

A LAND OF RIVERS

 FY 2024 REPORT



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Dear Anne Arundel County Resident,

In the eleventh year of our watershed restoration efforts and three years into the County's current 5-year State-issued stormwater permit, we are already on our way to achieving our current clean water goals. The implementation progress that we've made over the past few years has positioned us to comply fully with this new permit well in advance of our required benchmarks, and to go above and beyond in accelerating the recovery of our local waterways.

The Bureau of Watershed Protection & Restoration (BWPR), within the Department of Public Works, leads these efforts in its role to provide clean water 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 274 restoration projects and over 1,000 stormwater infrastructure projects to preserve our waterways for future generations.

In Fiscal Year 2023-24, BWPR has continued to optimize our operations, communications and available resources enabling us to lead the way in local Bay restoration both on-the-ground and online. An open line of communication between BWPR and its stakeholders via active use of social media platforms, in-person site visits and our new "Watershed Walks" keep the door open to the process of meeting our collective clean water goals. The County's stormwater resources have communicated a strong message that we're here to support a wide range of local stakeholders and are actively working to break down the barriers that inhibit restoration progress.

The increased use of innovative infrastructure maintenance techniques such as slip lining degraded pipes and enhancing eroded outfalls promotes healthy watersheds and provides opportunities to engage County residents in cost-effective stormwater management solutions. These innovative mechanisms are highly adaptable and can be applied in other jurisdictions to empower environmental stewards across the Bay watershed.

This Bureau's 2024 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 2024 (July 1, 2023 - June 30, 2024). These actions, combined with those from previous years and work by countless community groups and individual residents, will continue to restore our waterways and protect our communities.

In Anne Arundel County, we are inexorably tied to these streams, wetlands, rivers, and the Chesapeake Bay. 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, a watershed-based approach to restoration will promote the sustained protection of water quality and native habitat. 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. Under the County's previous NPDES MS4 permit, the County restored the equivalent of 4,996 acres of Anne Arundel County's impervious surface area, such as roads, sidewalks, and driveways, which have little or no stormwater management. The current NPDES-MS4 permit goal requires the management of an additional 2,998 acres of impervious surface.

This additional impervious surface management, and the associated nutrient and sediment reductions, will address the County's Phase III Watershed Implementation Plan (WIP) loads allocated to the County by the State for achieving the Chesapeake Bay

TMDL. Progress toward meeting the Chesapeake Bay TMDL is reported in the County's NPDES MS4 Annual Report 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 III 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.

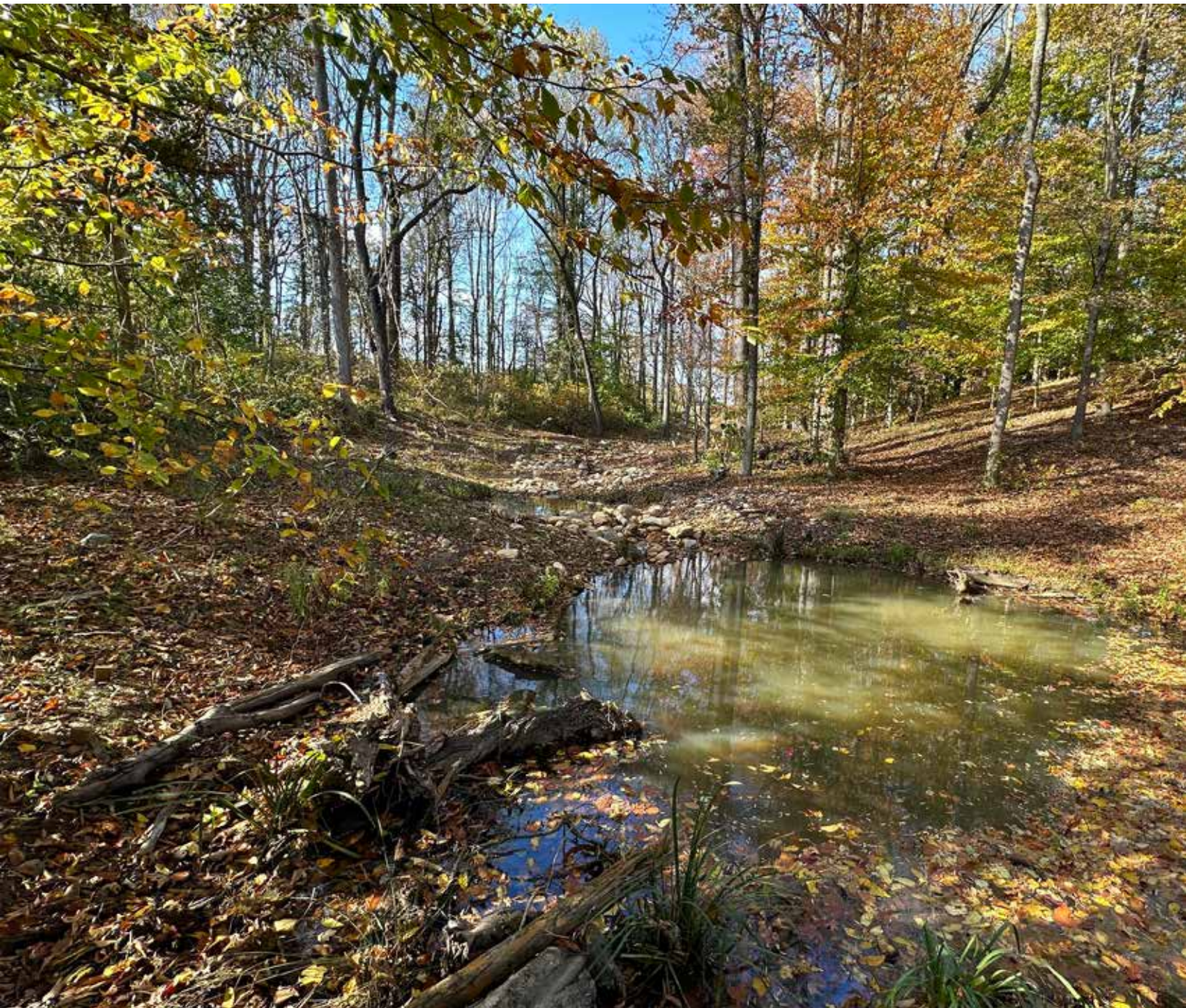
The current NPDES-MS4 permit goal requires the management of an additional 2,998 acres of impervious surface.



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 in local waterways and the Chesapeake. In addition, 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. More information can be found at www.ourwAater.org.



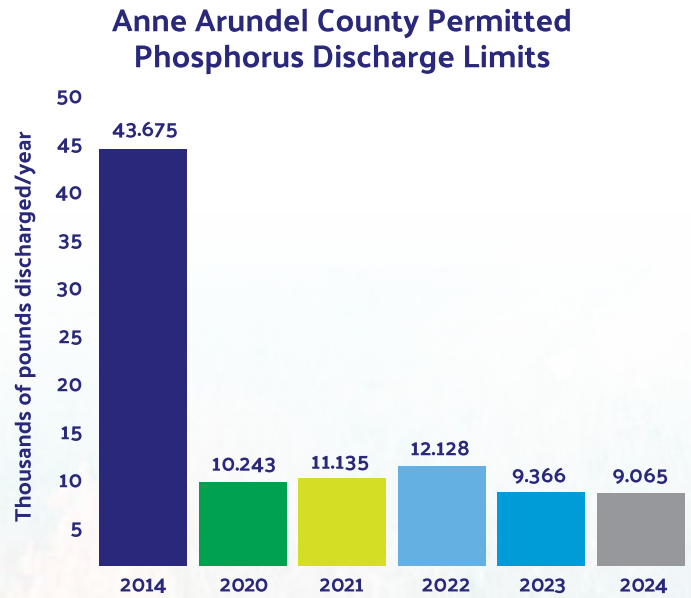
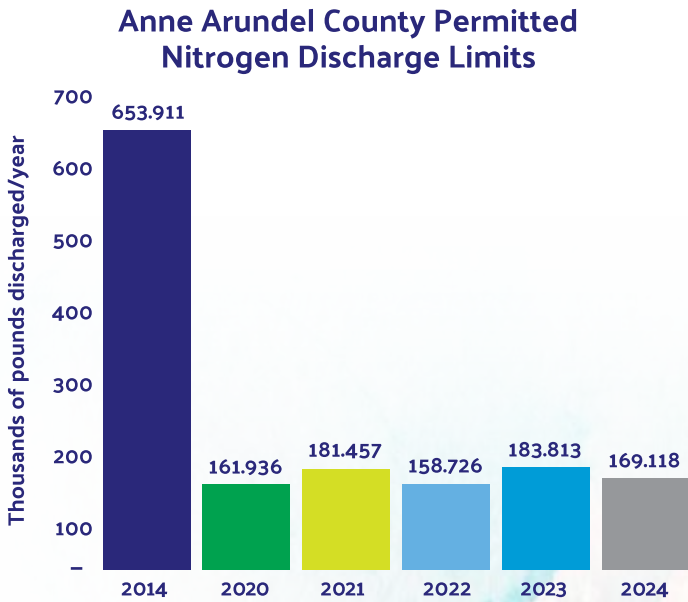
Water Reclamation Facilities

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, coupled with sediment and nutrients delivered from our businesses and homes, are the drivers of our local impairments due to excessive stormwater runoff. 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.

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 six years, the new facilities have been performing at a level well below the required limits for Total Nitrogen and Total Phosphorus discharge rates.

Water Reclamation Facilities/ Enhanced Nutrient Removal - Anne Arundel County’s \$249



Stormwater Remediation – As of the end of FY20, the County met the primary restoration goal of its fourth-generation MS4 permit by restoring the equivalent of 4,996 acres of impervious surface. The County’s fifth-generation MS4 permit was issued in November 2021 and set a new goal requiring the restoration of an additional 2,998 acres of impervious surface by November 4, 2026. The County has been making excellent progress and by the end of FY24 has restored the equivalent of 3,073 acres of impervious surface and has met its permit goal well before its permit deadline.

Septic System Conversions – There are approximately 41,500 septic systems in Anne Arundel County. Of these, over 14,000 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 the Department of Health continue to work closely together to direct Bay Restoration Funds for septic conversions and septic-to-sewer connections, as revenues are available. In FY24, BRF funds were leveraged to cost-share 148 pretreatment units and 13 connections to public sewer. For more information on the BRF grant program, visit www.aahealth.org.

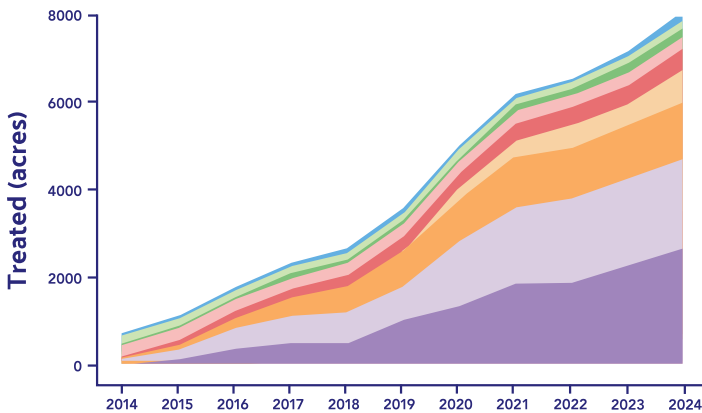


Progress toward MS4 Goals

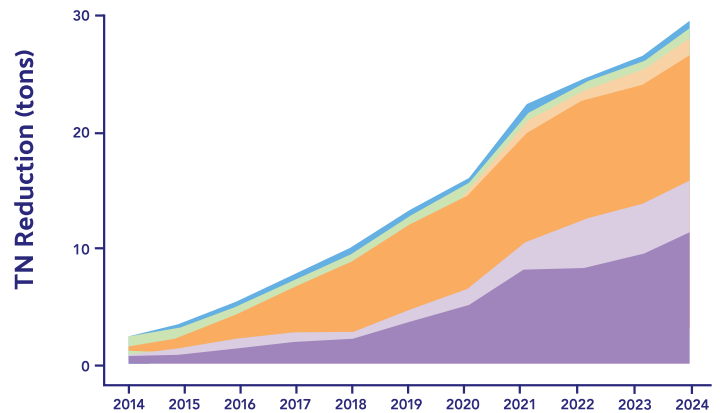
While the currency of the County's MS4 is "impervious acres treated," that number is really a stand-in for nutrient and sediment pollution reduced by those water quality practices. Both through its stormwater permit, and as a condition of the Chesapeake Bay Total Maximum Daily Load (TMDL), the County is required to reduce those pollutants both to local waterways, such as the Patapsco and Severn

Rivers, and to the Chesapeake Bay. Each jurisdiction within Maryland has been assigned by MDE a pollution allocation to address. The following figures demonstrate the County's progress towards reducing nitrogen, phosphorus, and sediment in local waterways through its clean water efforts associated with the stormwater sector. Each figure also indicates the share of pollutants reduced by various sorts of practices.

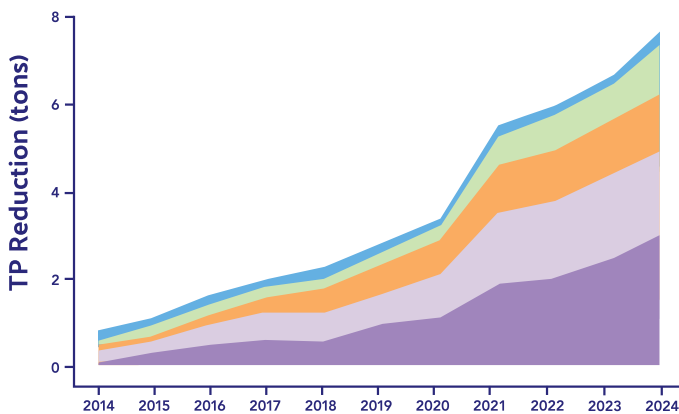
Impervious Restoration



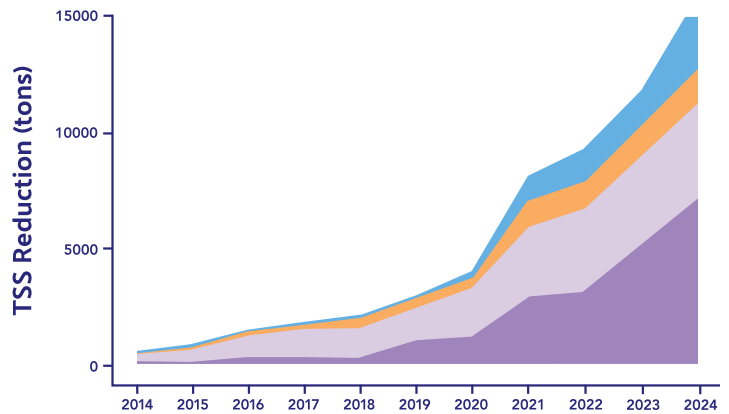
Total Nitrogen



Total Phosphorus



Total Suspended Sediment



- | | |
|---|---|
| ■ Land Cover Conversions | ■ Inlet Cleaning |
| ■ Street Sweeping | ■ Septic to Sewer Connections |
| ■ Septic Pumping | ■ Septic Denitrification Units |
| ■ Outfall Stabilizations | ■ Upland BMPs |
| ■ Shoreline Restorations | ■ Stream Restorations |

The Funding History

Through fiscal year 2024, 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, the Department of Public Works Bureau of Highways, the 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.

As required by Anne Arundel County's NPDES-MS4 permit, the FY22 Financial Assurance Plan was introduced on September 6, 2022 at the Anne Arundel County Council Meeting as Resolution 37-22. The Resolution was passed on October 3, 2022. The FY24 Financial Assurance Plan was approved by County Council on November 4, 2024.

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 \$98.40 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	$\$98.40 \times 0.4$	\$39.36
R1, R2, R5	\$98.40	\$98.40
RA, RLD	$\$98.40 \times 2$	\$196.80
Non-Residential	Actual sf of impervious surface divided by 2,940 \times \$98.40	Varies



Bureau of Watershed Protection & 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.

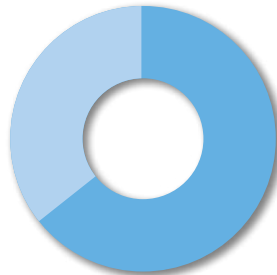
Stream & Wetland Restoration – Stream erosion is the largest contributor of sediment and phosphorus to our local rivers, and the County's strategy to stabilize and re-hydrate valley bottoms through restoration will provide benefits to water quality, floodplain connection, and native habitat on a broad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

In addition to the work above, funds from the WPRF are used to address a multi-million-dollar 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.

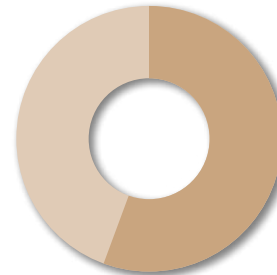
BWPR Restoration Project Goals (Number of projects completed/anticipated)



Stream & Shoreline Restoration
46 out of 101 completed

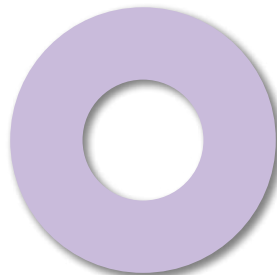


Stormwater Management
50 out of 73 Completed



Outfall Stabilizations
14 out of 25 Completed

BWPR MS4 Attainment Goals (acres to date/projected acres)

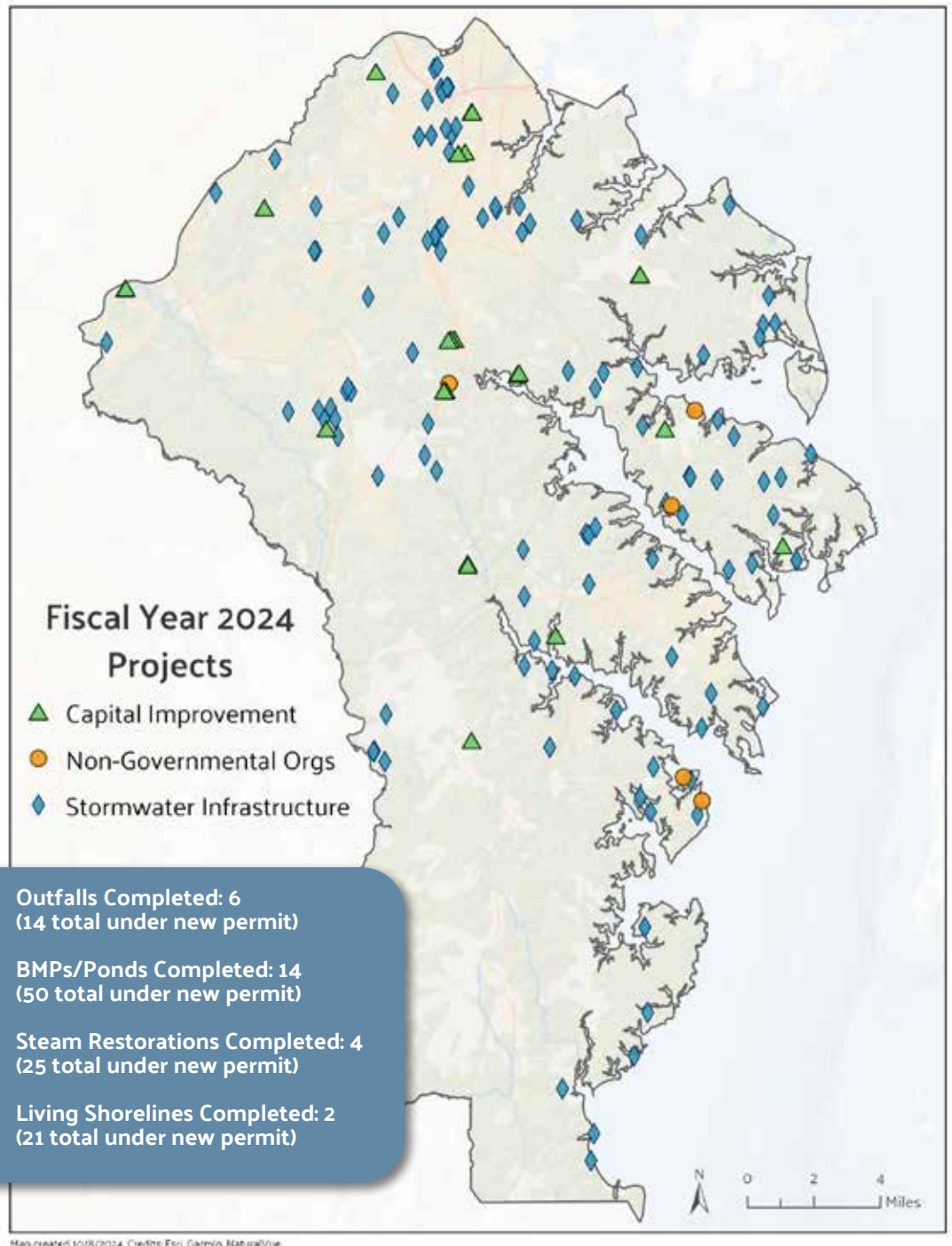


5th Generation MS4 Permit Progress Tracking
3,073 of 2,998 completed

BWPR Restoration Projects Completed in FY24

The following projects were constructed to meet multiple objectives including:

- 🌿 water quality enhancement
- 🌿 improved fish habitat
- 🌿 infrastructure protection
- 🌿 improved riparian functions
- 🌿 improved flood attenuation



More detail on the locations of these projects can be found at aarivers.org using the BWPR Watershed Restoration Projects Viewer.

Highlighted Project - Broad Creek Valley Stream Restoration

Throughout Broad Creek Park behind the Health Department off Truman Parkway, BWPR has partnered with Arundel Rivers Federation to restore a total of 5,462 linear feet of actively eroding stream. The stream was restored in three phases (completed in 2018, 2020 and 2022) by installing rock and earthen weir structures in the existing channel along with valley wide grade control structures. A tributary connecting to the East Branch of Broad Creek had become increasingly degraded and unstable due to high volumes of stormwater runoff entering the site from upstream. As the stream channel became more incised, large amounts of sediment would wash into Broad Creek and the South River during even minor storm events. Funding was provided by the Anne Arundel County's Bureau of Watershed Protection and Restoration, the Chesapeake Bay Trust, and the Maryland Department of Natural Resources. Each phase was designed by the following contractors: Resource Restoration Group (Phase 1), BayLand Consultants & Designers, Inc. (Phase 2), and Gannet Flemming (Phase 3). Phase I and II were constructed by Resource Restoration Group and Pay Dirt, Inc constructed Phase III.

This third and final large scale restoration project within Broad Creek Park stretched over 3,700 linear feet and contributes to the County's waste load allocation goals toward the Chesapeake Bay Total Maximum Daily Load (TMDL) by maximizing the water quality credit potential of the site. Arundel Rivers utilized a valley restoration design approach to arrest both channel and bank erosion, provide pollutant load reductions, and restore the ecological function of the stream. This project reduces pollution loads by 991,196 lbs/year of total

suspended sediment, 343.8 lbs/year of total nitrogen, and 459.9 lbs/year of total phosphorus resulting in water quality benefits for Harness Creek and the South River.

Given the high-visibility location within a public County-owned park, this project serves as an excellent demonstration of an effective stream restoration and stormwater management practice. A local female Boy Scout organized two community volunteer days at the site, both with over 25 volunteers, for her Eagle Scout project which resulted in nearly 1,000 live stakes and around 900 native herbaceous plants added to stabilize and beautify the site.

Additionally, Arundel Rivers Federation hosted two Earth Day events for Luminis staff, which included a nature walk/tour of the project and plantings. BWPR has also hosted a public guided "Watershed Walk" throughout the project site with 20 attendees to engage and educate the local community on the County's efforts to maintain the health of the Bay and our local waterways. Michael and Kevin Bacon of The Bacon Brothers and SixDegrees.Org also visited the site for a planting alongside local scouts. Their visit was featured on WBaltTV11 and spread the news of this important work to a wider audience. Educational signage was added onsite after the completion of each phase to ensure park visitors can learn more about the project, the partners involved and the benefits of environmental restoration.

To learn more about this project, please visit www.aarivers.org.



Stormwater Infrastructure Program (SIP)

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 Stormwater Infrastructure Program 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,

culverts, and public best management practices BMPs throughout the County, as well as address any associated design and permitting requirements. These projects are normally identified and transferred to the SIP 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.

Stormwater Infrastructure Program Projects Budgeted In FY24	
Culvert & Closed Storm Drain Repair	\$5,167,000
Emergency Storm Drain	\$2,350,000
Storm Drain/SWM Infrastructure (BWPR)	\$1,000,000
TOTAL	\$8,517,000

FY24 Stormwater Infrastructure Program BWPR Capital Projects	
Council District	# of SIP Projects
1	22
2	20
3	17
4	14
5	35
6	20
7	26
TOTAL	154

SIP & Road Operations Division Milestones

The Stormwater Infrastructure Program is also responsible for managing the inventory, inspection, and maintenance of over 1,250 stormwater management facilities that are collectively referred to as Best Management Practices (BMPs).

In addition, SIP 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.

2024 Milestones	
Action	Result
BMPs Inspected	457
Curb Miles Swept	6,685
Tons of Litter Collected (Street Sweeping)	234
Storm Drain Structures Cleared	4,716
Linear Feet of Drain Pipe Cleared	28,731
Linear Feet of Ditch Cleaned	47,459



Watershed Protection & Restoration Fund Revenue and Expense Report

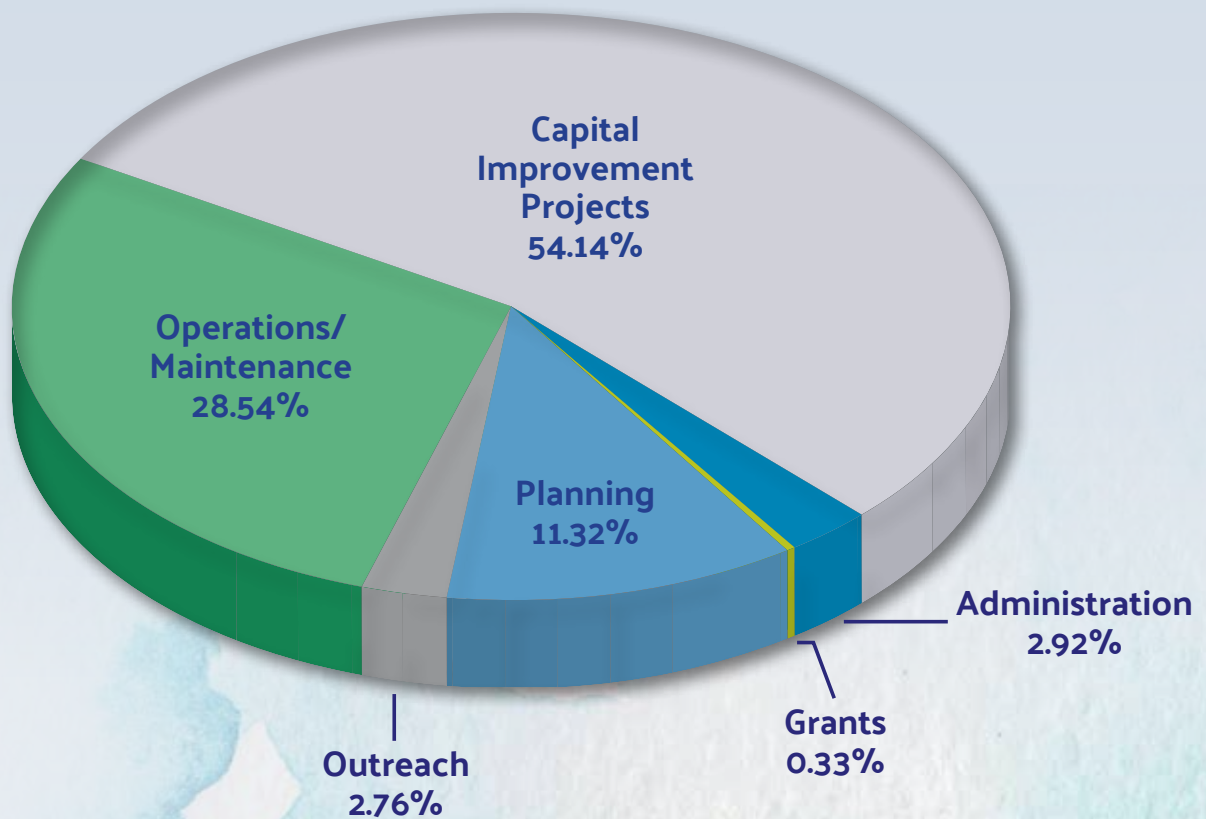
Maryland Environment Code Ann §4-202.1 (2013) requires that a county make a report publicly available, beginning on July 1, 2014, and every two years thereafter. This requirement was amended in FY15 to require annual reporting of operating expenditures. The following report is being issued to meet these revised requirements, and includes revenues and expenses for FY24, the tenth year of implementation for the Watershed Protection and Restoration Fund in Anne Arundel County, Maryland. This report includes expenses incurred beginning July 1, 2023 through June 30, 2024.

Revenues - The Stormwater Fee was first billed on property taxes on July 1, 2013. There were 224,157 properties in Anne Arundel County that were subject to the fee. For FY24, Anne Arundel County has received

\$25,586,486 in revenues as of June 30, 2024. In addition to the Stormwater Fees, the County has received \$1,877,118 to fund watershed protection and restoration projects from other sources.

Expenditures - Operating expenditures for FY24 totaled \$28,120,098. It should be noted that beginning in FY20, the County has taken a more aggressive approach to debt service. In FY24, the County has paid \$12,924,242 out of the total operating expenditures directly towards debt service. Of the remaining operating expenditures, \$8,026,302 was spent on operations and maintenance activities for the county's stormwater infrastructure. An additional \$3,182,135 was spent for planning for future improvements to these systems.

FY24 Operating Expenditures



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 and rivers. The program monitors the health and water quality of the County's streams and rivers in a variety of ways and for a variety of reasons, including:

Biological Health – Biological assessments are a highly effective, scientifically validated approach to understanding the overall health and quality of streams. Since 2004, the County has monitored the biological health of its non-tidal waterways for two overarching purposes: to establish a general baseline of knowledge regarding stream health and to compare future conditions over the long term to see if management actions are successful in restoring watershed health to degraded systems.

Fish and aquatic insect communities are the stream communities the County uses to understand overall stream health. Aquatic insects are somewhat stationary and integrate a whole season of water quality impacts in a way that a single water sample or short series of water samples simply cannot do.

Fish use different kinds of stream habitat and are mobile, providing a different understanding of stream health. Changes in biological communities from their

known and well-studied natural condition can indicate impairment in stream health.

BWPR finished its third round of aquatic biological sampling and first County-wide fish community assessment in 2021, providing the first complete baseline of fish distribution across the County and continuing the on-going assessment of aquatic insect communities performed since the program's inception in 2004. Using this fish distribution information, BWPR staff produced an atlas of freshwater fishes found in the County, which can be found on the BWPR Ecological Assessment & Evaluation unit's Biological Monitoring webpage at aarivers.org. In 2023, BWPR embarked on the fourth round of aquatic biological sampling. This five-year round (2023-2027) will provide additional information on fish distribution and allow us to assess the continuing status and trends of the aquatic biological stream resources in the County.

While biological monitoring is one of the County's primary surface water monitoring tools, BWPR also assesses stream and riparian area physical habitat and surface water quality samples in conjunction with biological monitoring, and for project-specific purposes. More details can be found on the Ecological Assessment & Evaluation unit's webpage.



Monitoring for Restoration Success

To determine if stream restoration projects are meeting their objectives and ensure that funds are spent efficiently, monitoring is sometimes performed on select projects to measure water quality, biological response, and stream valley stability both before and after restoration activities. For example, detailed monitoring to characterize post-restoration conditions was recently completed for the Cowhide Branch watershed. Here, the stream restoration involved the removal of a large dam, to restore free movement of fish within the watershed, as well as aquatic habitat and stream channel stability restoration.

The Cowhide Branch project was completed in 2018. BWPRs post-restoration monitoring of this project (2019-2024) included water quality, aquatic biological community condition, physical stream stability measurements, in-stream and riparian habitat assessment, and vegetative community monitoring. Physical stability and fish community assessments were also performed in the stream reaches above the restoration reach so the actual level of restored fish habitat could be determined. This stream restoration now provides accessible habitat for fish and attracts waterfowl and other wildlife. Water quality conditions

continue to trend positively, and wetland characteristics and overall habitat quality have improved. In 2021, BWPR staff observed evidence of beavers in the restored area and, shortly thereafter, a beaver dam was observed within the restored stream reach. Beaver activity is now regularly seen in this watershed.

A new project for BWPR staff will be the post-restoration physical stability monitoring of the Jabez Tributary 3 stream restoration. Throughout 2024, BWPR staff collaborated with a team comprised of Maryland DNR, the Severn RiverKeeper, and a private consulting firm to develop a post-restoration monitoring program that would address the Army Corps of Engineers/MDE permit requirements. While other team members are monitoring post-restoration hydrology, water quality, habitat and biological community condition, the BWPR staff will assess the physical stability of the restored reach. In late 2024, BWPR staff will establish monumented monitoring locations and begin data collection to document in-stream structure stability and inform any adaptive management necessary to ensure long-term project viability.



Highlighted Research Partnerships

BWPR values its partnerships with academic institutions and other governmental agencies. Bureau staff work closely with a variety of Federal, State, and local governmental agencies, academic institutions, and various non-governmental organizations, to further its mission. By working closely with partners, the Bureau can participate in cutting edge research and monitoring work, encourage stream and wetland restoration, and support other cost-effective research opportunities.

PCB Monitoring in the Sawmill Creek Watershed.

In 2010, the Maryland Integrated Report of Surface Water Quality listed the Baltimore Harbor, Curtis Creek/ Bay, and Bear Creek portions of the Patapsco River Mesohaline Tidal Chesapeake Bay Segment as impaired for Polychlorinated Biphenyls (PCBs) in sediment and fish tissue. As a result, a PCB TMDL was established in 2011. PCBs are a concern to human health because regular consumption of fish containing elevated levels of PCBs may lead to cancer or other serious non-cancer health effects.

In compliance with regulatory guidelines, BWPR developed a PCB TMDL Restoration Plan that includes actions for identifying sources of PCBs with the ultimate goal of reducing PCBs in the Curtis Creek Watershed and Baltimore Harbor Embayment. The Restoration Plan presents the results of desktop screening exercise to identify PCB sources, including potential locations for monitoring to confirm presence/absence. Progress toward achieving the required PCB load reduction is reviewed annually and submitted to the Maryland Department of the Environment (MDE) as required by the County's NPDES MS4 Permit.

As a component of the Restoration Plan implementation, BWPR partnered with University of Maryland Baltimore County (UMBC) and MDE on a pilot PCB monitoring program in the Sawmill Creek catchment of the Curtis Creek watershed. The purpose of the monitoring project was to identify the presence and magnitude of PCBs in select stream segments in Sawmill Creek (Phase I) and, if PCB presence was detected, to conduct additional monitoring in subsequent phases to determine the source of the PCBs. Phase I monitoring occurred in 2020 and identified both North Glen Branch and Ferndale Branch as tributaries of potential concern. As a result, a second phase of

monitoring was planned to further track down PCB sources in both tributaries. The Phase II monitoring strategy included:

- Repeat deployment of passive samplers in the water column at and around the section of concerns to further track down freely dissolved PCB sources;
- Joint deployment of passive samplers in the sediment porewater to verify if bed sediments are acting as a PCB source to the overlying water column through PCB diffusive flux;
- Analysis of PCB concentrations in suspended sediments collected during storm events at outfalls located and/or connected to suspected land sources; and
- Analysis of freely dissolved PCB concentrations during storm events at selected locations using a novel short-term passive sampling approach.

The results of Phase II monitoring indicated that both Ferndale Branch and North Glen tributary were responsible for an increase of freely dissolved PCB concentrations at their confluence with Sawmill Creek. Further Phase II source tracking also showed an ongoing recovery of both tributaries, with concentrations in Ferndale Branch ultimately trending below TMDL endpoint levels.

Following completion of Phase II, UMBC and the County are now investigating additional cooperative monitoring work as described below. The following is anticipated to begin in 2025.

- Conduct short term (1-2 years) and long term (5-7 years) monitoring in Ferndale Branch to verify that ongoing recovery trends, observed in 2022, are not transient.
- Design and implement Phase III source-tracking monitoring in the North Glen Branch to further identify PCB source(s) and to track changes in water column PCB concentrations.
- If the downward trends observed in 2022 are not consistent, collect baseflow and storm event samples and analyze for PCB concentrations to ascertain if PCB levels measured in streams are linked to surface drainage from contaminated sites in the watershed.

Illicit Discharge Detection & Elimination (IDDE) Program

BWPR 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 screens a minimum of 150 outfalls yearly for dry-weather flow conditions; if dry-weather flow is observed, the discharge is tested for pollutants, and the source of the pollution is investigated. The County's IDDE program has been successful in the identification and removal of a wide variety of sources of pollutants, including illicit wastewater connections, upland pollutant sources, illegal dumping, and spills.

Case Study: Medical Center Discharge in Glen Burnie

In November 2023, IDDE program outfall screening by the County's IDDE consultants (KCI Technologies, Inc.) revealed dry weather discharge exceeding allowable chlorine and fluoride levels at an outfall near the University of Maryland Baltimore-Washington Medical Center in Glen Burnie. The field team traced the discharge to a storm pipe that goes underneath the medical building. Three subsequent re-inspections of this outfall within the four days following the initial discovery confirmed the occurrence of an illicit discharge emanating from the pipe underneath the building.

County Inspections and Permits (I&P) staff confirmed the illicit discharge and with assistance from KCI staff

and Medical Center facilities staff identified roof drain and cooling tower drainage to be the source of the discharge. Medical Center facilities staff confirmed that cooling tower discharge is treated for legionella, and that treatment chemicals may contain chlorine. Facilities staff also mentioned that the cooling tower was recently drained for the winter, which may have coincided with KCI's initial discovery. I&P staff requested plans for the cooling towers and associated plumbing. I&P staff also inquired with facilities staff and MDE about the Medical Center's need for a permit for cooling tower discharge.

While coordinating with Medical Center facilities staff, I&P continued to monitor the outfall. Dry weather discharge was observed in February 2024 and April 2024 visits, though there was not enough discharge to gather a sample for analysis on either occasion. In April 2024, Medical Center facilities staff contacted I&P and stated that they believed the discharge was due to cooling towers overflowing in the roof drains. In May 2025 a correction notice was issued by I&P to eliminate the discharge and in June 2024 the Medical Center responded that they had adjusted the cooling tower float levels to prevent intermittent discharge. MDE also informed I&P that cooling tower discharge required routing to the sanitary sewer system or would require the Medical Center to obtain a special discharge permit to drain to the stormwater system.

During two follow-up inspections of the outfall, I&P staff observed dry weather discharge but chlorine levels were 0.0 mg/L on both occasions. I&P informed the Medical center that the discharge is in compliance, but any future maintenance activity that involves draining of the cooling towers will require de-chlorination or a discharge permit issued by MDE.



Watershed Restoration Grants

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 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.

For more information about the Anne Arundel County Watershed Restoration Grant Program, please visit www.cbtrust.org.

Below is a list of organizations that were awarded funding from Anne Arundel County for water quality restoration projects in 2024:

Organization	Project Description	Watershed	Funding Amount	Match Amount	Impervious Acres Treated
Magothy River Association	Stewarts Landing Living Shoreline	Magothy River	\$62,000	\$10,000	5.4
Arundel Rivers Federation	Hillsmere Shores Marina Resilience Project	South River	\$56,005	\$478,881	45.9
Arundel Rivers Federation	Southern District Police Station Rain Garden Makeover and Impervious Removal	South River	\$63,676	\$824	0.1
Arundel Rivers Federation	Quiet Waters Shoreline Restoration and Oyster Reef Creation	South River	\$289,262	\$40,000	35.5
Arundel Rivers Federation	Southdown Shores Pipe Daylighting and Habitat Creation Project	South River	\$312,081	\$280,792	2.6
GreenTrust Alliance Inc.	Enhancing Community Resilience Using a Living Shoreline in Elizabeth’s Landing	Patapsco River	\$125,238	\$126,900	8
Arundel Rivers Federation	Village of Middle Cove Impervious Removal	South River	\$30,614	\$19,538	0.3
TOTAL			\$938,935	\$956,935	77.7



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

The 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.

2024 WSA Successes:

- Reached 57,369 Anne Arundel County residents, providing technical assistance or environmental education, including over 6,000 children.
- Planted 19,313 native perennials and shrubs and 4,538 trees for a total of 23,851 plants in the ground.
- Led more than 728 new restoration projects and 342 maintenance events, monitoring visits and site assessments.
- Stewards donated 10,135 volunteer hours, and mobilized community members to donate an additional 19,792 hours of service towards restoration, education, and outreach, for a combined total of 29,927 hours volunteered for WSA.
- Removed 722,785+ square feet of invasive species.
- The WSA Staff hosted an additional 30 outreach/continuing education events and short courses, engaging 951 people through 84 hours of training, and the 11-session Watershed Steward Certification Course (over 70 hours of training and outreach to 30 attendees) for a total of over 80,000 person hours of training.

Replant Anne Arundel - A County-wide Tree Planting Initiative: WSA continued the Replant model to implement new tree planting projects across the county in Fall 2022 and Spring 2023. 4,295 new trees

were planted during this project period as follows:

- **Tree Troopers:** Since the Fall of 2023, there have been 2,089 trees planted through the Tree Troopers program. In the Spring of 2023, 30 new Tree Troopers were trained and their projects were installed in the Fall 2023 and Spring 2024.
- **Backyard Buffers:** In Spring 2024, WSA distributed 1,093 bare root seedlings, provided by the Maryland Department of Natural Resources, to 59 County Residents.
- **Groves of Gratitude:** Groves of Gratitude distributed a total of 580 trees to over 60 County Residents in Fall 2023.
- **Tree Ambassadors:** In 2024, WSA trained 14 new Tree Ambassadors, most of which are located in Annapolis, Brooklyn Park, and Glen Burnie.

RePollinate Anne Arundel: Inspired by the RePlant Anne Arundel Program, Watershed Stewards, in collaboration with Anne Arundel County Master Gardeners and the USGS Bee Lab, the RePollinate Anne Arundel program has grown over 11,800 native plants and distributed the plants to over 70 different communities in the county since 2022. In fall of 2023, over 4,700 plants were distributed to over 20 project sites, including residential communities, county parks, and Steward projects. In spring of 2024, volunteers have grown over 4,500 native plants from seed to be distributed to Anne Arundel County communities in Fall 2024. More information about the RePollinate Program may be found at <https://aawsa.org/repollinate-anne-arundel>.

Save Our Trees: What started as an enthusiastic group of Stewards, neighbors, and friends working together to save trees from invasive vines is now officially a program of WSA. The mission of SOT is to have immediate and long-term impacts on the removal of English ivy and other invasive vines that are killing off mature trees in Anne Arundel County and the City of Annapolis. Together, with community volunteers, in June 2024, SOT surpassed their goal of 5,000 trees saved by cutting and removing invasive vines. WSA looks forward to working with this Steward-led initiative to set new goals for the coming year and continuing to engage communities and complement our organizational mission. More information on Save Our Trees can be found at <https://aawsa.org/save-our-trees>.

For more information about WSA, please visit www.aawsa.org.

Public-Private Partnership - Full Delivery of Water Quality Improvements Contract

Dove Hill Farm Stream Restoration – Launched in 2016, the County’s “Full Delivery of Water Quality Improvements” contract was 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 supports the County’s Municipal Separate Storm Sewer System (MS4) and Chesapeake Bay Total Maximum Daily Load (TMDL) permits.

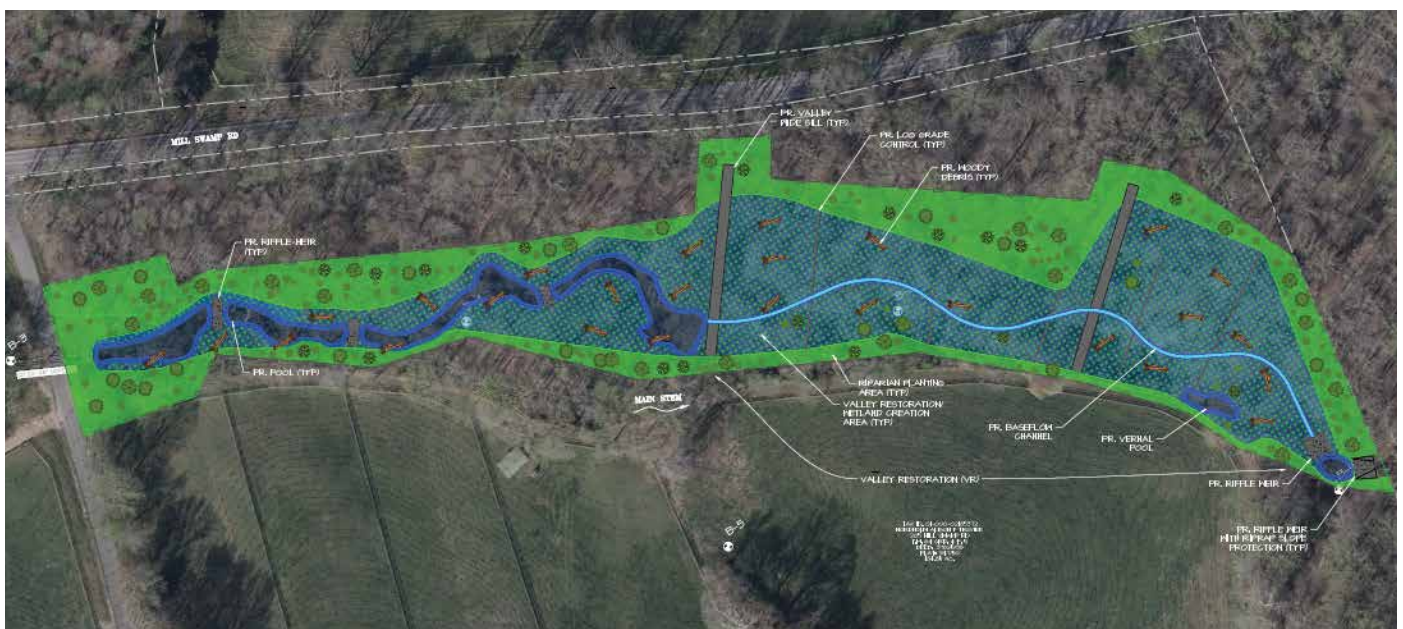
During FY24, the Bureau of Watershed Protection and Restoration awarded \$1.837 million through its innovative Full Delivery of Water Quality improvements contract for the restoration of an eroding tributary to the Rhode River. The winning design-build team, BayLand Consultants & Designers, Inc. will undertake the landowner coordination, design, permitting, and construction of the outfall restoration project.

The Dove Hill Farm Stream Restoration project, located in Edgewater, will use Regenerative Stream Conveyance (RSC) and Valley Restoration (VR) as these approaches achieve the goals of the project, reduce impacts to the adjacent valley, and enhance stream ecology through improved water quality and habitat. The proposed plan provides a vast and complete ecosystem protection and enhancement that transitions the headwaters of Mill Swamp Branch to a stable and resilient stream valley. Significant ancillary benefits will also be derived

including the creation and protection of areas of riparian forest and floodplain wetland habitat. Some key benefits include:

- Creates/enhances over 102,260 SF of floodplain wetlands.
- Provides 1,580 LF of sustainable stream restoration in a highly degraded stream reach.
- Enhances resilience to climate change including increased rainfall intensities by slowing streamflow velocities and improving groundwater infiltration which reduces downstream flooding.

The full award will only be paid upon completion of the project and verification of the project’s benefits, which is anticipated to be completed in the fall of 2025. The County’s capital program intends to make an additional solicitation in the fall of 2024.



Anne Arundel County Soil Conservation District

Soil Conservation Districts were formed in response to the Dust Bowl that occurred in the 1930s when eroding land led to dust storms and economic devastation. There was an initiative to form Soil Conservation Districts throughout the country and local landowners made up a Board of Supervisors that could convey to the federal government the needs of the local agricultural community. Each county in Maryland has a Soil Conservation office with Frederick County having two. Though they are in the process of merging into one.

The Anne Arundel District was formed in 1946. Working with agricultural landowners, the District provides guidance as well as engineering services to keep soil and nutrients on the land. The District partners with Anne Arundel County, the Maryland Department of Agriculture (MDA), the Natural Resources Conservation Service (NRCS), and the Southern Maryland Resource Conservation and Development (RC&D) to accomplish its mission. The office houses both state and federal employees, all working together to accomplish the same goals. The office currently works with approximately 400 agricultural cooperators throughout the County. One of the services the District provides is to develop a Soil Conservation and Water Quality Plan or plans if the cooperator owns or works multiple farms, for each cooperator, that outlines existing and proposed conservation practices on the farm.

Since Soil Conservation Districts have experience with controlling soil on agricultural land, when the Maryland Sediment Control Law was passed in 1970, the state assigned the Districts with the task of reviewing

all sediment and erosion control plans for urban development. Thus, the Anne Arundel Soil Conservation District reviews the sediment and erosion control portion of a grading plan that is submitted to the County as well as the sediment control portion of graded plans submitted to the City of Annapolis.

A high-priority mission of the District is to meet the federally mandated Chesapeake Bay Total Maximum Daily Load (TMDL) by 2025. These goals have been set by the Environmental Protection Agency and reaching these goals in the agricultural community of the County is the responsibility of the Maryland Department of Agriculture. Soil Conservation Districts throughout the state have partnered with MDA to accomplish this task. Districts accomplish this by installing Best Management Practices (BMPs) on agricultural land. There are 125 Maryland BMPs, both agronomic and structural, each having its own standard and specification. One of our more recent tools to combat eroding streams on agricultural properties is Step Pool Storm Conveyance (SPSC) that, until recently, have only been installed on urban sites.

With Anne Arundel County working with the urban community and Soil Conservation working with the agricultural community, we are working together to meet our TMDL goals and thus improving the water quality in the Chesapeake Bay.

For more information, please visit www.annearundelscd.org.





Anne Arundel County
Bureau of Watershed
**Protection
& Restoration**

AARivers.org

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