Furnace Creek Post-Restoration

BWRP Restoration Projects Completed in FY20

The following projects were constructed to meet multiple objectives including: water quality enhancement, infrastructure protection, improved flood attenuation, improved fish habitat, and improved riparian functions.



Outfalls Completed: 3

BMPs/Ponds Completed: 7

Steam Restorations Completed: 3

Living Shorelines: 3

Impervious Surface Removal Projects: 2

Reforestation Projects: 1

Infrastructure Management Division (IMD) - Stormwater Management

Effective operations and maintenance practices are critical to watershed health. The County operates and maintains a wide range of infrastructure to protect public health and safety, water quality, and property. It is important to ensure operations and maintenance activities not only keep those assets in good working order, but also protect water quality and habitat functions.

The Infrastructure Management Division is responsible for managing the inventory, inspection, and development of the County's Stormwater Infrastructure Capital Program. This program aims to repair and/or replace aging, damaged storm drain systems and culverts throughout the County, as well as address any associated design and permitting requirements. These projects are normally identified and transferred to the IMD by the Road Operations Division and are scheduled in a worst-first priority order.

Funds from the Bureau of Watershed Protection and Restoration are used to address stormwater infrastructure repairs and replacements, ensuring that the County's culverts and drainage infrastructure are functioning properly and are not a threat to public health and safety.

INFRASTRUCTURE MANAGEMENT DIVISION PROJECTS BUDGETED IN FY20	
Culvert & Closed Storm Drain Repair	$4,767,000
Emergency Storm Drain	$2,350,000
Storm Drain/SWM Infrastructure (BWPR)	$1,000,000
TOTAL	**$8,117,000.00**

FY20 INFRASTRUCTURE MANAGEMENT DIVISION BWPR CAPITAL PROJECTS	
Council District	# of IMD Projects
1	17
2	13
3	12
4	25
5	33
6	7
7	32
TOTAL	**139**

IMD & Road Operations Division Milestones

The Infrastructure Management Division is also responsible for managing the inventory, inspection, and maintenance of over 850 stormwater management facilities that are collectively referred to as Best Management Practices (BMPs). In addition, IMD works alongside the Road Operations Division to sweep County roads to remove loose materials, litter, and other debris that is unsightly, hazardous, or could cause possible drainage obstructions.

2020 MILESTONES	
ACTION	RESULT
BMP's Inspected	591
Curb Miles Swept	6,654
Tons of Litter Collected (Street Sweeping)	391
Storm Drain Structures Cleared	2,237
Linear Feet of Drain Pipe Cleared	88,756
Linear Feet of Ditch Cleaned	129,474
Storm Drains Cleared	6,637

Watershed Protection and Restoration Fund Revenue and Expense Report

Maryland Environment Code Ann §4-202.1 (2013) requires that a county make a report publicly available, beginning on July 1, 2014, and every two years thereafter. This requirement was amended in FY15 to require annual reporting of operating expenditures. The following report is being issued to meet these revised requirements, and includes revenues and expenses for FY20, the seventh year of implementation for the Watershed Protection and Restoration Fund in Anne Arundel County, Maryland. This report includes expenses incurred beginning July 1, 2019 through June 30, 2020.

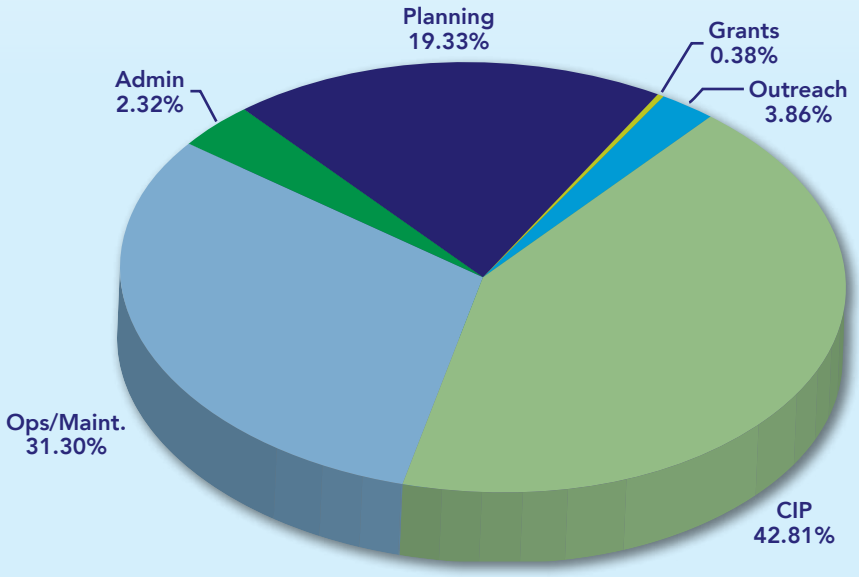
Revenues

The Watershed Protection and Restoration Fee was first billed on property taxes on July 1, 2013. There were 212,980 properties in Anne Arundel County that were subject to the fee. For FY20, Anne Arundel County has received $23,327,000 in revenues as of June 30, 2020. In addition to the Watershed Protection and Restoration Fees, the County has received $1,749,000 to fund watershed protection and restoration projects from other sources.

Expenditures

Operating expenditures for FY20 totaled $21,617,000. It should be noted, that the County has taken a more aggressive approach to debt service in FY20, which has resulted in $6,928,000 being paid in FY20 out of the total operating expenditures. Of these expenditures, $6,765,000 was spent on operations and maintenance activities for the County's stormwater infrastructure. An additional $4,179,000 was spent for planning for future improvements to these systems. The fund balance of $3,459,000 will be used to pay debt payments associated with the capital improvement projects required to update the aging infrastructure and the construction of best management practices for locations that do not meet current requirements.

FY20 Operating Expenditures



Stream Restoration Effectiveness Monitoring

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Furnace Branch Stream Restoration Assessment

A tributary to the Patapsco River, Furnace Branch was converted from a natural steam system to a concrete floodway back in the 1950's or 1960s. This reach of Furnace Branch receives drainage from a watershed that was developed prior to stormwater management requirements and is approximately 51% impervious. In 2019, a major restoration effort was implemented to restore the site from a concrete drainage ditch to a stream/wetland complex that is much more natural in character. BWPR staff monitored water chemistry for two years before restoration activities began and will commence post-restoration water chemistry monitoring as part of multi-faceted assessment to track changes in overall health of this watershed. Automated monitoring equipment is used to collect storm event samples.

For stream reaches where restoration work has not occurred, the purpose of this effort is to continue or begin an evaluation of baseline biological conditions before restoration work commences, to understand potential geomorphic (stream channel) instability within the reaches of interest, and to evaluate habitat conditions within the study reaches.

For sites that have already been restored, the purpose of the work is to evaluate any changes in habitat or biological conditions observed in the restored reaches or in reaches immediately up or downstream of restored reaches.

FY 2020 PROGRESS:

- Characterizing water flow through the new project has begun. This is a critical step in understanding post-restoration storm event flows and in estimating post-restoration pollutant loading rates.
- Automated water monitoring is expected to resume during mid to late 2021.

Illicit Discharge Detection and Elimination (IDDE) Program

The BWRP is responsible for implementing the County's Illicit Discharge Detection and Elimination (IDDE) Program, which focuses on identifying and eliminating illicit discharges to the County's storm drain system. An illicit discharge is defined as any discharge to the storm sewer system that is not composed entirely of stormwater (except where allowed by a discharge permit). BWPR collaborates with other County agencies that have the legal authority to inspect and enforce any identified illicit discharges. The County's IDDE program has been successful in the identification and removal of a wide variety of sources of pollutants, including illicit connections, upland pollutant sources, illegal dumping, and spills. During the course of the County's annual outfall field screening, observed flow during dry weather conditions is tested for pollutants and the source of flow is investigated. During FY20, 155 outfalls were successfully inspected and seven (7) potential sources of illicit discharges were identified. Of these, four were confirmed as illicit discharges, with one additional incident being the result of a likely private water line leak. By the end of the fiscal year (June 30, 2020), the Department of Inspection and Permits (I&P) had resolved all but one of these incidents. To report a potential illicit discharge or other environmental violation contact the Anne Arundel County Environmental Hotline at 410-222-7171.

Case Study

In January 2020, the County's IDDE consultant observed discolored, odorous water actively flowing from a stormdrain outfall in Linthicum Heights. Chemical testing of the discharge revealed a high level of detergents. The team returned to the outfall the following day and observed similar conditions. The field team conducted a thorough investigation of the source of the discharge and found the discharge accumulating in a commercial driveway before entering a stormdrain inlet. Further trackdown of the discharge led the team to a car wash building, where the discharge was observed flowing from the seams of the curb surrounding the building. The team immediately reported their findings to BWPR and the Department of Inspections and Permits (I&P). The intermittent nature of the observed flow was consistent with car wash operations.

I&P began their investigation immediately upon receiving notification of the incident. Upon arrival at the site, I&P inspectors observed the same actively flowing effluent at the outfall and at the car wash building. The inspector spoke with car wash personnel and the property manager regarding the discharge, who agreed to make the necessary plumbing repairs to correct the issue. Two days later I&P returned to the site for a follow-up investigation and confirmed that the plumbing repairs were made. The inspector observed no discharge exiting the car wash building, nor was there any discharge flowing from the outfall. Another follow-up visit 3 days later confirmed the plumbing repairs were still working, as no discharge was observed at the building or the outfall.

Watershed Partnerships

Successful conservation and preservation of Anne Arundel County's watersheds takes teamwork. To that end, in 2014 the Anne Arundel County Department of Public Works, in partnership with the Chesapeake Bay Trust, created the Anne Arundel County Watershed Restoration Grant Program, a community grant program to support watershed restoration activities throughout the County in order to improve water quality in local streams and rivers.

The grant program was created to engage local nonprofit organizations, landowners, and communities in efforts to restore the County's waterways; to provide resources to these groups to enable them to implement greening and water quality projects; and to assist Anne Arundel County's efforts to meet the requirements of its state and federal stormwater permit and local waterway cleanup plans. This program encourages on-the-ground restoration activities that reduce stormwater flow and pollutants and engage Anne Arundel County residents in these activities.

Below is a list of organizations that were awarded funding from Anne Arundel County for water quality restoration projects in 2020:

ORGANIZATION	PROJECT DESCRIPTION	WATERSHED	FUNDING AMOUNT	MATCH AMOUNT	IMPERVIOUS ACRES TREATED
Ulmstead CIA	Ulmstead Community Park Rain Garden	Magothy River	$18,900	$19,762	.33
Loch Haven Civic Assoc.	Loch Haven Beach Restoration/Living Shoreline	South River	$129,034	$152,534	6.5
Arundel Rivers Federation	Broad Creek/Camp Woodlands Stream Restoration	South River	$43,198	$895,093	43.5
Arundel Rivers Federation	Beards Creek/Annapolis Landing Outfall & Stream Restoration	South River	$349,312	$503,504	33.6
Severn Riverkeeper	St. Dixon / Central Sod Farm Restoration	Severn River	$242,567	$320,995	3.8
Severn River Association	West Severna Park Living Shoreline	Severn River	$32,277	$12,226	1.2
Arundel Rivers Association	Broad Creek Park Stream Restoration	Severn River	$364,225	$1,430,420	130.1
TOTAL			**$1,179,513**	**$3,334,534**	**219.03**

More information about the grant program can be found at www.cbtrust.org.

Arlington Echo Outdoor Education Center - Chesapeake Connections

The Arlington Echo Outdoor Education Center is operated by the Office of Environmental Literacy and Outdoor Education Program of Anne Arundel County Public Schools. Arlington Echo Outdoor Education Center offers Anne Arundel County students year-round opportunities to experience the natural environment. The Outdoor Education programs at Arlington Echo use environmental and outdoor learning to enhance, extend and enrich classroom curriculum. Arlington Echo hosts fourth grade elementary students on day and overnight trips, but also hosts middle, and high school groups.

Chesapeake Connections is the Outdoor Education outreach program of Arlington Echo which connects classroom instruction with a series of relevant hands-on experiences that lead to environmental stewardship. The staff at Arlington Echo Outdoor Education Center provide support and expertise to complete yearlong environmental service-learning projects as part of Chesapeake Connections with many Anne Arundel middle and elementary schools. The service-learning projects are incorporated into each school's curricula and involve using community areas or school grounds for environmental restoration activities. The program works to restore and/or create bogs, raingardens, and manage runoff areas on school grounds or in the community to treat stormwater pollution. These projects meet growing environmental needs in our area and help protect the Chesapeake Bay.

The BWPR has partnered with the Chesapeake Connections program to provide hands-on experiences for Anne Arundel County students through the planting of native trees and other vegetation at several restoration projects. In 2020, over 850 Anne Arundel County Public School students participated in planting events at 1 newly restored water quality project site in the County.

Below is a listing of those opportunities that occurred during 2020 (Note: Because of the COVID-19 pandemic, the Chesapeake Connections Program, in an abundance of caution, was halted in March 2020. Several other restoration sites were scheduled for plantings.):

Barrensdale Outfall Repair: Old Mill Middle School South – 347 6th grade students and Severna Park MS – 510 6th grade students

Anne Arundel County Watershed Stewards Academy (WSA)

A LAND OF RIVERS

The Anne Arundel County Watershed Stewards Academy was created in 2009 out of a partnership between Arlington Echo Outdoor Education Center and the Anne Arundel County Department of Public Works to build capacity within communities to reduce pollutants entering our waterways via stormwater runoff. The Bureau of Watershed Protection and Restoration continues to provide critical support in connecting Stewards and communities with watershed studies, planning, and restoration efforts.

WSA trains citizens in Anne Arundel County to help neighbors reduce pollution in our local streams, creeks, and rivers. WSA's hands-on training course gives Stewards the tools to bring change to their communities, by turning knowledge and good intentions into action. Stewards work with communities to install projects such as rain gardens or conservation landscapes that capture polluted runoff. Collectively, these community and individual actions add up to better health for our local waterways and the Chesapeake Bay.

2020 WSA Successes

- Installed 96,655 square feet of new-in-the-ground projects
- Reached 8,422 County residents, providing technical assistance or environmental education
- Planted 9,390 Native Plants and Trees
- Stewards donated 9,929 volunteer hours towards restoration, education, and outreach in their communities
- Removed 23,670 square feet of invasive species
- Removed 14,640 pounds of trash

For more information about WSA visit www.aawsa.org

Public-Private Partnerships - A Win-Win Situation

During FY20, the Bureau of Watershed Protection and Restoration awarded $3.016 million to an Anne Arundel County-based companies to restore 2,875 feet (more than half a mile) of shoreline through its innovative Full Delivery of Water Quality Improvements contract.

Launched in 2016, this is the fourth award of the county's "Full Delivery of Water Quality Improvements" contract, designed to increase the county's environmental restoration capacity. The contract is structured to help Anne Arundel County meet its federal pollution reduction permits and goals by partnering with the private sector to implement cost-effective restoration projects that reduce runoff. Specifically, the work will support the county's Municipal Separate Storm Sewer System (MS4) and Chesapeake Bay Total Maximum Daily Load (TMDL) permits.

The winning design-build team,

consisting of Bayland Consultants and Designers, LLC, based in Hanover, and their sub-contractor, Shoreline Design, LLC, of Edgewater, will undertake the landowner coordination, design, permitting, and construction of two living shoreline projects in the County.

Project one is located in Shadyside, at the mouth of the West River, and consists of a 675' extension of a living shoreline project recently installed to protect and enhance Jack Creek Park.

Project two, a 2,200' living shoreline project at the mouth of the Severn River near Annapolis, will enhance a conservation tract owned by a local nonprofit organization that serves as an outdoor environmental education venue as well as great blue heron rookery, migratory shorebird habitat, and home to bald eagles and osprey.

Both projects will provide protection for existing marsh and wetland as well as create additional, vital intertidal habitat. The full award will only be paid upon completion of the projects and verification of the project's benefits. The county's capital program intends to make an additional solicitation in the fall of 2020.

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Anne Arundel Soil Conservation District -

Helping the County Meet its Chesapeake Bay Cleanup Commitments

For more than 70 years, farmers have turned to the Anne Arundel Soil Conservation District as a trusted source of knowledge and technical expertise in managing and protecting soil and water resources on their farms. Today, farmers, developers, businesses, environmental groups, and government agencies rely on the District to help them meet nutrient and sediment reduction goals outlined in the county's Watershed Implementation Plan to protect and restore the Chesapeake Bay by 2025.

Agricultural Programs

The Phase III Watershed Implementation Plan was published on August 23, 2019 and agriculture is well on its way to reducing the nutrients and sediment reaching the Bay, reducing nitrogen levels by 20%, phosphorus by 26% and sediment by 28% since 2017. This success is largely due to the on-the-ground efforts of our soil conservation professionals, who work with farmers to develop Soil Conservation and Water Quality Plans (SCWQPs) that address natural resource and environmental concerns for their farms. These plans usually include a menu of best management practices (BMPs) that can be installed to protect soil and water resources. Cover crops and streamside buffers are often recommended to prevent nutrients from crop fields and nurseries from entering waterways. Livestock fencing, watering facilities and improved pasture management practices help farmers protect streams from livestock impacts.

In FY20, the Anne Arundel Soil Conservation District developed/updated 78 SCWQPs for county farms. These plans included more than 81 (32 WIP) BMPs. The design, installation and construction supervision of these practices are the responsibility of the District's technical staff.

Urban Programs

Construction and road building projects can have a significant impact on water quality. The District is authorized to review and approve erosion and sediment control plans for projects in the county. This ensures that environmental safeguards are in place to minimize soil erosion, nutrient runoff and sediment buildup in local waterways. In FY20, the District reviewed 1,156 erosion and sediment control plans for construction projects on 29,555 acres. Approximately 286 (24.7%) of these plans were new submittals totaling 2,597 acres. To further protect the County's valuable natural resources, the District provides recommendations to homeowners with drainage, erosion, and shoreline erosion concerns.

Conservation Partners

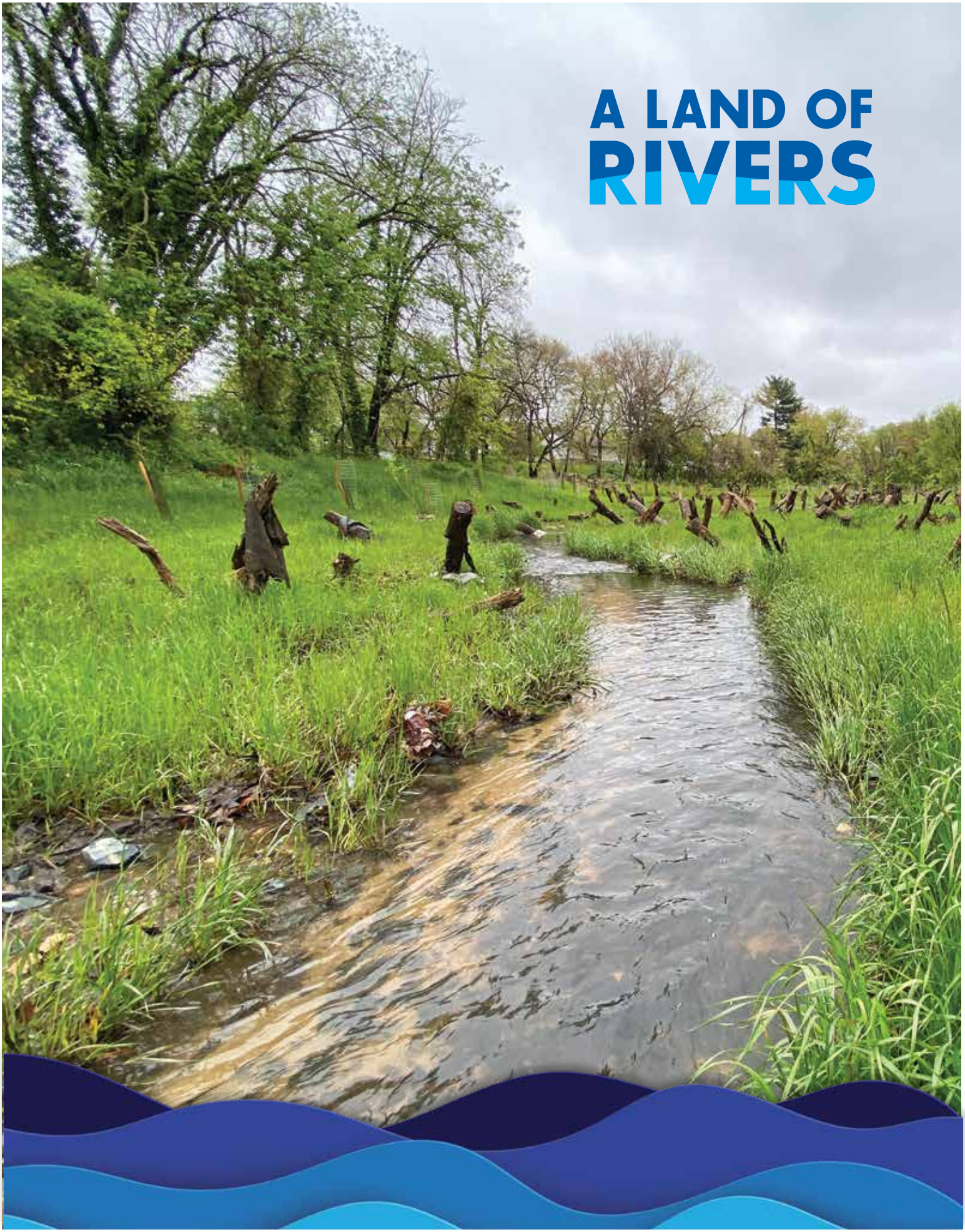
The Anne Arundel Soil Conservation District works with a number of local, state and federal agencies to carry out its mission, including the Maryland Departments of Agriculture, Natural Resources Conservation Service, Farm Service Agency, University of Maryland Extension, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, S outhern Maryland Resource Conservation and Development, and U.S Navy.

Farm Ponds

One of the services the Soil Conservation District provides is working with landowners to repair and restore agricultural ponds. Agricultural ponds not only help with the management of storm water by storing the water during a storm event and releasing it at a safe rate but they are also used for fire control, irrigation of field crops, a source of water for livestock, to catch sediment coming off the farm and provide habitat for aquatic animals, plants, and amphibians. Many ponds were previously constructed with metal pipes as their outlets. Though the steel pipes had a bituminous coating or were galvanized when installed, after 30 years or more, the naturally acidic Anne Arundel County soils have taken their toll and it is not uncommon to see moderate to severe deterioration in the metal. With the introduction of plastic pipe in large sizes, we can replace the deteriorated steel pipe with plastic pipe. The plastic pipe is Corrugated High Density Polyethylene (HDPE) pipe and is expected to last 100 years. After the pond is constructed, we assist with fish stocking, and aquatic vegetation management.

A new option to the traditional pipe system is the Step Pool Stormwater Conveyance (SPSC). Anne Arundel County Department of Public Works has been installing these systems in the urban areas for some time now. We are in the process of installing the second one on agricultural land. Working with a grant from the Department of Natural resources, Chesapeake & Coastal Service and in conjunction with contractors Underwood and Associates, we are installing just over 1,000 linear feet of the conveyance system. The total cost being $954,000.00. When the landowner purchased the property, they inherited a pond that was collecting water from a state road. The pond outlet has failed and so has the piping system that conveyed the overflow from the pond to a stream. Rather than replace the piping system, an alternative method of conveying the water was explored. After looking at the property and options, it was decided an SPSC would work with all its added benefits.

ANNE ARUNDEL SOIL CONSERVATION DISTRICT Agricultural Best Management Practices (BMPs) Planted/Installed Fiscal Year 2020			
Best Management Practice	**Status**	**Percent of WIP Goal Achieved**	**2025 WIP III Goal**
Cover Crops – Traditional (acres)	4,707 ac.	101%	4,667 acres
Soil Conservation & Water Quality Plans (cumulative acres)	10,719 ac.	77%	14,000 acres
Prescribed Grazing (acres)	90.7 ac.	6%	1,500 acres
Horse Pasture Management (acres)	750	20%	400 acres
Land Retirement to Open (acres)	65.3 ac.	12%	538 acres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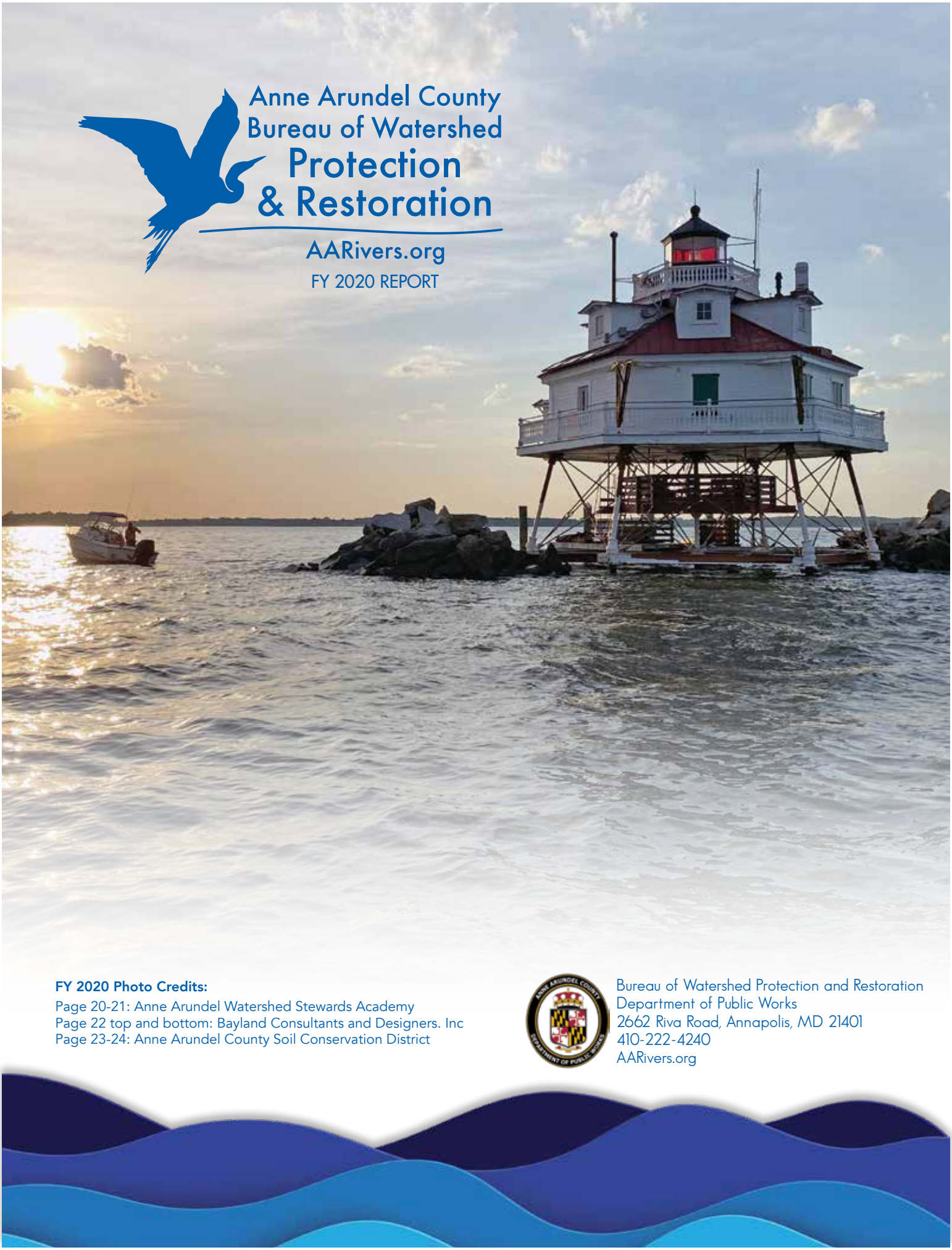

Anne Arundel County Bureau of Watershed Protection & Restoration

AARivers.org

FY 2020 REPORT

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