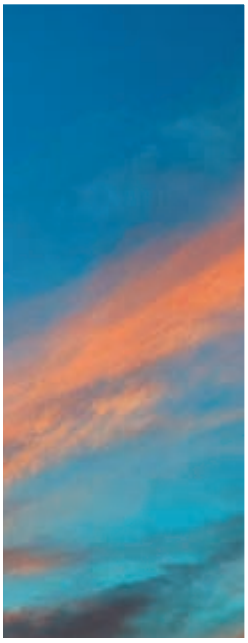
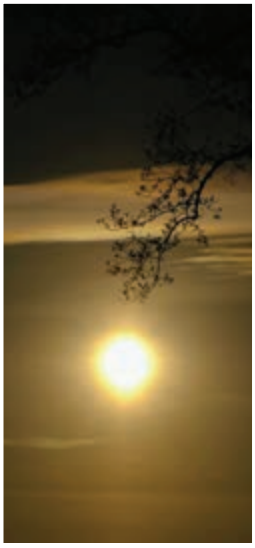
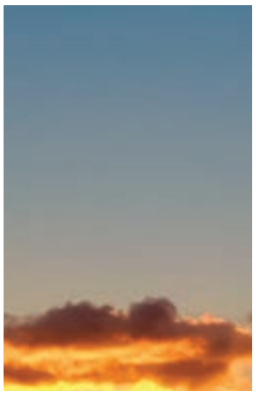
Anne Arundel County
WATERSHED
Protection & Restoration
PROGRAM

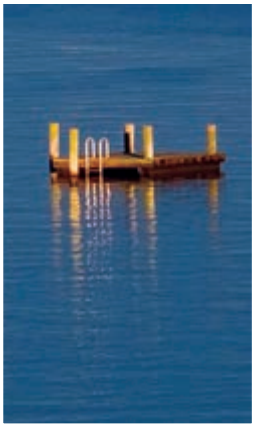
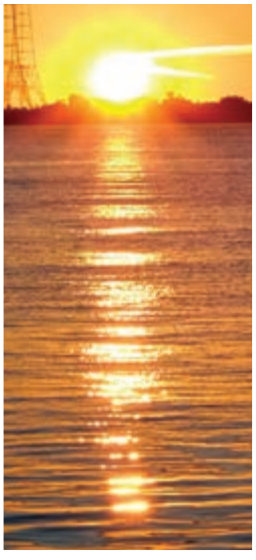
AARivers.org


# A Land of Rivers

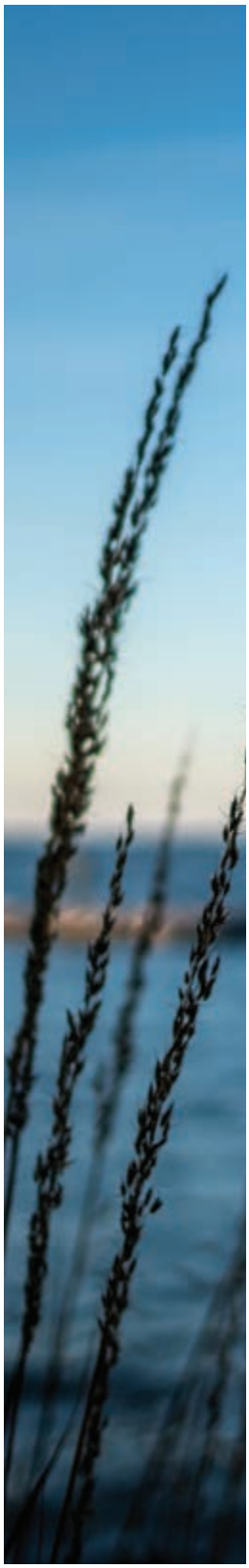



FY 2018 Report

Anne Arundel County
Maryland

Bureau of Engineering
Department of Public Works

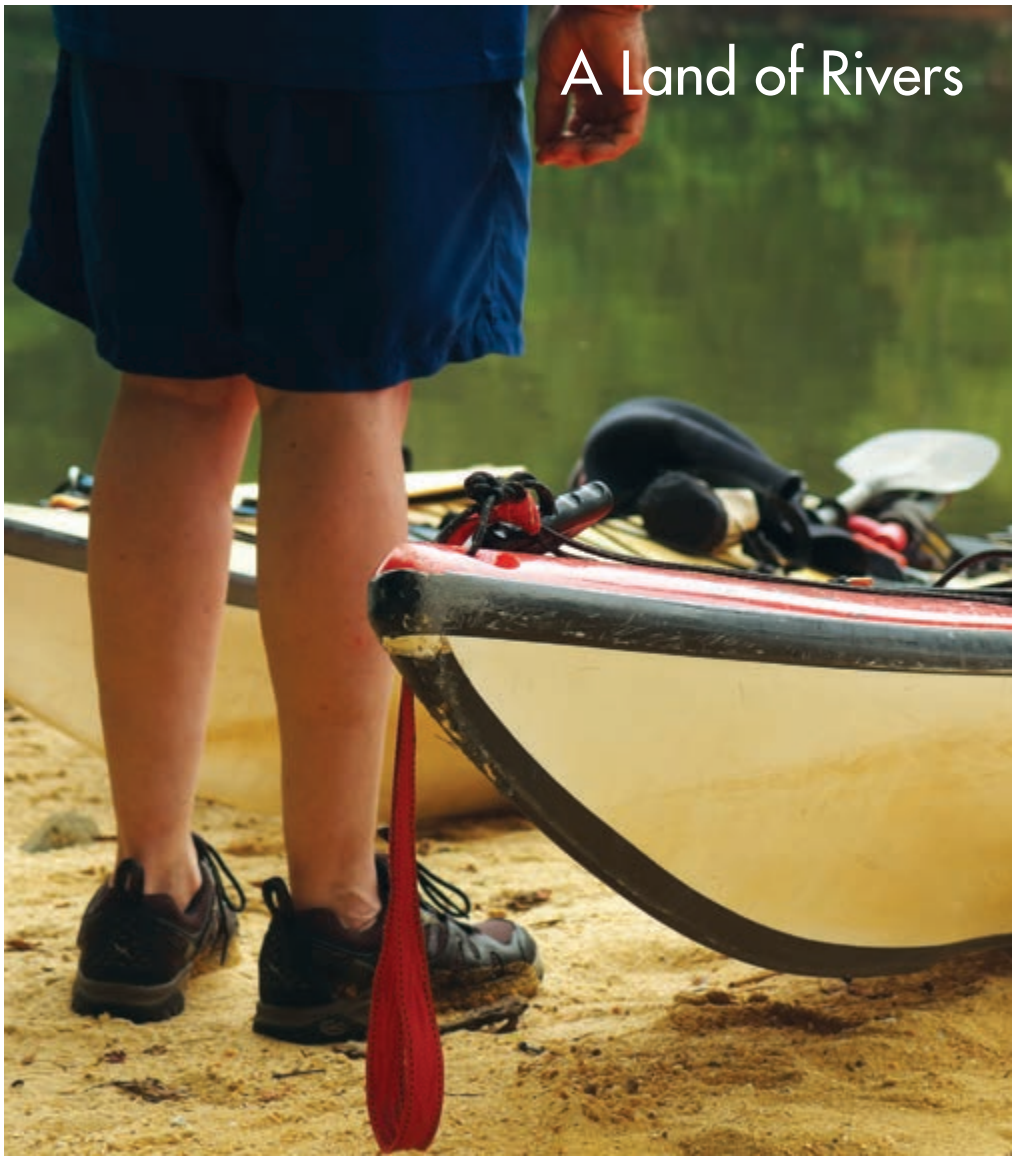


# Dear Anne Arundel County Resident,

Our *2018 Anne Arundel County, A Land of Rivers* report summarizes the watershed protection and restoration actions initiated by the Anne Arundel County Department of Public Works and our partners during fiscal year 2018 (July 1, 2017 – June 30, 2018). In 2012, the County finalized its Watershed Implementation Plan (WIP) to provide targets for improving water quality and watershed health, and to protect and restore natural resources. The County reports annually on progress made towards these goals through innovative and collaborative projects.

Quality of life encompasses a broad range of policies and priorities that affect the citizens of our County in a very personal way every single day. As residents of Anne Arundel County, which has more miles of shoreline than any other jurisdiction in Maryland, our efforts to improve quality of life must begin with improving the health of the waterways.

In recognition of that fact, we are in the midst of the largest waterway cleanup effort in the history of Anne Arundel County. In just the last three years, we have initiated over 170 new projects and completed over 100 water quality projects at a total cost of over $84 million dollars.



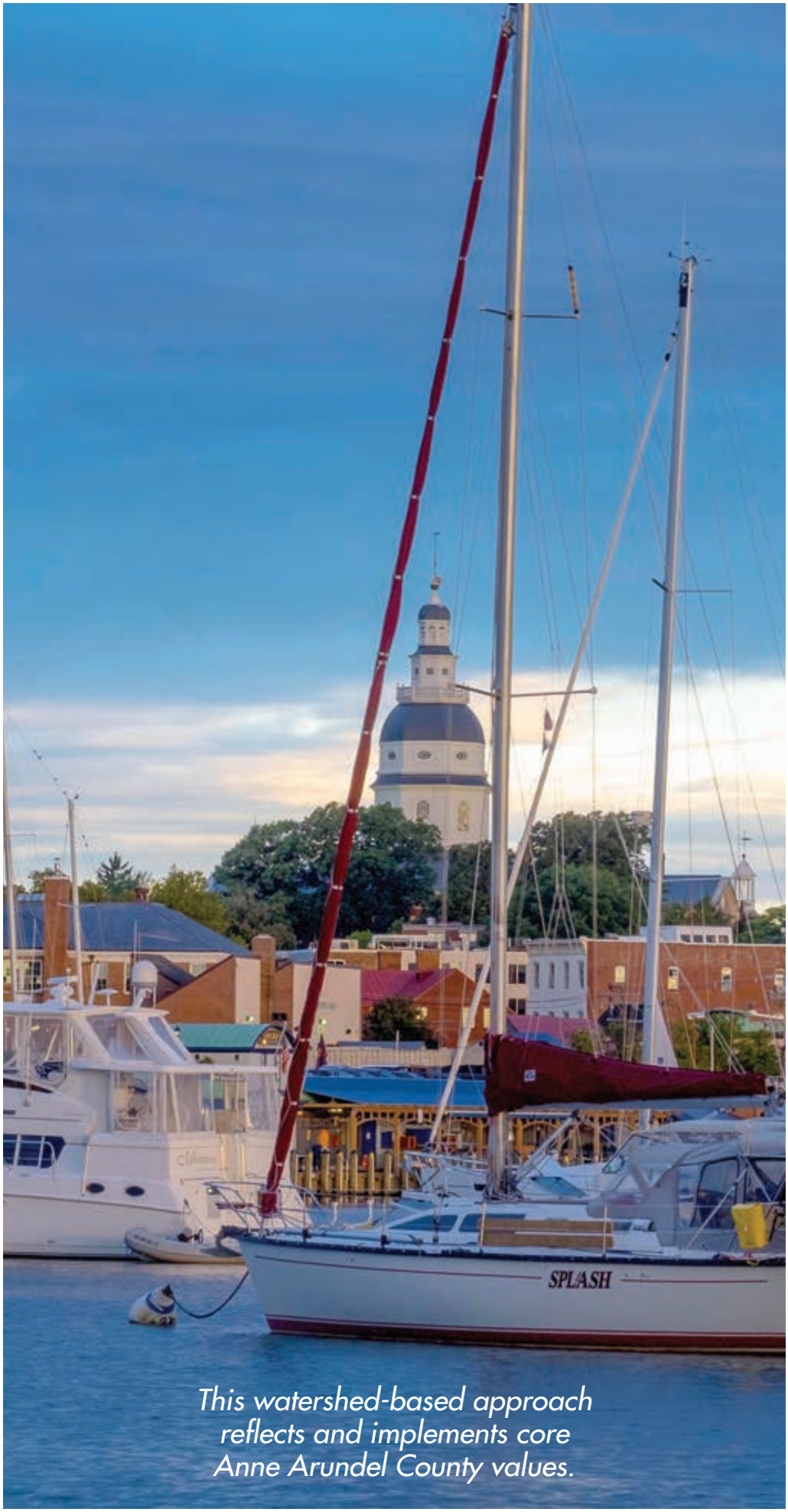
These investments have also bolstered our existing stormwater infrastructure resulting in the repair or replacement of over 450 storm drains and culverts, a tenfold increase in our implementation rate compared to prior funding levels.

These projects, combined with the concerted efforts of the Federal and State governments and private sector organizations over the past decade, are showing tremendous results.

The Chesapeake Bay Foundation rating of the Bay is now 34, the highest since the 1940s. Our rivers are healthier than they have been in decades.

Sincerely,

Steven R. Schuh
County Executive




*This watershed-based approach reflects and implements core Anne Arundel County values.*

# 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 growing 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 wildlife species.

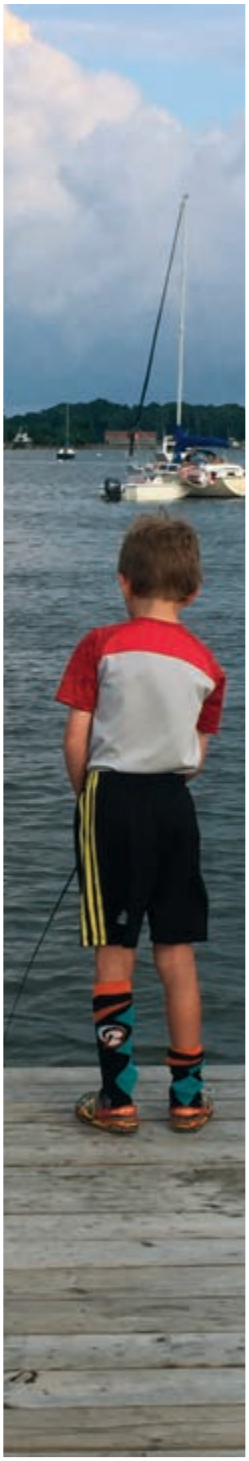
Improving watershed health is truly a county-wide effort. Anne Arundel County is committed to managing County operations in a manner that sustains our quality of life and economy while protecting the viability of our natural resources.

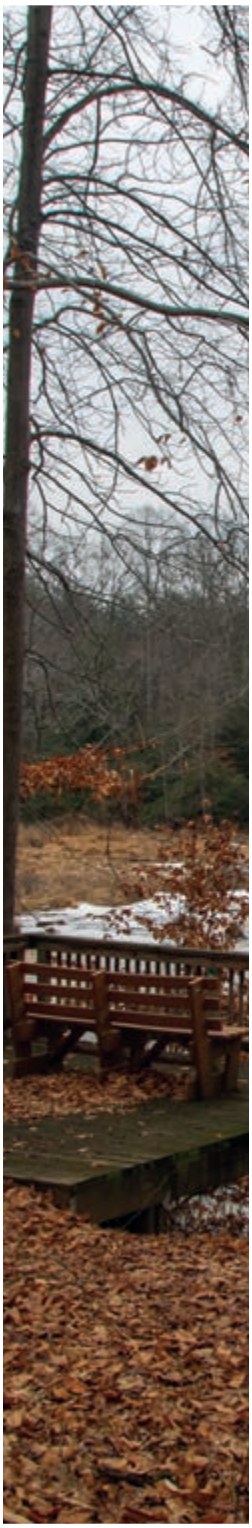
This watershed-based approach reflects and implements core Anne Arundel County values. In addition to protecting and improving watershed functions such as providing clean water and habitat, these projects promote improved public safety, economic vitality, and community stewardship.

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, and business organizations to accomplish its goals.

*We can cost-effectively meet our regulatory obligations while achieving a net benefit to the long-term health and livability of our County.*

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.





## Regulatory Drivers

The 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 II 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.

## 2017 – 2018 Two Year Milestone Highlights (Stormwater, Wastewater, Septic)

- **18 – stormwater management pond retrofits**
- **140 – culverts and storm drains repaired or replaced**
- **6,779 – curb miles swept**
- **3 – NGO projects installed**
- **248 – nitrogen reducing septic systems installed**
- **9 – septic systems connected to sewer**

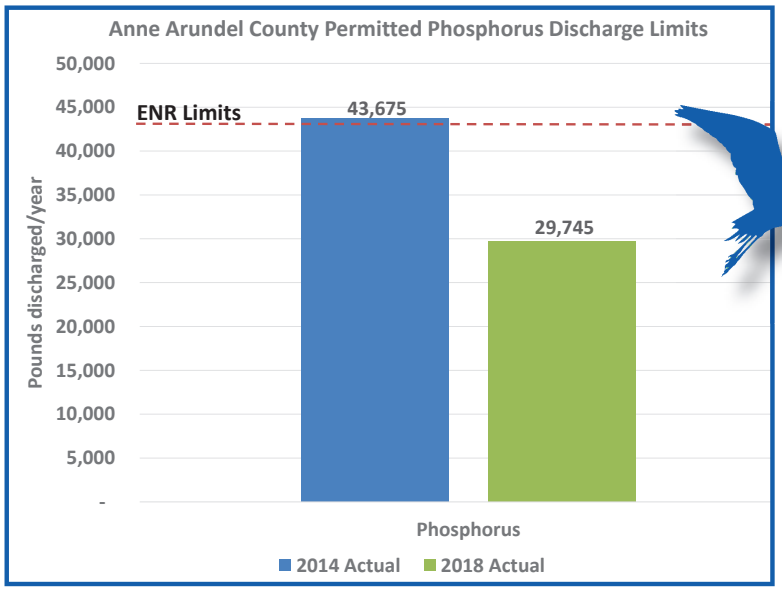
# The Restoration Plan

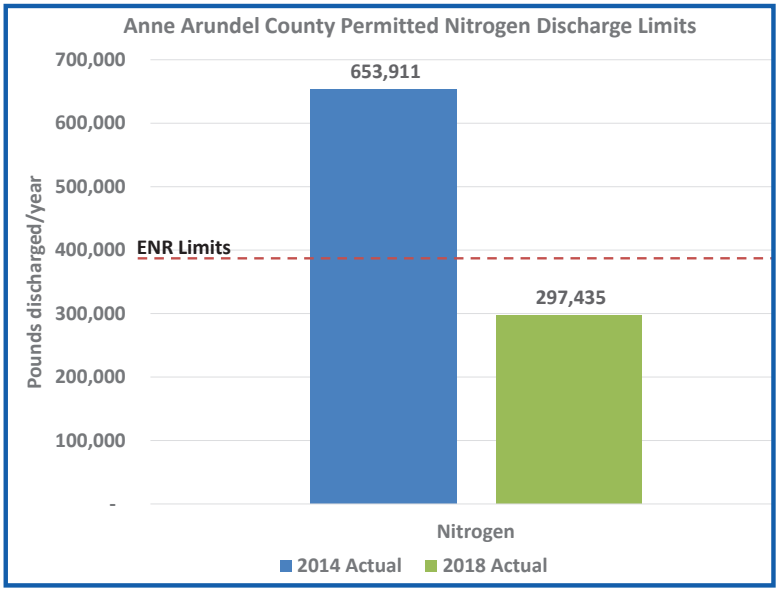
Anne Arundel County's Watershed Implementation Plan enumerated three primary strategies for achieving its required pollution reduction targets: 1) Upgrading, to the current limits of technology, the County's major Water Reclamation Facilities (WRFs); 2) Reducing pollution from urban stormwater by providing treatment for currently untreated impervious areas within the County by 2019 and beyond, and; 3) Converting roughly half (~20,000) of the County's septic systems to more effective, nutrient-reducing wastewater treatment alternatives.

## Water Reclamation Facilities – Enhanced Nutrient Removal

Anne Arundel County's $249 million investment to upgrade each of its seven Water Reclamation Facilities (WRF) with Enhanced Nutrient Removal (ENR) technology was completed in July 2017. These ENR upgrades will enable 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 year, the new facilities have been performing at a level below the required limits for Total Nitrogen and Total Phosphorus discharge rates.




## Stormwater Remediation

At the end of FY18, the County had achieved over 33% of the restoration requirements under its current MS4 permit, with the rest of the required work in the procurement, design, and construction pipeline. Additionally, the County's final watershed assessment – of the Middle Patuxent and Herring Bay – was finalized just before the end of fiscal 2018.

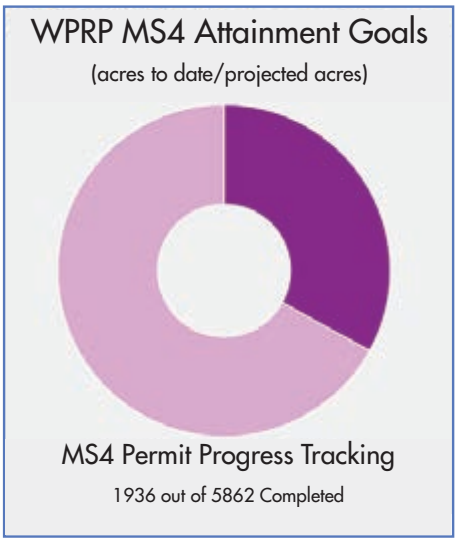
## Septic System Conversions

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 Anne Arundel County Health Department continue to work closely together to direct Bay Restoration Funds for septic conversions and septic-to-sewer connections, as revenues are available.

In FY18 the Department of Health improved water quality through the BRF, which cost-shared 146 pretreatment units and 4 connections to public sewer. For more information on the grant program, visit AAHealth.org.

During 2018, it is anticipated that that the Maryland Department of the Environment (MDE) will require the County to being developing a Phase 3 WIP, further refining the County's plan to achieve the 2025 Chesapeake Bay TMDL goals, a process which the County has already begun.




For latest progress, visit AARivers.org

# Funding History

Through fiscal year 2018, 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 Watershed Protection and Restoration Program working to protect and restore the County's watersheds.

In July of 2016, the WPRP 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 2019.

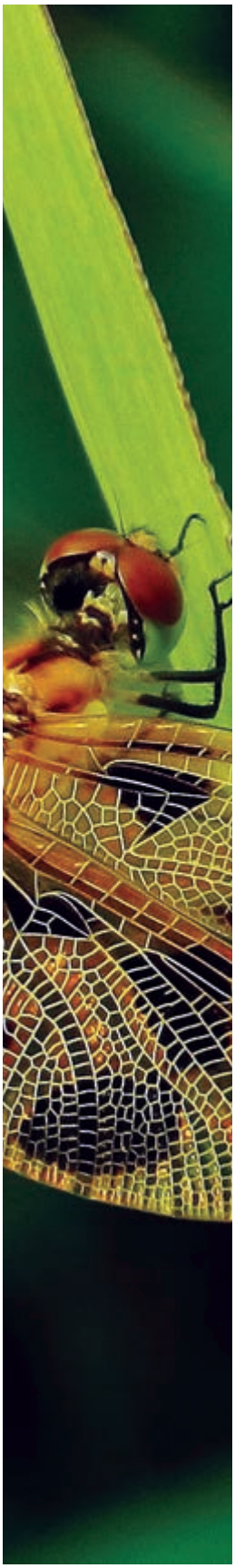
## How Is The Fee Calculated?

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 $85 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 | $85 x .4 | $34 |
| R1, R2, R5 | $85 | $85 |
| RA, RLD | $85 x 2 | $170 |
| Non-Residential | Actual sf of impervious surface divided by 2,940 x $85 | Varies |

To view the WPRF for your property visit 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 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.

## Summary of Watershed Restoration Projects

| WATERSHED IMPLEMENTATION PLAN (WIP) PROJECTS FUNDED IN FY18 | |
|---|---|
| Patapsco River (Non-Tidal) Watershed | $2,800,000 |
| Patapsco River (Tidal) Watershed | $4,735,000 |
| Severn River Watershed | $2,538,000 |
| South River Watershed | $ 600,000 |
| County-wide Projects | $6,000,000 |
| TOTAL | $16,673,000 |

NOTE: Watershed Implementation Plan (WIP) project costs include: Stream Restoration, Stormwater Management Pond Retrofits, and Storm Drain Outfall Enhancements. The funding identified in the above table represents only that portion of the project costs that were funded in the FY18 Capital Budget.

# WPRP – Carrying Out The Plan

The Watershed Protection and Restoration Program 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 WPRP 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 outdated are rebuilt to optimize their pollution reduction capacity and provide an array of ecosystem benefits.

| SWM POND RETROFIT/CONVERSION PROJECTS FUNDED IN FY18 | | |
|---|---|---|
| Watershed | Council District | # of Ponds |
| Patapsco Non-Tidal | 1,2 | 22 |
| Patapsco Tidal | 2 | 4 |
| South River | 7 | 1 |
| TOTAL | | 27 |

**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.

| STORMWATER OUTFALL REPAIR PROJECTS FUNDED IN FY18 | | |
|---|---|---|
| Watershed | Council District | # of Outfalls |
| Patapsco Non-Tidal | 1 | 50 |
| Patapsco Tidal | 2 | 34 |
| Severn River | 6 | 3 |
| South River | 7 | 4 |
| TOTAL | | 91 |

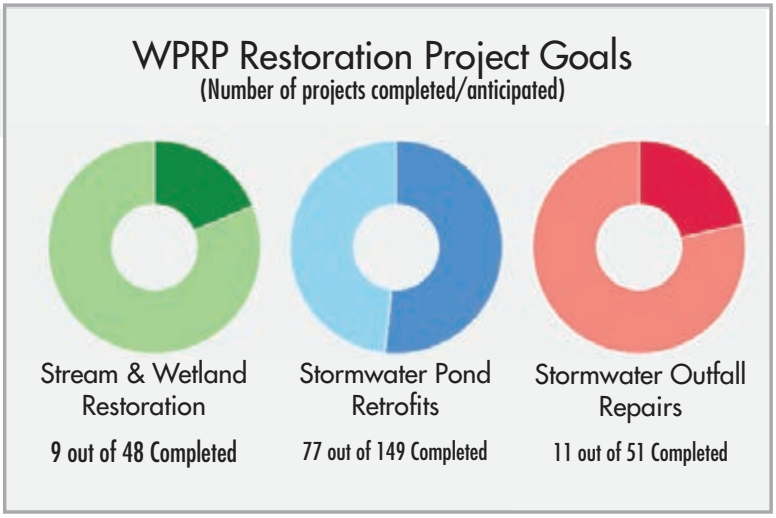
**Stream & Wetland Restoration** – Stream erosion is the largest contributor of sediment and phosphorus to our local rivers, and the County's strategy to re-hydrate valley bottoms through restoration will provide water quality, floodplain connection, and ecological benefits on a broad scale.

**STREAM RESTORATION PROJECTS FUNDED IN FY18**

| Watershed | Council District | # of Stream Segments | Stream Length (Linear Feet) |
|---|---|---|---|
| Patapsco Tidal | 2 | 18 | 13,919 |
| Severn River | 6 | 4 | 3,879 |
| South River | 7 | 8 | 8,978 |
| TOTAL | | 30 | 26,776 |

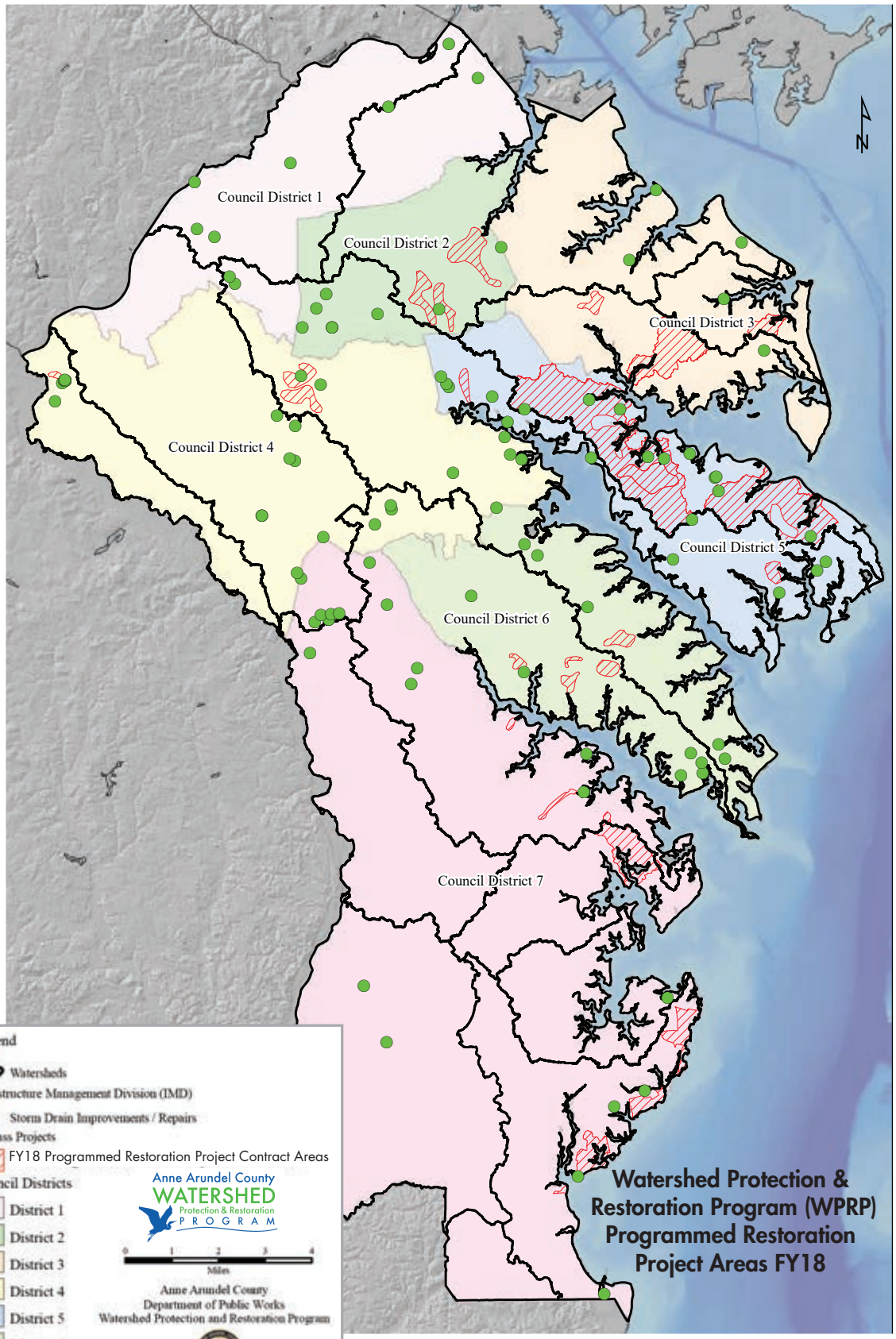
NOTE: Stream restoration project costs are programmed in the CIP budget over multiple years.

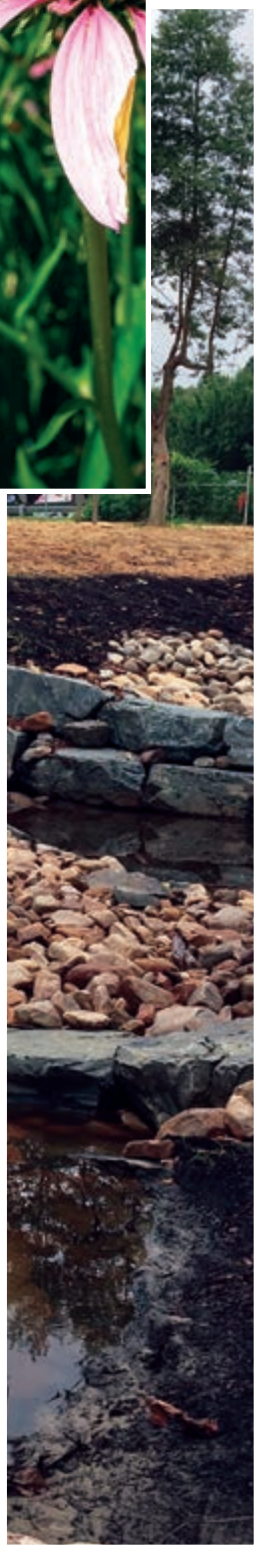
*Through June 30, 2018*

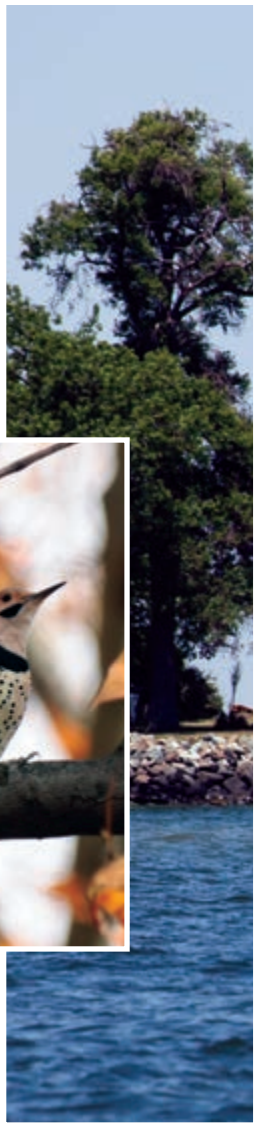


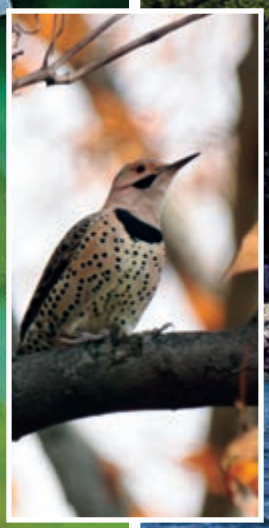

In addition to the work above, funds from the WPRF are used to address a $40+ million backlog of stormwater infrastructure repairs and replacement, ensuring that the County's culverts and drainage infrastructure are functioning properly and are not a threat to public health and safety.

# Watershed Protection & Restoration Program (WPRP) Projects Budgeted in FY2018

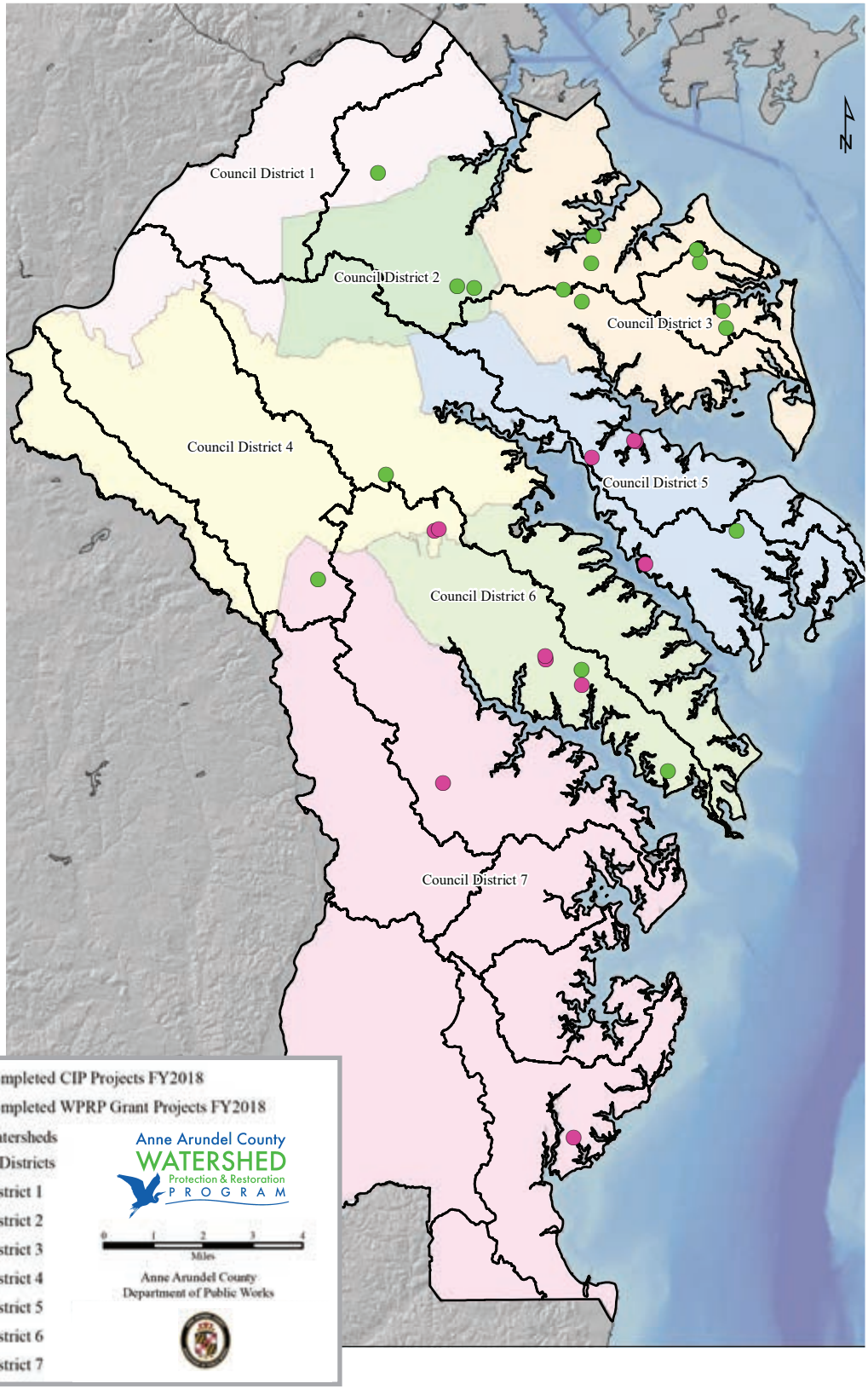






# Watershed Protection & Restoration Program (WPRP) Restoration Projects Completed in FY18




Outfalls Completed: 3
BMPs/Ponds Completed: 15
WPRP Grant Projects Completed: 11

# 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.

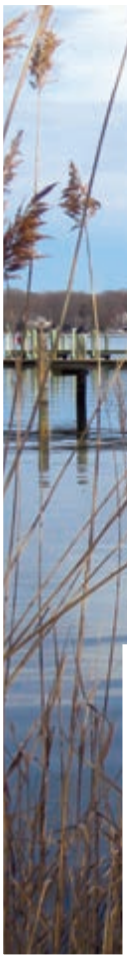
The Infrastructure Management Division is responsible for managing the inventory, inspection, and development of the County's Stormwater Infrastructure Capital Program. This program aims to repair and/or replace aging, damaged storm drain systems and culverts throughout the County, as well as any associated 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.

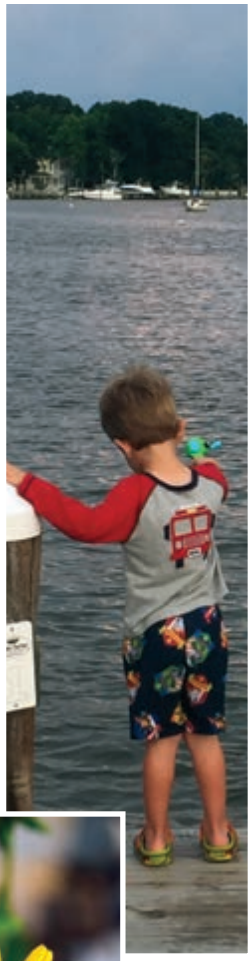
Funds from the Watershed Protection and Restoration Program are used to address stormwater infrastructure repairs and replacements, ensuring that the County's culverts and drainage infrastructure are functioning properly and are not a threat to public health and safety.

| INFRASTRUCTURE MAINTENANCE DIVISION PROJECTS BUDGETED IN FY18 | |
|---|---|
| Culvert & Closed Storm Drain Repair | $4,767,6000 |
| Emergency Storm Drain | $600,000 |
| Storm Drain/SWM Infrastructure (WPRP) | $2,000,000 |
| TOTAL | $7,367,000 |

| FY18 INFRASTRUCTURE MANAGEMENT DIVISION WPRP CAPITAL PROJECTS | | |
|---|---|---|
| Council District | # of IMD Projects | Total FY18 Capital Funding |
| 1 | 9 | $146,990 |
| 2 | 7 | $139,918 |
| 3 | 6 | $515,518 |
| 4 | 24 | $508,872 |
| 5 | 21 | $994,708 |
| 6 | 11 | $195,930 |
| 7 | 20 | $399,303 |
| TOTAL | 98 | $2,901,239 |

*The County operates and maintains a wide range of infrastructure to protect public health and safety, water quality, and property.*





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.

| 2018 MILESTONES | |
|---|---|
| Action | Result |
| BMP's Inspected | 591 |
| Curb Miles Swept | 6,779 |
| Tons of Litter Collected (Street Sweeping) | 361 |
| Storm Drain Structures Cleared | 4,135 |
| Linear Feet of Drain Pipe Cleared | 89,773 |
| Linear Feet of Ditch Cleaned | 159,421 |
| Storm Drains Cleared | 7,432 |

# Watershed Protection and Restoration Fund Revenue and Expense Report

## Expenses Posted as of June 30, 2018

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 FY18, the fifth year of implementation for the Watershed Protection and Restoration Fund in Anne Arundel County, Maryland. This report includes expenses incurred beginning July 1, 2017 through June 30, 2018.

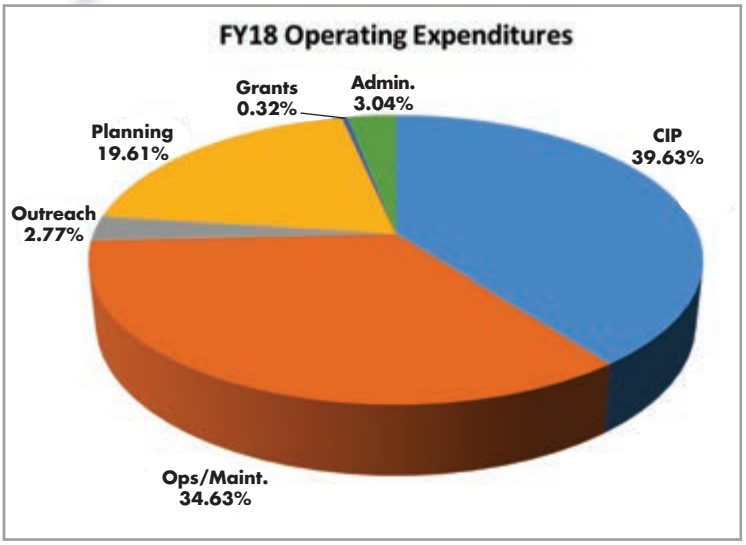
## Revenues

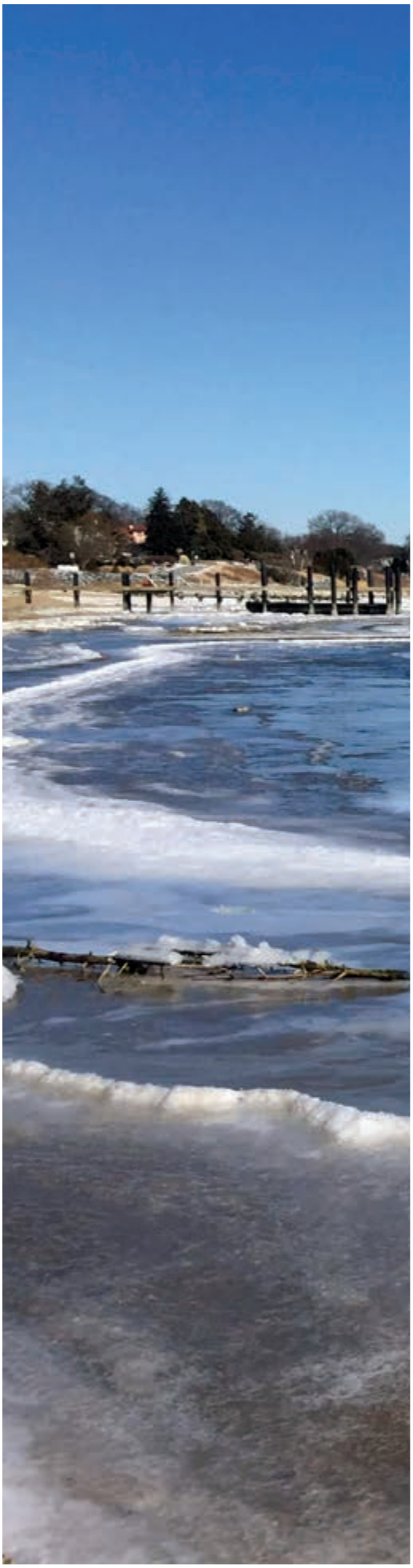
Watershed Protection and Restoration Fee was first billed on property taxes on July 1, 2013. There were 212,980 properties in Anne Arundel County that were subject to the fee. For FY18, Anne Arundel County has received $21,666,000 in revenues as of June 30, 2018. In addition to the Watershed Protection and Restoration Fee, the county has received $1,300,000 to fund watershed protection and restoration projects from other sources.

## Expenditures

Operating expenditures for FY18 totaled $15,294,000. Of these expenditures, $5,297,000 were spent on operations and maintenance activities for the county's stormwater infrastructure. An additional $2,999,000 were spent for planning for future improvements to these systems. The fund balance of $7,671,000 will be used to pay debt payments associated with the capital improvement projects required to update the aging infrastructure and construction of new best management practices for locations that do not meet current requirements.

*Anne Arundel County has received $21,666,000 in revenues as of June 30, 2018.*



# The Surface Water Monitoring Program

The Surface Water Monitoring Program is responsible for evaluating the in-stream water quality of the County's non-tidal streams for purposes of developing a long-term water quality characterization. The program monitors the health of the County's streams in a variety of ways and for a variety of reasons:

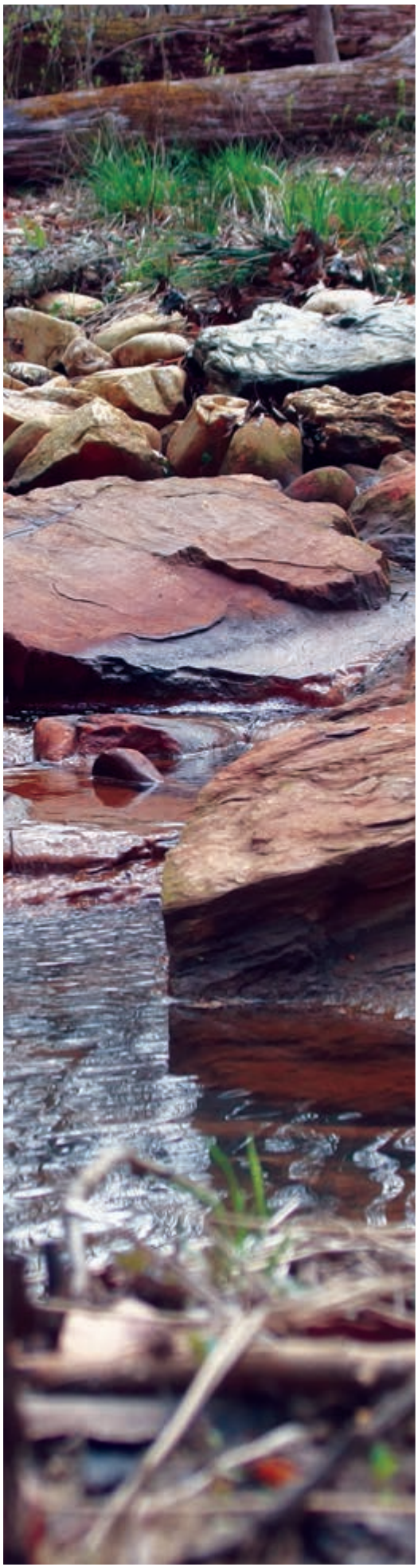
*Biological Monitoring* — Stream insects and fish were sampled in five watershed areas in 2018 as part of Year 2 of Round 3 of the Countywide Biological Monitoring Program (Program). The purpose of the Program is to understand the health of County streams and rivers and to track trends in County watersheds to see if management actions are influencing stream health. A total of 80 sites were sampled in 2018. As Year 1 (2017) and Year 2 data reports are completed, they will be uploaded to the WPRP website. AARivers.org

Biological monitoring also continued at the County's Longterm Monitoring (LTM) Sites, which are certain stream reaches sampled over a period of years either to understand pre-restoration conditions or to follow up on the effects that restoration activities may have had on overall stream health. Efforts are being made to develop a web-based portal to view all the condition information collected at these LTM Sites; completion of the portal is anticipated by the end of 2018.

*Monitoring for Restoration Success* — Select restoration projects are monitored before and after construction to determine if the project is meeting its water quality design objectives. Pre-construction monitoring has been completed on Cowhide Branch and is underway on Furnace Branch. Post construction monitoring will resume when these projects are complete.

WPRP staff also engaged in a special study to characterize water quality conditions found in pools and riffles created during implementation of a subset of stream restoration practices. Field work concluded in late summer 2018 and data interpretation and reporting will begin by the end of the year.

*Stormwater Monitoring* — The County's NPDES MS4 permit requires the County to maintain two long term monitoring stations on Church Creek in the South River watershed. Both base flow and storm flow are sampled to determine the impacts of redevelopment and watershed restoration on stream water quality.



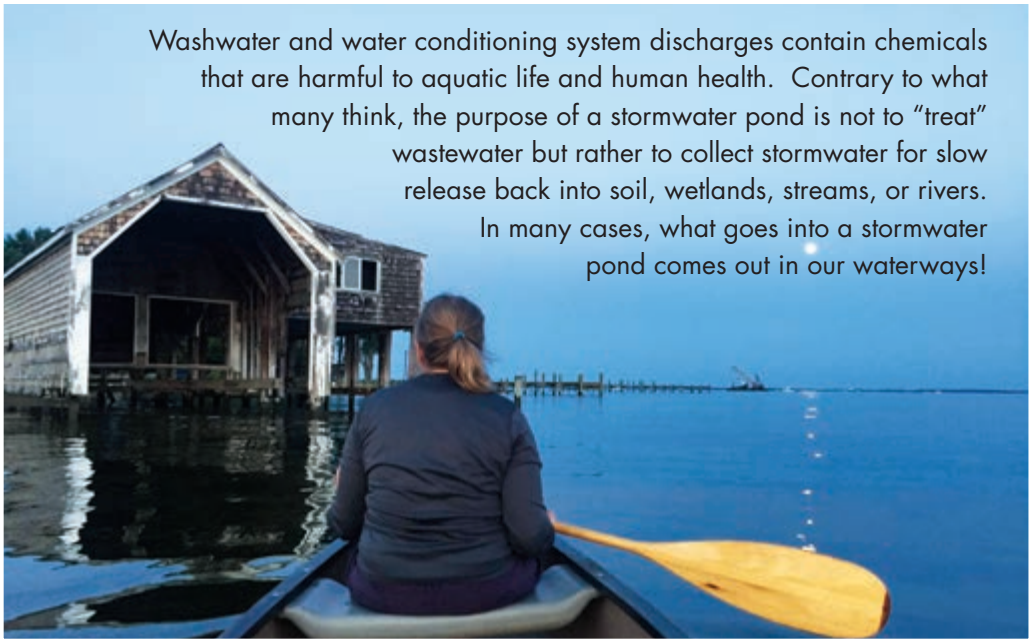
# Illicit Discharge Detection and Elimination (IDDE) Program

The WPRP 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 (expect where allowed by a discharge permit). WPRP 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, dumping and spills. During the course of the County's annual outfall field screening, dry weather flow seen flowing from a storm drain outfall is identified for further investigation. In FY17, 10 potential sources of illicit discharges were identified. During FY18, 151 outfalls were successfully inspected and seven potential sources of illicit discharges were identified. Of these, six were confirmed as illicit discharges. The Department of Inspections and Permits continues to pursue resolution of five of these cases in which the pollutant source could not be readily identified. To report a potential illicit discharge or other environmental violation contact the Anne Arundel County Environmental Hotline at 410-222-7171.

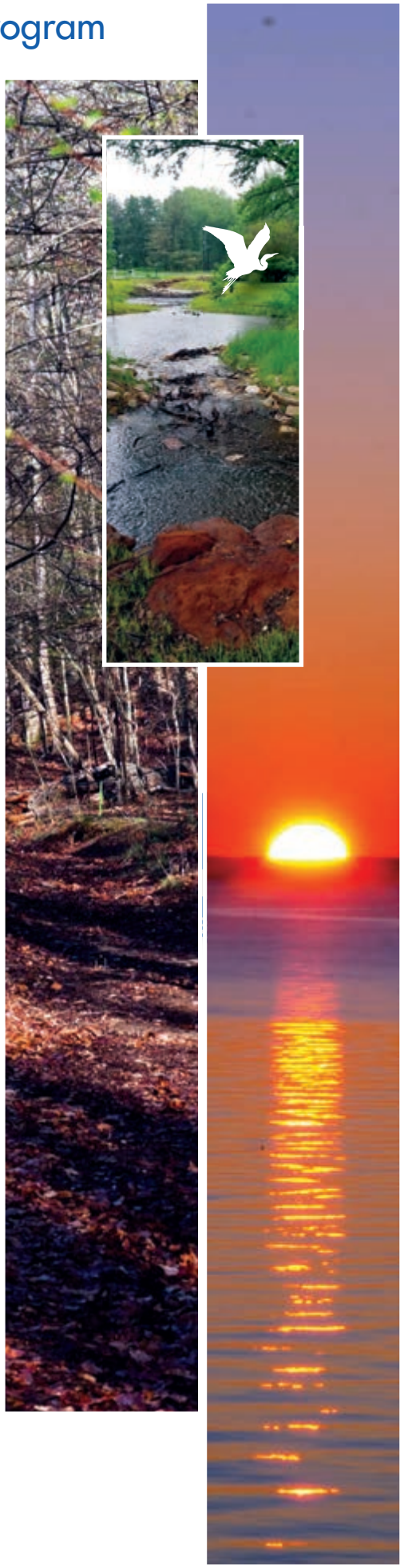
## Case Study

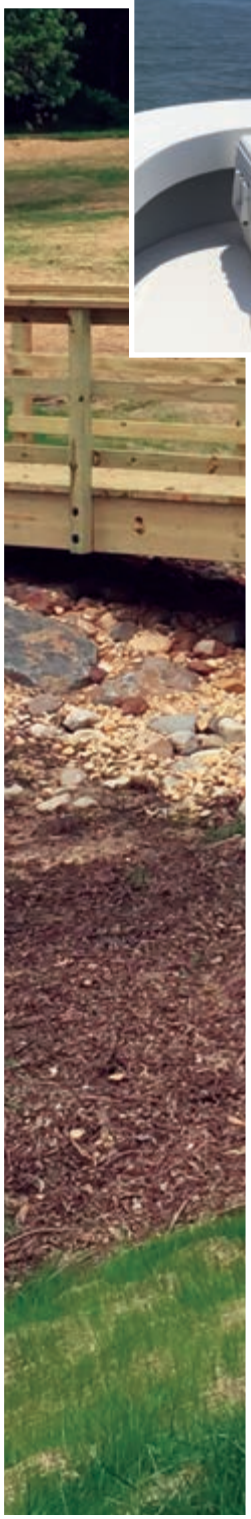
In September 2017, one of the County's stormwater management retrofit contractors witnessed soapy discharge entering a stormwater pond from a pipe originating from a private residence. The contractor informed the County's Department of Inspections and Permits, and County inspectors conducted a formal investigation. Inspectors found a pipe discharging washing machine wastewater, as well as another pipe discharging water from a water conditioning system, directly into the stormwater pond. The illicit drainage was also causing erosion on the pond embankment.

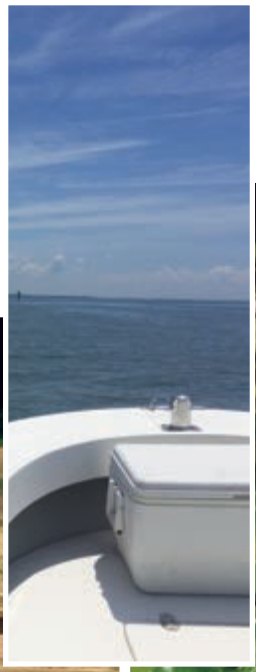
County inspectors informed the property owners of the violation and worked with them to remedy the situation. Inspectors issued a Correction Notice to the property owners and advised the owners to cease use of appliances contributing to the illicit discharge until corrections were made. To correct the issue, the property owners redirected the drainage into a stone infiltration pit on the property and removed the old drainage pipes from County property.

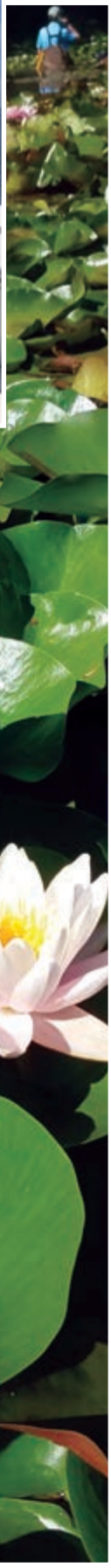


Washwater and water conditioning system discharges contain chemicals that are harmful to aquatic life and human health. Contrary to what many think, the purpose of a stormwater pond is not to "treat" wastewater but rather to collect stormwater for slow release back into soil, wetlands, streams, or rivers. In many cases, what goes into a stormwater pond comes out in our waterways!









## 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.

*This program encourages on-the-ground restoration activities that reduce stormwater flow and pollutants and engage Anne Arundel County residents in these activities.*

| ORGANIZATION | PROJECT DESCRIPTION | WATERSHED | FUNDING AMOUNT | MATCH AMOUNT | IMPERVIOUS ACRES TREATED |
|---|---|---|---|---|---|
| Alliance for the Chesapeake Bay | Asbury United Methodist Church SPSC/Broadneck Park BMPs | Severn River | $136,404 | $297,635 | 0.88 |
| South River Federation | Bacon Ridge Stream Restoration | South River | $164,122 | $438,766 | 43.5 |
| South River Federation | Broad Creek Health Department Phase II Restoration | South River | $370,746 | $125,893 | 7.5 |
| | TOTAL | | $671,272 | $862,294 | 51.88 |

Above is a list of organizations that were awarded funding from Anne Arundel County for water quality restoration projects in 2018.

More information about the grant program can be found at 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.

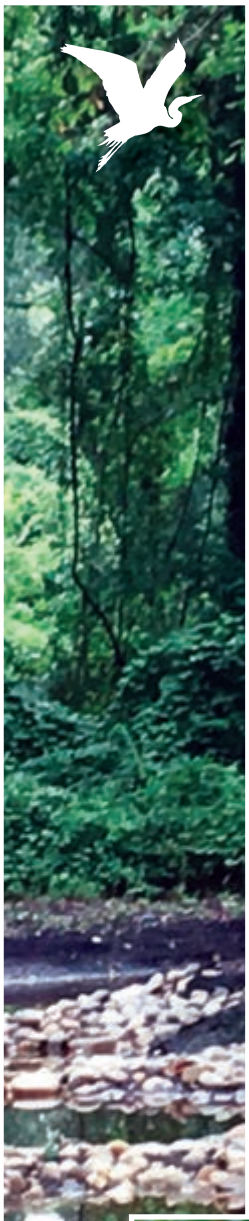
*The program works to restore and/or create bogs, gardens, and runoff areas on school grounds or in the community to treat stormwater pollution.*

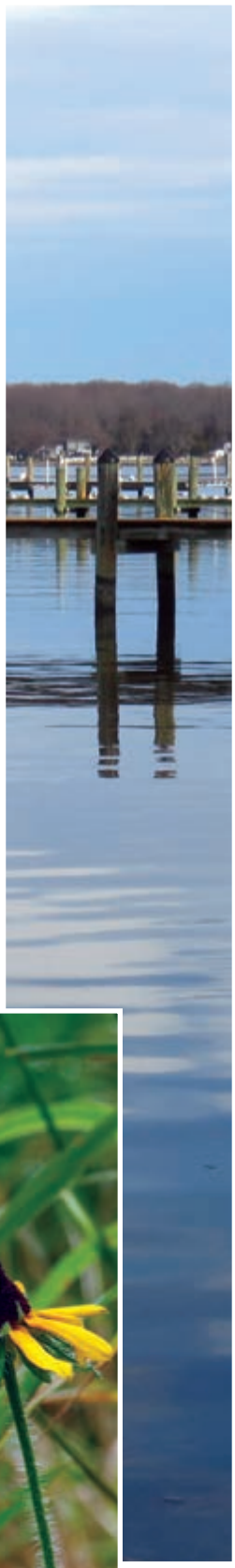
Chesapeake Connections is Arlington Echo's Outdoor Education outreach program which connects classroom instruction with a series of relevant hands-on experiences that lead to environmental stewardship. The staff at Arlington Echo Outdoor Education Center provide support and expertise to complete yearlong environmental service-learning projects as part of Chesapeake Connections with many Anne Arundel middle and elementary schools.

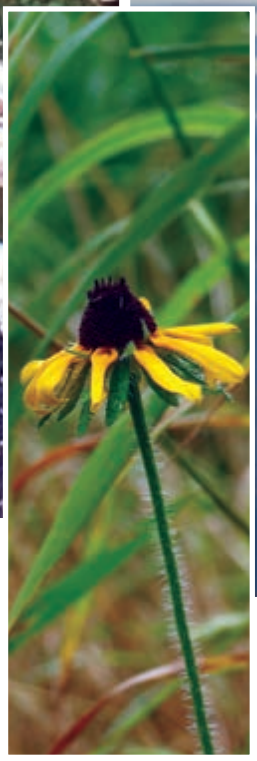
The service-learning projects are incorporated into each school's curricula and involve using community areas or school grounds for environmental restoration activities. The program works to restore and/or create bogs, gardens, and runoff areas on school grounds or in the community to treat stormwater pollution. These projects meet growing environmental needs in our area and help protect the Chesapeake Bay.

The WPRP 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 2018, about 2,700 Anne Arundel County Public School Students participated in planting events at 4 newly restored water quality project sites around the County. Below is a listing of those opportunities that occurred during FY2018:

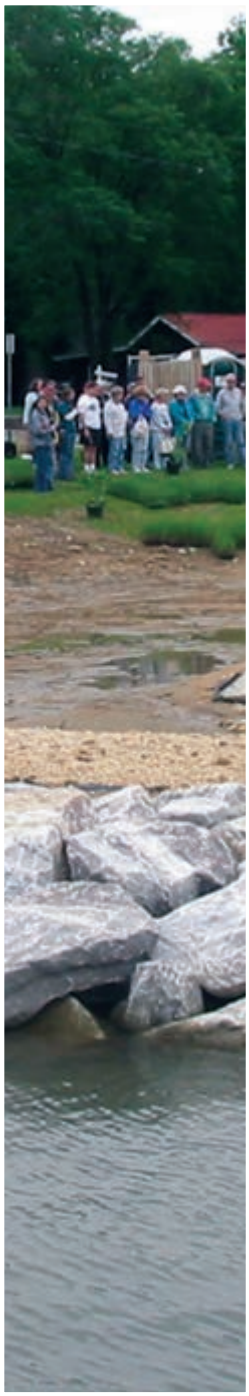
- **Winchester on the Severn Outfall Repair**
  - Severna Park Middle — 435 students
  - Old Mill South Middle — 310 students
  - Crofton Middle — 410 students
- **Fox Cub Court Pond Retrofit**
  - Marley Middle — 320 students
  - Corkran Middle — 240 students
- **Cowhide Branch Stream Restoration**
  - Central Middle — 330 students
  - Lindale Middle — 220 students
- **Briarwood Pond Retrofit**
  - Magothy River Middle — 240 students
  - Lindale Middle — 160 students







# Anne Arundel County Watershed Stewards Academy (WSA)



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 Watershed Protection and Restoration Program continues to provide critical support in connecting Stewards and communities with watershed studies, planning, and restoration efforts.

*Partnerships build capacity within communities to reduce pollutants entering our waterways via stormwater runoff.*

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.


## 2018 WSA Successes

- 82 rain barrels installed (4,670 gallons retained)
- 9,605 native plants and trees planted
- 574,079 square feet of new green projects
- 8,713 citizens of Anne Arundel County received technical assistance or environmental education
- 8,154 Steward volunteer hours towards restoration and education in their communities
- 106,290 square feet of invasive species removed
- 627 bags of trash collected

More information about WSA visit AAWSA.org

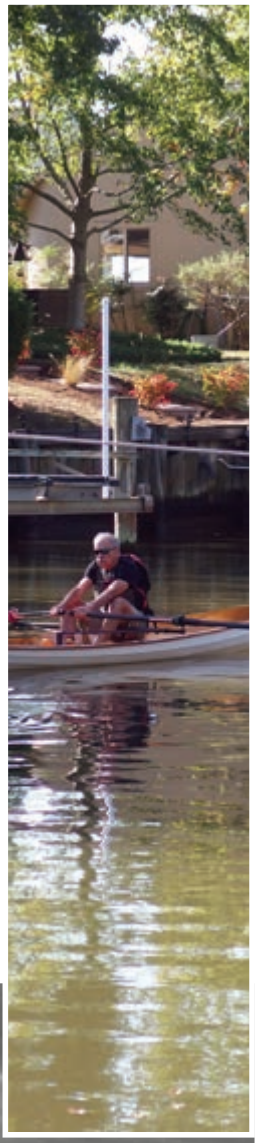
## Public-Private Partnerships – A Win-Win Situation

In FY17, the Watershed Protection and Restoration Program entered into its first public-private partnership with Resource Environmental Solutions (RES) to clean up the Severn Run, Patapsco, and Patuxent waterways. The $3.8 million "Full Delivery of Water Quality Improvements" contract is uniquely structured to help the County better satisfy its Municipal Separate Storm Sewer System (MS4) and Chesapeake Bay Total Maximum Daily Load (TMDL) permits and goals.

As a result of this partnership, the recently completed retrofit of a stormwater pond owned and maintained by AJ&C Garfunkel in Laurel is the first project in the County to utilize cutting-edge technology to help control flooding and reduce pollution. RES, in conjunction with technology firm, Opti, installed a Continuous Monitoring and Adaptive Control (CMAC) system, which will allow water levels in the pond to rise safely during rain events to store, retain, and treat stormwater onsite. This CMAC system proactively monitors weather forecasts and actuates drainage valves to minimize flooding and run-off.

During FY18, WPRP awarded $1.7 million to I97 Sewer, LLC to provide the reduction of nearly 3,500 lbs of nitrogen per year through the connection of four major commercial facilities on aging septic systems to the public sewer network. Once connected, wastewater loads can be treated to the highest limits of technology at the County's wastewater plants equipped with enhanced nutrient removal (ENR) technology, resulting in water quality improvements.

In total, four commercial complexes located in Millersville, Hanover, and Glen Burnie will be converted from their existing septic systems to public sewer, using a combination of private funds and the "Full Delivery of Water Quality Improvements" contract award. The combined effort will leverage in excess of $4 million in private funds to put the equivalent of over 290 homes onto public sewer. The full award will only be paid upon completion of the projects and verification of the project's benefits.



# Anne Arundel Soil Conservation District

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.

*Helping the County Meet its Chesapeake Bay Cleanup Commitments*

## Agricultural Programs

Agriculture is making tremendous strides on behalf of the Bay, accounting for more than 46 percent of all nutrient and sediment reductions in the county. 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.

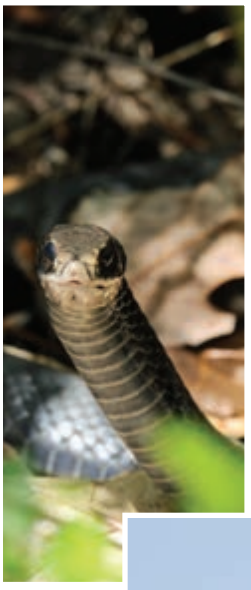
In FY 2018, the Anne Arundel Soil Conservation District developed/updated 31 SCWQPs for county farms. These plans included more than 41 BMPs. The design, installation and construction supervision of these practices are the responsibility of the District's technical staff.

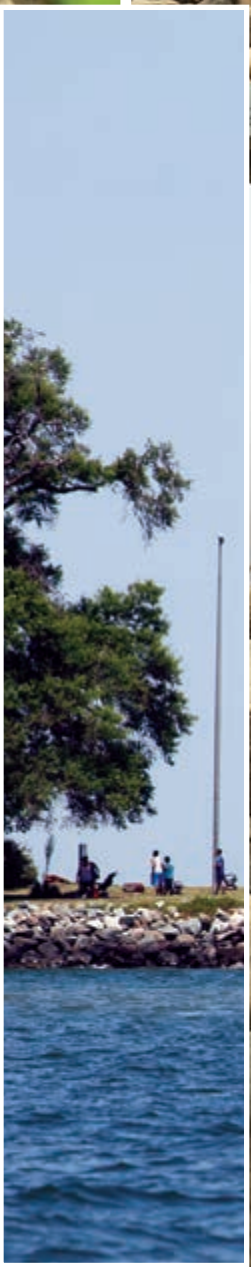
## Urban Programs

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 FY 2018, the district reviewed 1,673 erosion and sediment control plans for construction projects on 17,573 acres. To further protect the county's valuable natural resources, the District provides planning, design and management services for local stream restoration projects, shoreline stabilization projects, and drainage management projects.

## 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, Southern Maryland Resource Conservation and Development and U.S. Navy.





# Soil Conservation District 2018 Highlights

ANNE ARUNDEL SOIL CONSERVATION DISTRICT
AGRICULTURAL BEST MANAGEMENT PRACTICES (BMPS) PLANTED/INSTALLED
FISCAL YEAR 2018

| Best Management Practice | Status | Percent of WIP Goal Achieved |
|---|---|---|
| Cover Crops (acres) | 5,310 | 180% |
| Soil Conservation & Water Quality Plans (acres) | 10,876 | 73% |
| Forest Buffers (acres) | 1.5 | 28% |
| Livestock Fencing (linear feet) | 4,347 | 7% |
| Retirement of Highly Erodible Land (acres) | 172 | 718% |
| Watering Facility (number) | 5 | 1118% |

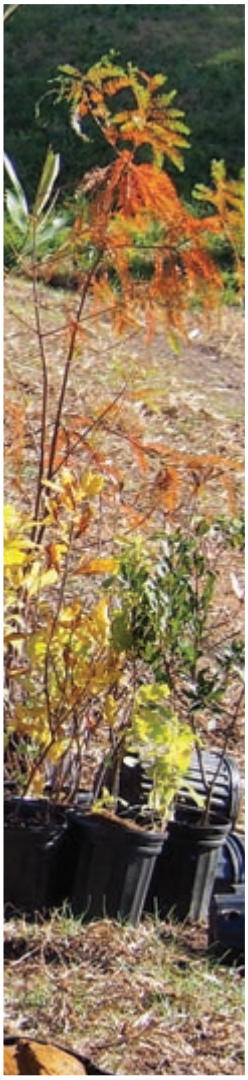
# Naval Support Activity at Greenbury Point

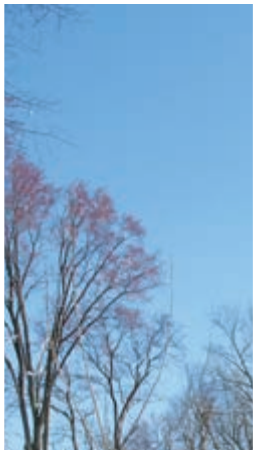
Currently the District is partnering with Southern Maryland Resource Conservation and Development (RC&D)on a Navy project to restore approximately 1,100 linear feet of shoreline at the North Severn Complex of Naval Support Activity.

The site is located on Greenbury Point at the confluence of the Severn River and the Chesapeake Bay. Coastline Design, PC is currently conducting a survey of the site and will provide a design for construction.

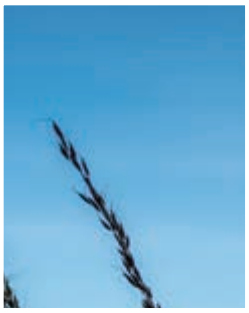
The North Severn Complex encompasses 852.8 acres and includes Greenbury Point. The North Severn Complex was purchased by the Navy in 1909 and from 1918 to 1996, the Naval Radio Transmitter Facility operated on Greenbury Point.

Antennas were constructed on the point and were used to communicate with the Navy's submarine fleet. The signals from the antennas could penetrate the ocean allowing communications with submarines. Advances in satellite communications have made the antennas obsolete and only 3 of the 19 antennas remain at the point. Long fetch distances in the Severn River and Chesapeake Bay allow for excessive wind and high wave energy resulting in erosion of the exposed shoreline.



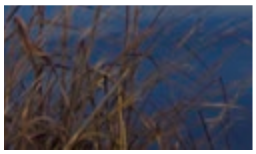
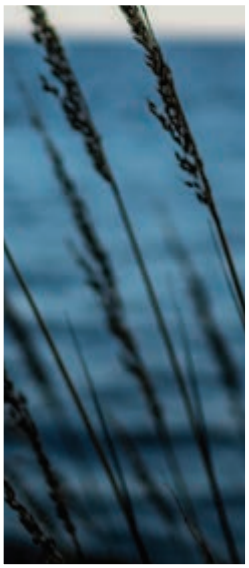











Anne Arundel County
WATERSHED
Protection & Restoration
PROGRAM

Bureau of Engineering
Department of Public Works
2662 Riva Road, Annapolis, MD 21401
410-222-4240
AARivers.org

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