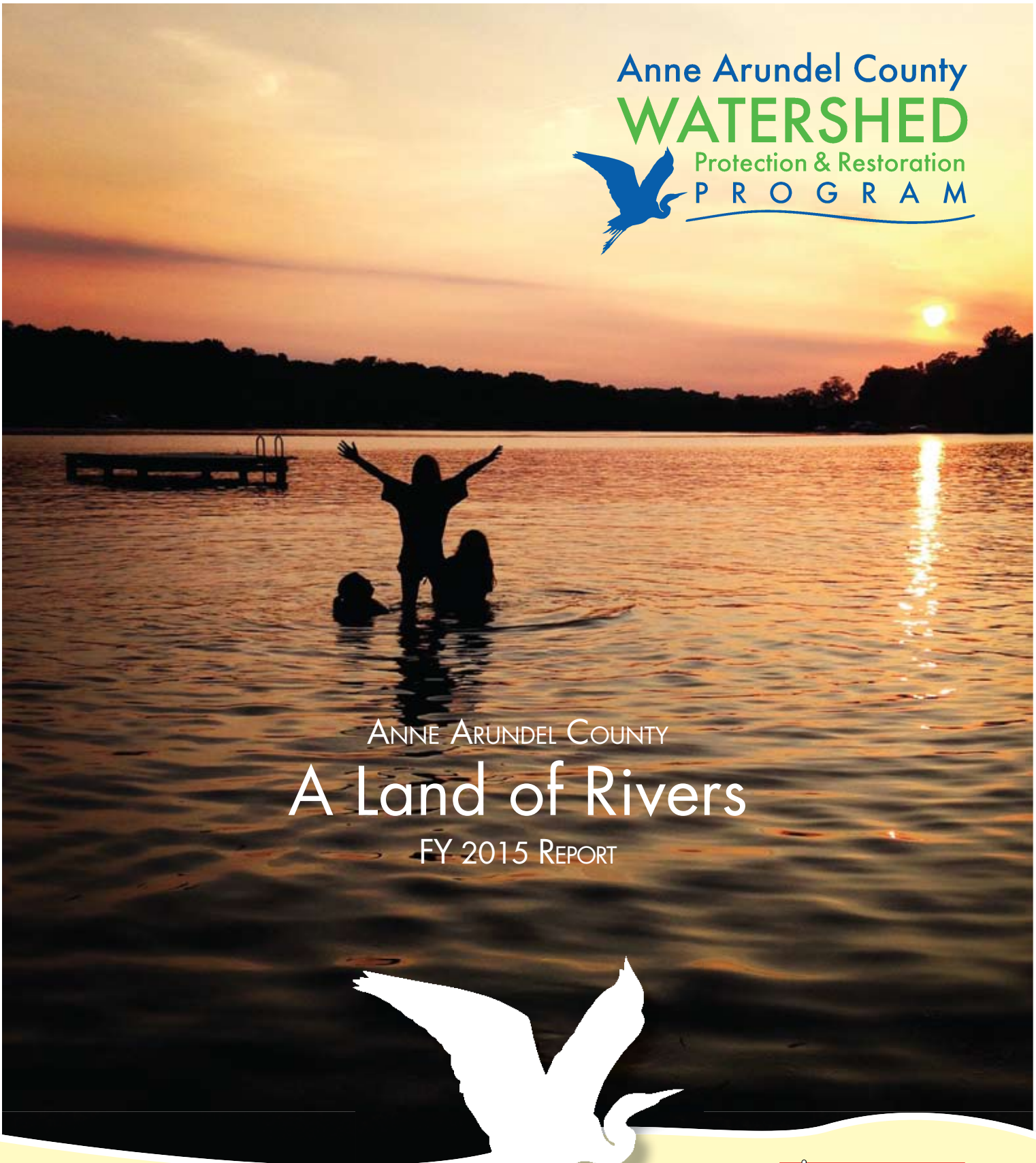


Anne Arundel County
WATERSHED
Protection & Restoration
PROGRAM

ANNE ARUNDEL COUNTY

A Land of Rivers

FY 2015 REPORT

ANNE ARUNDEL COUNTY
MARYLAND

Anne Arundel County
Department of Public Works
AARivers.org

Dear Friends,

Our *2015 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 during fiscal year 2015. In 2012, the County finalized its Watershed Implementation Plan (WIP) to provide goals 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.

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 expand, it will be possible to protect and restore water quality and habitat and prevent future urban problems 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 and 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. This collaborative approach enables entities to share resources, combine efforts, and address watershed issues that require a comprehensive approach.

Sincerely,

Steve

Steven R. Schuh
County Executive

The Changing Landscape

Anne Arundel County is a land of rivers. With more than 533 miles of shoreline and 12 different major watersheds, everything that happens on Anne Arundel's landscape is just a short trip away from its waterways. From its colonial beginnings in the middle of the 17th century, to today, with a population of over 550,000 residents, the land has been used intensively and continuously, shifting from a largely forested landscape to one that was heavily agricultural and cleared, then to the blend of urban, suburban, and rural uses that we see today.

The current health of our local waterways is a product of more than 350 years of intensive land use and an insufficient recognition that the clearing of the landscape, much of which was accomplished by the mid-18th century, followed by increasingly intensive development over the course of the past 50 years, has left our rivers with a broken network of streams and creeks.

This transformation of the natural landscape, with the addition of impervious surfaces such as roof tops, roads, sidewalks, and driveways endures today as the County continues to grow. The addition of these impervious surfaces has led to the issue of stormwater runoff. Stormwater runoff is the rain or snowmelt that flows off these impervious surfaces and into a local storm drain or culvert. All stormwater runoff ends up in nearby creeks, streams, rivers, and eventually the Chesapeake Bay without treatment. Since runoff comes into contact with litter, gasoline, oils, brake pad dust from cars, pesticides, waste from pets, and many other toxins along its journey, stormwater is a significant source of pollution to our waterways. In addition, stream erosion is accelerated as stormwater runoff is swiftly routed through a network of pipes to nearby waterways. Erosion adds excess sediment to the water, which has devastating effects on stream ecosystems. In fact, all of Anne Arundel County's waterways are considered "impaired" because of excessive levels of contaminants and sediment, largely a result of untreated stormwater runoff.

Over the course of the past decade, the Anne Arundel County Department of Public Works (DPW) has invested considerable time and money in conducting watershed assessments of each of the County's river systems. These assessments have involved walking hundreds of miles of streams throughout the County, evaluating their biological and physical condition, and developing a restoration implementation plan to recover their health and arrest the continued flow of pollutants into our rivers.

Regulatory Drivers

In 2010, with the implementation of the Chesapeake Bay Total Maximum Daily Load (TMDL) requirements by the US Environmental Protection Agency (EPA), and in 2014, with the issuance of a more aggressive National Pollutant Discharge Elimination Systems Municipal Separate Storm Sewer System (NPDES-MS4) Permit issued by the Maryland Department of the Environment, the regulatory demand to increase the pace of local restoration implementation has increased considerably.

These more ambitious pollution reduction goals require greater coordination between the local, state, and federal government agencies permitting and implementing restoration work, and with the public-at-large, who expects accountability and results from programs that require their substantial financial participation.

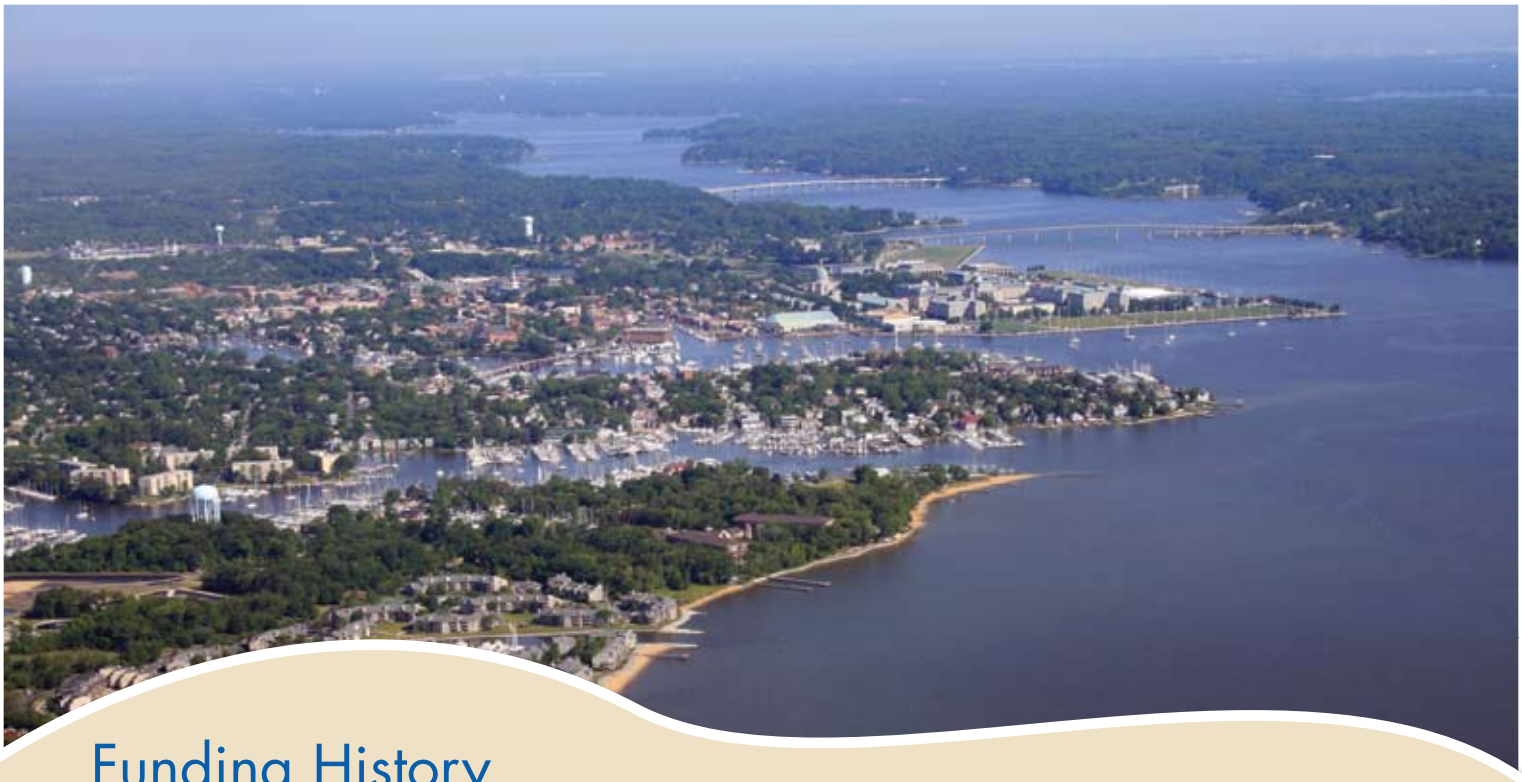
Anne Arundel County possesses the expertise, the plan, and the resources to accomplish our shared clean water goals. The Watershed Protection and Restoration Program (WPRP) has hundreds of projects programmed over the next several years to ensure that we succeed in our ambitious mission to restore the health of our local creeks and rivers.

The Restoration Plan

As part of the TMDL development process, the State of Maryland was required to provide EPA with a Watershed Implementation Plan (WIP), a strategy that laid out, in broad terms, the State's strategies for reaching its pollution reduction goals. Subsequently, in 2011, each of the counties within Maryland was required to develop individual County-wide WIPs to provide more detailed strategies for how local implementation efforts would be structured in order to achieve local pollution reduction requirements. As a result of the time and resources Anne Arundel County had previously invested in assessing its watersheds and developing restoration strategies, it was one of two counties selected by the State (the other was Caroline County) to provide technical assistance to other localities developing their own plans.

In July of 2012, the County finalized its WIP, which enumerated three primary strategies for achieving its required pollution reduction targets: 1) Upgrading, to the current limits of technology, the County's major wastewater treatment plants (WWTPs); 2) Converting roughly half (~20,000) of the County's septic systems to more effective, nutrient-reducing wastewater treatment alternatives, and; 3) Reducing pollution from urban stormwater. This third strategy dovetails completely with the County's obligations under its NDPES MS4 permit, which require the treatment of currently untreated impervious areas within the County over the next five years and beyond.

Anne Arundel's stormwater strategy is informed by nearly $6 million in physical stream condition, riparian habitat, water quality and aquatic assessments of hundreds of miles of stream corridors within each of the County's 12 primary watersheds. These watershed assessments have demonstrated widespread degradation – both in the physical condition and biological vitality – of the county's non-tidal watershed networks from the Patapsco River basin in the north to Herring Bay in the south, and have had an instrumental role in shaping Anne Arundel County's watershed restoration strategy.



Funding History

In 2012, in response to State legislation creating a mandate that the 10 largest NPDES MS4 jurisdictions develop dedicated and protected revenue streams to fund local stormwater restoration, Anne Arundel County convened a Stormwater Fee Implementation Committee comprised of County staff, community stakeholders, and local legislative representatives. After several months of consideration and deliberation – including consultation with economic and financial experts – the committee recommended a rate and structure that would allow the County to fully achieve both its near term MS4 permit goals as well as its longer range WIP goals.

The following year, the Anne Arundel County Council passed legislation to create a Watershed Protection and Restoration Special Revenue Fund and Program.

This legislation created a dedicated Watershed Protection and Restoration Special Revenue Fund (WPRF) as well as a stormwater remediation fee on impervious surfaces throughout the county to finance stormwater restoration work.

In July of 2013, the Watershed Protection and Restoration Program (WPRP) was created within the Department of Public Works to implement the County's required stormwater restoration strategies.

During the 2015 Maryland General Assembly, legislation was passed, and subsequently signed by the Governor, which eliminated the requirement for the 10 largest MS4 jurisdictions to collect a dedicated fee to fund local stormwater restoration projects. However, the legislation enhanced the requirement that local governments demonstrate they have the financial capacity to carry out the required restoration work.

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:

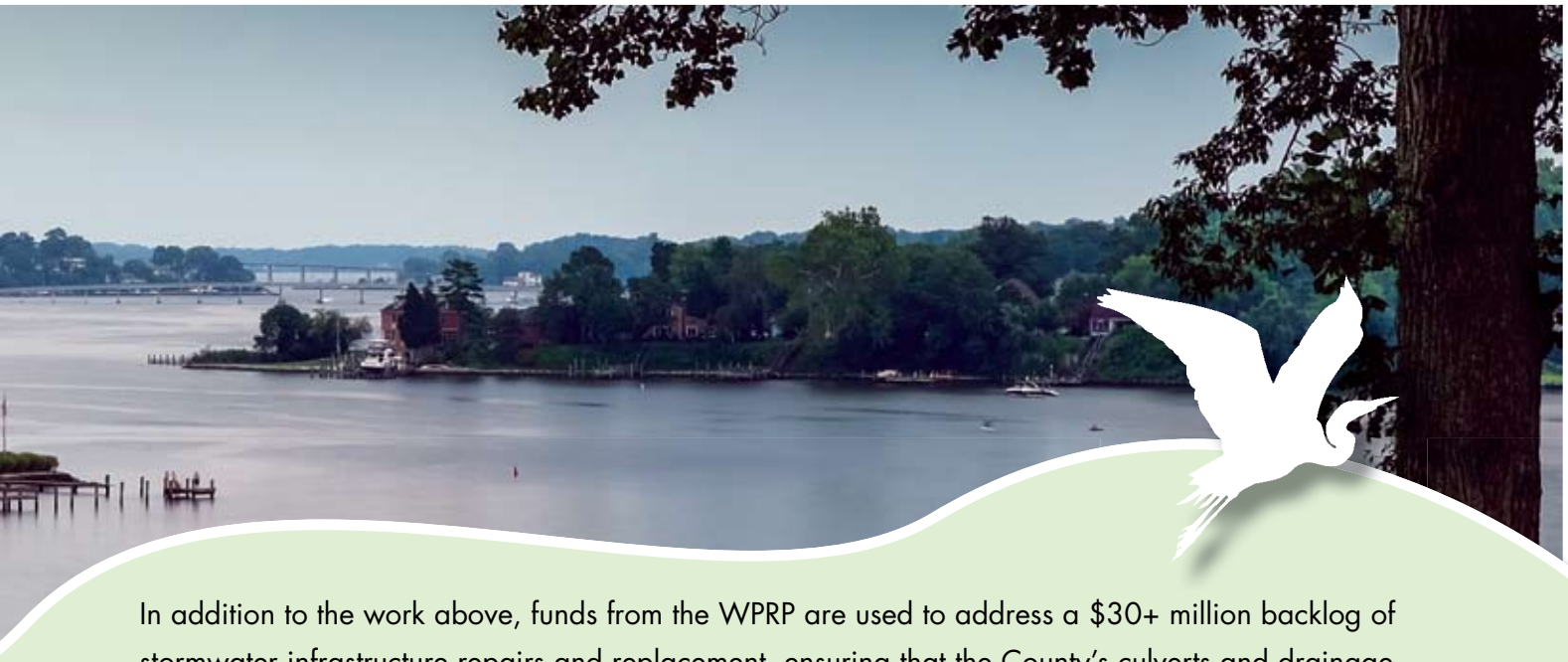
ANNUAL WATERSHED PROTECTION AND RESTORATION FEE RATES		
Zoning	Rate Calculation	FY16 Fee
R10, R15, R22	$85 x .04	$34
R1, R2, R5	$85	$85
RA, RLD	$85 x 2	$170
Non-Residential	Actual sf of impervious surface divided by 2,940 x $85	Varies

Watershed Protection and Restoration Program – Carrying Out the Plan

The Watershed Protection and Restoration Program (WPRP) is located in the Bureau of Engineering of the Anne Arundel County Department of Public Works. The WPRP 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 will be 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 – will be 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 re-hydrate valley bottoms through restoration will provide water quality, floodplain connection, and ecological benefits on a broad scale.



In addition to the work above, funds from the WPRP are used to address a $30+ 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.

Healing Our Rivers

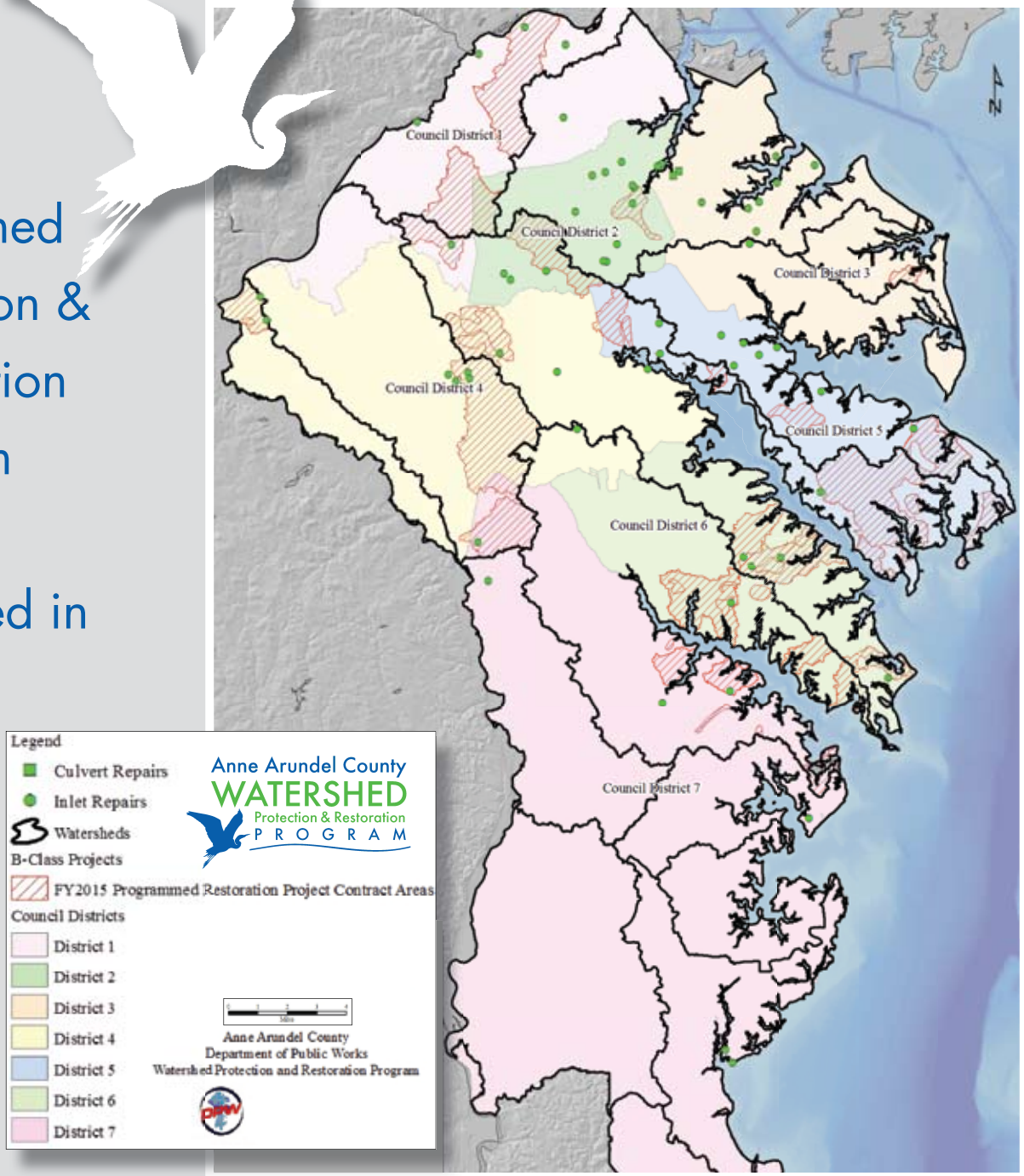
The health of Anne Arundel County's waterways is tied to the health of its watersheds. While the health of the Chesapeake Bay itself is integrally tied to inputs from the region's largest waterways, such as the Susquehanna and Potomac Rivers, the health of our rivers and creeks has been demonstrated to be largely driven by activities – both past and present – in our own watersheds. Nutrient discharges from our wastewater treatment plants 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, are put on the path to recovery.

Summary of Watershed Restoration Projects

WATERSHED IMPLEMENTATION PLAN (WIP) PROJECTS FUNDED IN FY15	
Bodkin Creek Watershed	$178,200
Little Patuxent Watershed	$16,663,900
Magothy River Watershed	$8,146,300
Patapsco River (Non-Tidal) Watershed	$5,296,200
Patapsco River (Tidal) Watershed	$5,489,600
Upper Patuxent Watershed	$2,979,800
Severn River Watershed	$13,536,800
South River Watershed	$20,269,900
TOTAL	$72,560,700

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 FY15 Capital Budget. Watershed assessments for Little Patuxent, West/ Rhode River Herring Bay and Middle Patuxent are scheduled for completion by 2017.

Watershed Protection & Restoration Program Projects Budgeted in FY2015



Stream & Wetland Restoration Program

Purpose & Function

Anne Arundel County's Stream & Wetland Restoration Program is a watershed-based approach to restoring degraded stream systems to improve stream morphology, ecological function, water quality, along with aquatic and riparian habitat to ensure the resilience of the County's environment for its citizens. The Stream & Wetland Restoration Program is at the core of Anne Arundel County's program to meet federal and state mandated pollutant load reductions (TMDLs) and impervious surface management (NPDES MS4) requirements.

Stream Restoration Project Tasks

- Assessment and Evaluation
- Prioritization and Project Selection
- Design
- Community Input
- Federal, State and Local Permits
- Private/Public Property Access Approval
- Construction
- As-Built Approval
- Adaptive Management

Monitoring

Pre- and post- construction monitoring is often integral to restoration projects and is, many times, required by Federal and State permitting agencies. Collecting data on the performance and function of restoration projects provides decision makers with information that assists managers in making informed management decisions.

STREAM RESTORATION PROJECTS FUNDED IN FY15					
Project #	Watershed	Community	Council District	# of Stream Segments	Stream Length (Linear Feet)
B552200	Magothy	Arnold	5	5	4,273
B554800	Patapsco Tidal	Marley	2	16	16,829
B555800	Bodkin Creek	Lakeshore	3	2	682
B556200	Upper Patuxent	Laurel	4	2	727
B557700	Severn	Odenton	4	6	9,015
B557800	Severn	Odenton	4	5	5,044
B558200	Severn	Millersville	5	1	1,125
B558300	Severn	Annapolis	6	4	3,879
B558400	Severn	Annapolis	6	2	2,032
B558500	Severn	Annapolis	5	3	3,158
B559100	South	Annapolis	6	4	5,023
B559300	South	Annapolis	6	6	3,490
B559400	South	Annapolis	6	3	4,960
B559700	South	Edgewater	7	8	8,978
TOTAL				67	69,215

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

Stormwater Management Pond Retrofit/Conversion and Storm Drain Outfall Enhancement Program

Purpose & Function

Anne Arundel County's Stormwater Management (SWM) Pond Retrofit/Conversion and Storm Drain Outfall Enhancement Program utilizes a watershed-based approach to reducing pollutant loads from upland sources and managing stormwater from impervious surfaces within Anne Arundel County. The SWM Pond Retrofit/Conversion and Storm Drain Outfall Enhancement projects along with the Stream & Wetland Restoration projects make up Anne Arundel County's Stormwater Tier One Watershed Implementation Strategy (WIP). The County's WIP was structured to meet Federal and State mandated pollutant load reductions required to achieve the Chesapeake Bay TMDL, including those local TMDLs established for Anne Arundel County's waterways, and impervious surface management (NPDES MS4) requirements.

Pond Retrofit/Conversion & Outfall Enhancement Project Tasks

- Assessment and Evaluation
- Prioritization and Project Selection
- Design
- Community Input
- Federal, State and Local Permits
- Private/Public Property Access Approval
- Construction
- As-Built Approval
- Adaptive Management

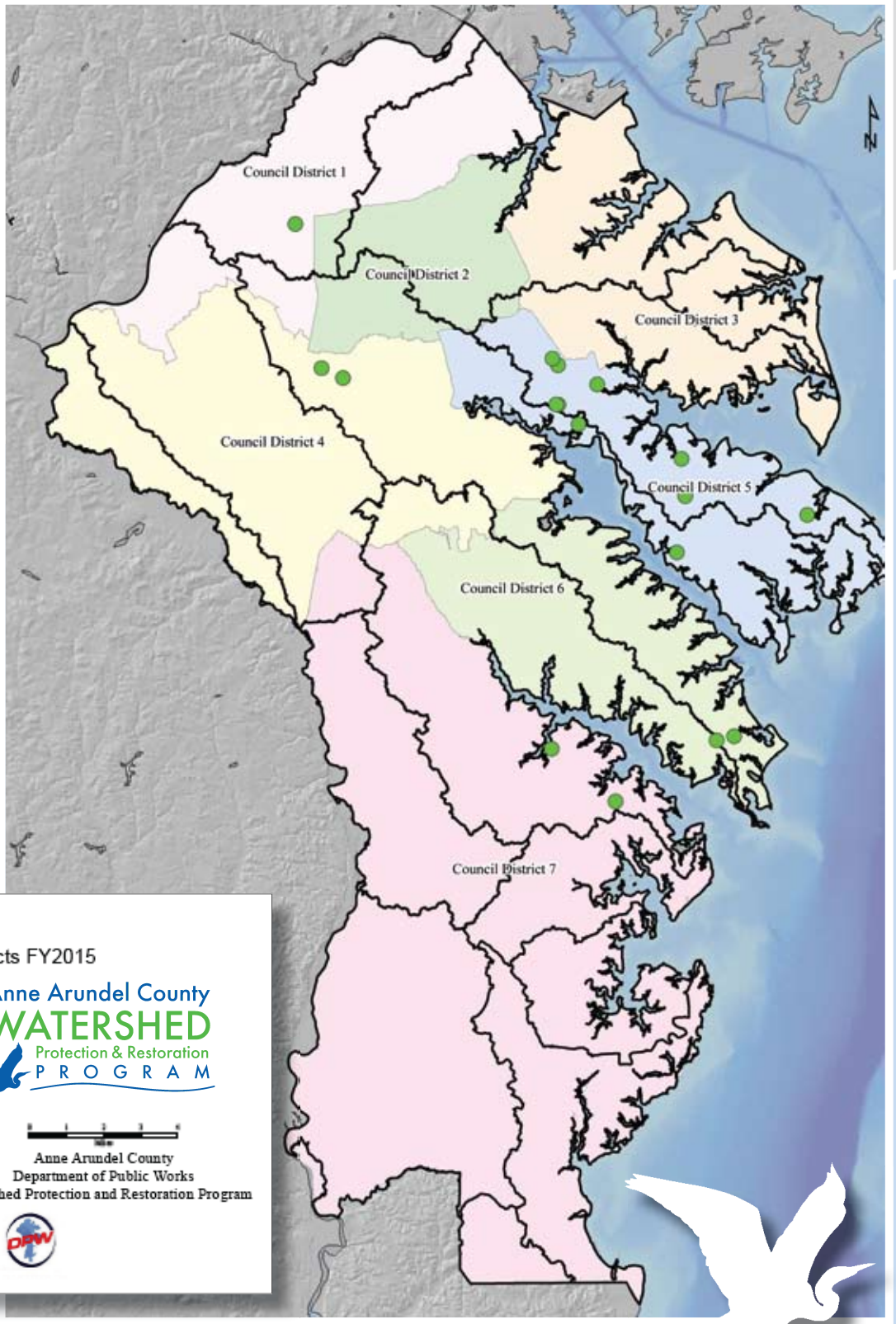
SWM POND RETROFIT/CONVERSION PROJECTS FUNDED IN FY15			
Project #	Watershed	Council District	# of Private Ponds
B552200	Magothy	5	3± (PC), 2± (PP)
B555600	Patapsco, Non-Tidal	1, 2	18± (PP)
B557800	Severn	4	2± (PP)
B558000	Severn	1, 2, 4, 5, 6	22± (PP)
B559100	Severn	6	1± (PP)
B559300	Severn	6	1± (PP)
TOTAL			49

NOTE: (PC) = Public Ponds (PP) = Private Ponds

STORM DRAIN OUTFALL ENHANCEMENT PROJECTS FUNDED IN FY15			
Project #	Watershed	Council District	# of Outfalls
B552200	Magothy	5	24±
B552400	Magothy	5	27±
B554800	Patapsco Tidal	2	23±
B555800	Bodkin Creek	3	3±
B556200	Upper Patuxent	4	2±
B556300	Upper Patuxent	1	7±
B556800	Little Patuxent	4, 7	23±
B556900	Little Patuxent	7	22±
B557700	Severn	4	6±
B557800	Severn	4	7±
B557900	Severn	4, 5, 6	46±
B558200	Severn	5	6±
B558300	Severn	6	3±
B558400	Severn	6	5±
B559100	South	6	5±
B559200	South	6	17±
B559300	South	6	8±
B559400	South	6	3±
B559600	South	6	12±
B559700	South	7	4±
B558000	South	7	8±
B56000	South	7	7±
TOTAL			268

WPRP Restoration Projects Completed in 2015

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



Outfalls Completed: 5

Notable Project: Olde Severna Park Outfall Repair

Ponds Completed: 10

Notable Project: Wethersfield SWMP Retrofit

Stream Restorations Completed: 1

Notable Project: Leeds Road Stream Restoration

Infrastructure Management Division (IMD) — Stormwater Management

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 FY15	
Culvert & Closed Storm Drain Repair	$4,766,600
Emergency Storm Drain	$600,000
Storm Drain/SWM Infrastructure	$1,000,000
TOTAL	$6,366,600.00

2015 Infrastructure Management Division WPRP Capital Projects

COUNCIL DISTRICT	ROAD NAME	PROJECT SCOPE OF WORK	CAPITAL FUNDING
1	Boulevard Place	Replace CSD pipes. Repair inlets and manholes.	$34,000
1	West Nursery Road	Reconstruct structures.	$36,000
1	224 Ferndale Road	Replace CSD pipes. Repair inlets and manholes.	$10,000
1	Carriage Dr	Install new storm drainage system.	$62,000
1	Race Road	Slope Stabilization project.	$552,000
2	Southfield Rd	Replace CSD pipes. Repair inlets and manholes.	$80,000
2	Ridgely Rd / Marlboro Rd	Install new storm drainage system.	$70,000
2	Bliss La	Replace CSD pipes. Repair inlets and manholes.	$11,000
2	Norman Ave	Replace CSD pipes. Repair inlets and manholes.	$45,000
2	A Street SW	Replace CSD pipes. Repair inlets and manholes.	$55,000
2	119 S. Jerome Pkwy	Replace CSD pipes. Repair inlets and manholes.	$34,000
2	107 Glen Rd	Install new storm drainage system.	$163,000
2	Lionsheart Glen	Install new storm drainage system.	$48,000
2	7847 Leymar Rd	Replace CSD pipes. Repair inlets and manholes.	$35,000
2	202 Greenway SE	Reconstruct structures.	$11,000
2	8183 Weyburn Ave	Replace CSD pipes. Repair inlets and manholes.	$20,000
2	551 Lanny Ct	Reconstruct structures.	$14,000
2	1303 Ava Rd	Replace CSD pipes. Repair inlets and manholes.	$74,000
2	8255 Quarterfield Rd	Install new storm drainage system.	$56,000
2	8148 Harvest Ct	Replace CSD pipes. Repair inlets and manholes.	$66,000
3	237 Arundel Rd	Replace CSD pipes. Repair inlets and manholes.	$70,000
3	Crystal Palace La	Replace CSD pipes. Repair inlets and manholes.	$10,000
3	Briar La	Install new storm drainage system.	$23,000
3	Marley Neck Rd #1 Culvert	Culvert replacement project.	$198,000
3	Solley Rd	Replace CSD pipes. Repair inlets and manholes.	$22,000
3	Marley Neck Rd #2 Culvert	Culvert replacement project.	$186,000
3	Green Forest @ 225th St	Replace CSD pipes. Repair inlets and manholes.	$10,000

2015 INFRASTRUCTURE MANAGEMENT DIVISION WPRP CAPITAL PROJECTS			
COUNCIL DISTRICT	ROAD NAME	PROJECT SCOPE OF WORK	CAPITAL FUNDING
3	Holly/Beach Rds	Install new storm drainage system.	$287,000
3	Hingham Harbor	Replace CSD pipes. Repair inlets and manholes.	$30,000
3	7696 Grace Ave	Reconstruct structures.	$9,000
4	Piney Orchard/Waugh Chapel Rd	Reconstruct structures.	$55,000
4	Waugh Chapel/Blackberry	Reconstruct structures.	$46,000
4	570 Rita Dr	Replace CSD pipes. Repair inlets and manholes.	$55,000
4	3592 Whiskey Bottom Rd	Replace CSD pipes. Repair inlets and manholes.	$33,000
4	1166 Goldfinch La	Install new storm drainage system.	$32,000
4	Burlington Rd	Replace CSD pipes. Repair inlets and manholes.	$25,000
4	Stehlik Dr	Reconstruct structures.	$14,000
4	3326 Crumpton South	Reconstruct structures.	$10,000
4	1152 Oak View Dr	Reconstruct structures.	$8,000
4	Eachann La	Replace CSD pipes. Repair inlets and manholes.	$13,000
5	River Road	Replace CSD pipes. Repair inlets and manholes.	$16,000
5	Mulard Ct	Replace CSD pipes. Repair inlets and manholes.	$33,000
5	172 Tam Glade Rd	Install new storm drainage system.	$23,000
5	28 Whittier Pkwy	Install new storm drainage system.	$80,000
5	24 Hatton Dr	Reconstruct structures.	$10,000
5	512 Pinefield Dr	Reconstruct structures.	$1,000
5	Cattail Passage Ct	Replace CSD pipes. Repair inlets and manholes.	$12,000

2015 INFRASTRUCTURE MANAGEMENT DIVISION WPRP CAPITAL PROJECTS			
COUNCIL DISTRICT	ROAD NAME	PROJECT SCOPE OF WORK	CAPITAL FUNDING
5	White Cedar La	Install new storm drainage system.	$35,000
5	Pocono Rd	Replace CSD pipes. Repair inlets and manholes.	$24,000
5	Century Vista Dr	Install new storm drainage system.	$69,000
5	Latrobe Dr	Install new storm drainage system.	$255,000
6	Farragut Rd	Install new storm drainage system.	$40,000
6	Admiral Dr	Replace CSD pipes. Repair inlets and manholes.	$12,000
6	Bestgate Rd Inlet Rehab	Reconstruct structures.	$172,000
6	Jennifer Rd Inlet Rehab	Reconstruct structures.	$72,000
6	Cardamon Dr	Replace CSD pipes. Repair inlets and manholes.	$21,000
7	2311 Halls Grove Rd	Reconstruct structures.	$10,000
7	Ullswater Pl	Reconstruct structures.	$9,000
7	6074 Drum Point Rd	Replace CSD pipes. Repair inlets and manholes.	$64,000
7	Cliff Dr / Maryland Ave	Install new storm drainage system.	$61,000
7	350 Central Ave	Reconstruct structures.	$10,000
7	Havre De Grace Dr	Replace CSD pipes. Repair inlets and manholes.	$23,000
7	Irvin Avenue SD	Install new storm drainage system.	$232,000

IMD Milestones

2015 MILESTONES	
Action	Result
BMP's Inspected	143
Miles of Street Swept	2,300
Tons of Litter Collected (Street Sweeping)	350
Storm Drain Structures Cleared	13,500
Linear Feet of Drain Pipe Cleared	18,000
Linear Feet of Ditch Cleaned	140,000
Storm Drains and Culvert Projects Completed	160

The Infrastructure Management Division is responsible for managing the inventory, inspection, and maintenance of 852 stormwater management facilities that are collectively referred to as Best Management Practices (BMPs). In addition, IMD works alongside the Roads Operations Division to sweep County roads to remove loose materials, litter, and other debris that are unsightly, hazardous, or could cause possible drainage obstructions.

Watershed Protection and Restoration Fund Revenue and Expense Report

Maryland Environment Code Ann §4-202.1 (2013) requires that a county make a report publicly available, beginning on July 1, 2014, and every two years thereafter. The following report is being issued in addition to these requirements, and includes revenues and expenses for FY15, the second year of implementation for the Watershed Protection and Restoration Fund in Anne Arundel County, Maryland. This report includes expenses incurred beginning July 1, 2014 through June 30, 2015.

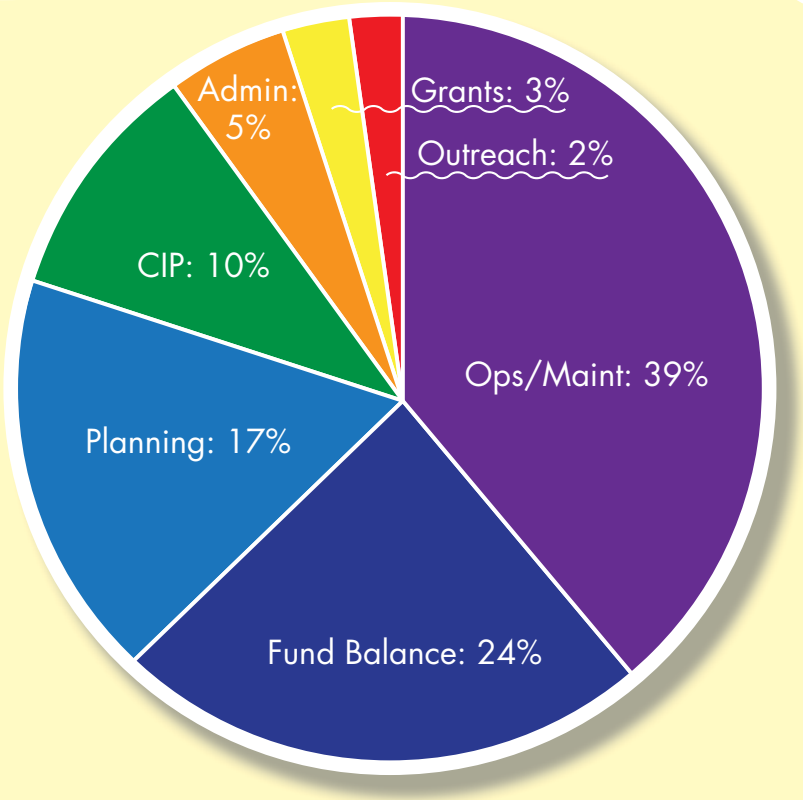
WPRP FY15 Operating Expenses

Expenses Posted as of July 10, 2015

Revenue and Expense Report

Revenues

The Stormwater Fee was first billed on property taxes on July 1, 2014. In FY15, there were 171,046 properties in Anne Arundel County that were subject to the fee. For FY15, Anne Arundel County has received $16,925,000 in revenues as of June 30, 2015. In addition to the Stormwater Fees, the county has received $422,000 to fund watershed protection and restoration projects from other sources.



Expenditures

Operating expenditures for FY15 totaled $13,267,000. Of these expenditures, $6,752,000 was spent on operations and maintenance activities for the County's stormwater infrastructure. An additional $2,922,000 was spent for planning for future improvements to these systems. The fund balance of $4,080,000 will be used to pay debt payments associated with the capital improvement projects required to update the aging infrastructure and the construction of best management practices for locations that do not meet current requirements.

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 for purposes of developing a long-term water quality characterization. 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 — How healthy are County waterways? What's the best way to measure their health? Biological assessments are a highly effective approach to understanding the overall health and quality of streams. The primary goals of the program are to assess the status of the County's biological stream resources and to establish a baseline for comparing future assessments, to track the status and trends of biological stream resources, and to relate them to specific programmatic activities.

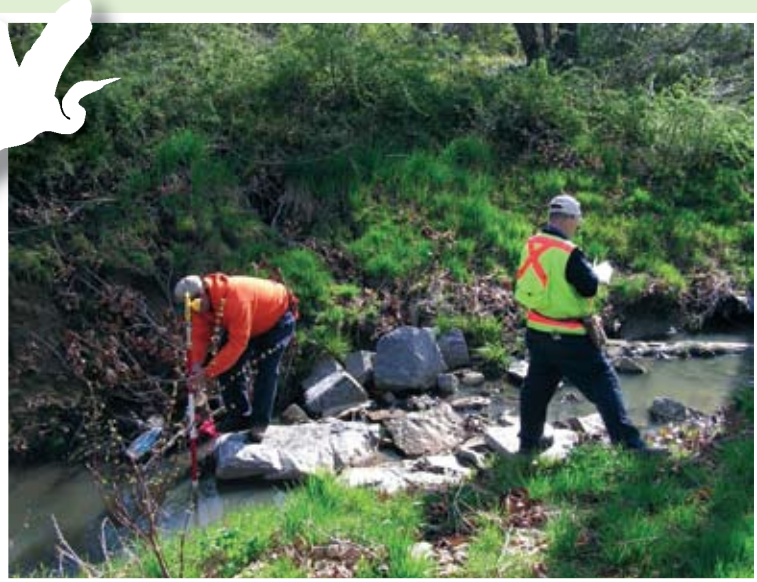
The aquatic insect communities that live in streams are very useful for indicating changes in overall stream health. Insects are somewhat stationary and integrate a whole season of water quality impacts in a way that a single water sample or short series of water samples simply cannot do. Changes in biological communities from their known and well-studied natural condition can indicate impairment in stream health.

From 2003 to 2013, the County completed two sampling rounds in each of the County's twelve major river basins and developed a baseline of existing conditions. The program is currently being redesigned to better characterize status and trends within the County's river basins and, through the addition of fish sampling, provide a more well-rounded assessment of non-tidal stream health. The start of a third round of sampling is planned for early 2016.

Monitoring for Restoration Success — To determine if a stream restoration project is meeting its objectives, before and after monitoring are performed. Water quality, biological, and stream channel stability measurements are performed both before and after restoration activities, ensuring that funds are spent effectively and efficiently. For example, in the Dividing Creek watershed the County has performed water quality monitoring, biological monitoring, and channel stability assessments using consultants and partnerships with researchers from the University of Maryland and Anne Arundel Community College to characterize site conditions before restoration activities that are planned for late 2015.

Stormwater Monitoring - As part of County compliance with Federal and State clean water regulations, the WPRP performs stormwater monitoring at two stations in the Church Creek (South River) watershed. These are long term monitoring stations that are used to understand the impacts of redevelopment activity and watershed restoration on stream water quality. Using computer- controlled sampling equipment, storms are sampled 12 times per year and occasional low flow samples are collected manually. A variety of pollutants are measured, including nutrients like nitrogen and phosphorus and heavy metals, like copper and zinc. The amount of water flowing past the stations is measured continuously. Using this flow information along with the measured amount of pollutants in the water, a total amount of a particular pollutant—known as its load—can be determined. Monitoring changes in these pollutant loads helps us understand if County efforts to improve stream water quality are successful or if more work needs to be done in the upstream developed areas to reduce these loads to desirable levels.

Illicit Discharge Detection and Elimination Program



Under its NPDES-MS4 permit, Anne Arundel County is required to implement an inspection and enforcement program to ensure that all discharges to and from the municipal separate storm sewer system that are not composed entirely of stormwater are either permitted by MDE or eliminated.

The requirements are broken down into five main components: field screening of a minimum of 150 storm drain outfalls annually, conducting routine surveys of commercial and industrial watersheds to find and eliminate pollutant sources, maintaining a program to address illegal dumping and spills, maintaining appropriate enforcement procedures for investigating and eliminating non-permitted discharges, and reporting of all discharge detection and elimination activities.

The County's program uses outfall field screening to locate illegal storm drain connections or other non-permitted dry-weather discharges through the municipal storm sewer systems. When dry-weather flows in municipal storm sewer systems are found, they are tested for contaminants. If contamination is found, the program requires that it be eliminated or permitted. Within each area where illicit screening is performed, routine visual surveys of commercial and industrial drainage areas are also conducted.

To report a potential illicit discharge or other environmental violation contact the Anne Arundel County Environmental Hotline at 410-222-7777.

Inspectors drive through each commercial and industrial area, looking for signs of pollution. If pollutant sources are present, the site is flagged for review by the County for possible enforcement action. The Anne Arundel County Department of Inspections and Permits (I&P) maintains an inspection and enforcement program for the discharge of illegal discharges into the County storm drain system, which includes illicit dumping and spills. In the event of dumping, a spill, or an illegal connection, I&P corrects the situation or refers the matter to MDE for correction.

Watershed Partnerships

Successful conservation and preservation of Anne Arundel County's watersheds takes teamwork. To that end, in late 2014 the Anne Arundel County Department of Public Works, in partnership with the Chesapeake Bay Trust, announced the Anne Arundel County Watershed Restoration Grant Program, a new 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 pollution permit and local waterway cleanup plan. This program encourages on-the-ground restoration activities that reduce stormwater flow and pollutants and engage Anne Arundel County residents in these activities. More information about the grant program can be found at CBTrust.org.

ORGANIZATIONS AWARDED FUNDING FOR WATER QUALITY RESTORATION PROJECTS IN 2015

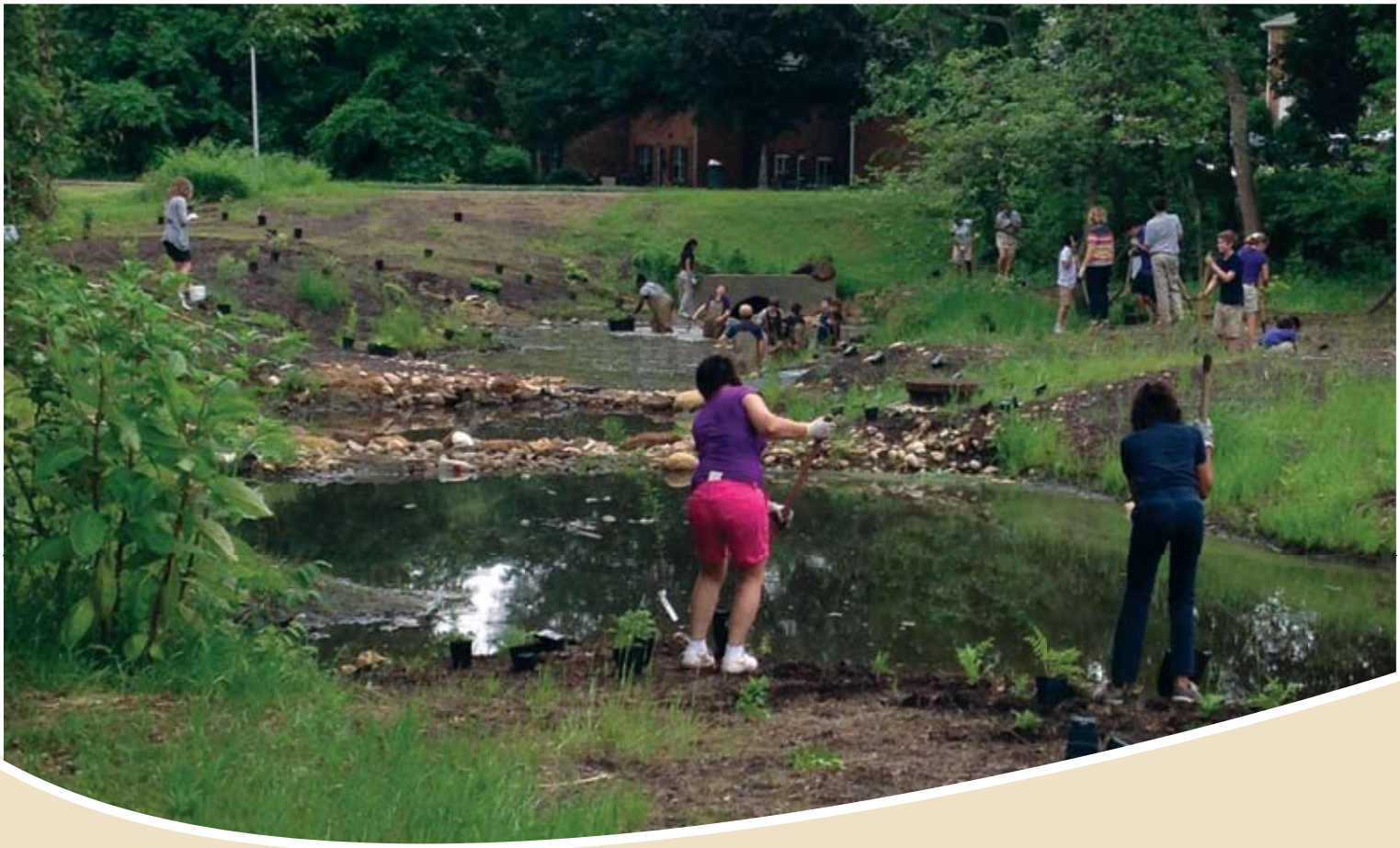
ORGANIZATION	PROJECT DESCRIPTION	FUNDING AMOUNT	MATCH AMOUNT	IMPERVIOUS ACRES TREATED
Ben Oaks Civic Association	Ben Oaks Flood Control	$87,566	$1,000	0.68
Herald Harbor Citizens Association	Bonaparte Road Bioswale and CPO	$55,255	$23,060	3.49
Round Bay Community Association	Round Bay Community – Randall Road Stormwater Mitigation	$23,387	$4,410	0.40
South River Federation	Camp Woodlands Pre-Treatment Retrofit	$55,494	$15,760	4.58
South River Federation	Hillsmere Bioretention Expansion	$77,406	$48,190	6.16
South River Federation	Annapolis Harbour Center Stream and Wetland Restoration	$100,000	$478,058	15.50
West/Rhode Riverkeeper, Inc.	Avalon Shores Fire Department Stormwater Wetland	$45,000	$1,950	0.63
	TOTAL	$444,108.00	$572,428.00	31.44

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.

While developing a positive environmental ethic and sense of stewardship, students learn the meaning of respecting each other as well as respecting the environment. By the end of their residential experience, students are given the tools necessary to become Chesapeake Stewards, and have gained the knowledge to protect and preserve the Chesapeake Bay and its watershed at home, school, and on their own.

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



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 2015, over 1,900 Anne Arundel County Public School Student participated in planting events at 9 newly restored water quality project sites around the County. Below is a listing of those opportunities that occurred during 2015:

- Ruppert's Ravine Restoration – 360 6th grade students from Old Mill Middle – South
- Gray's Luck Pond Retrofit – 200 6th grade students from Corkran Middle School
- Collington Court Pond Retofit – 40 AP Science students from Broadneck High School
- Haskell Drive Outfall Retrofit – 300 6th grade students from Marley Middle School
- Denington Lane Pond Retrofit – 120 6th grade students from Severna Park Middle School
- Olde Severna Park Outfall Repair – 300 6th grade students from Severna Park Middle School
- Buena Vista Phase 2 – 12 AP Environmental students from Broadneck High School
- Leeds Dr. – 300 6th grade students from Lindale Middle School
- Crofton Tributaries Phase 1 – 300 6th grade students from MacArthur Middle School

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.

Since its inception, the Anne Arundel County Watershed Stewards Academy has been training citizen leaders to take action in their local communities to improve the health of their waterways. WSA is unique in its train-the-trainer curriculum, and uses the energy of citizen volunteers to reach private property owners who want to make changes on their properties. Through existing partnerships with businesses, citizens, local watershed groups, Anne Arundel County Public Schools, and Anne Arundel County government, WSA is poised to continue cultivating leaders in every community in Anne Arundel County to restore our watersheds, one landscape at a time. To learn more about WSA, visit AAWSA.org.

2014 WSA Successes*

CERTIFIED.....25 Watershed Stewards, bringing the total Master Watershed Steward roster to 130

ENROLLED.....45 new Steward Candidates

VOLUNTEERED.....over 3,000 hours to reduce pollutants in their communities

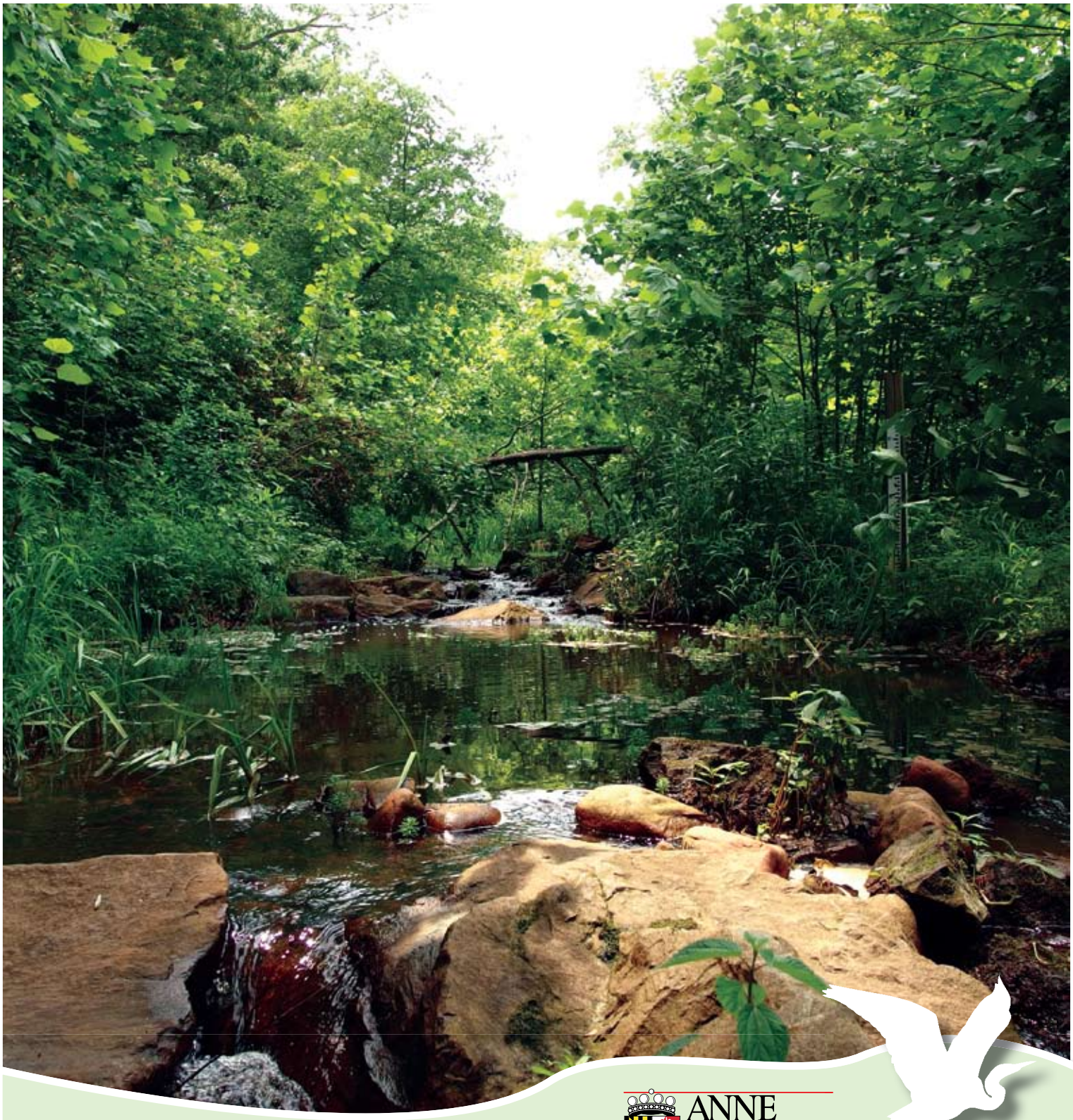
PLANTED.....over 8,500 native plants and trees

CREATED.....over 95,000 square feet of rainscaping and forested buffers

INSTALLED.....65 rain barrels

ENGAGED.....over 8,500 people in Anne Arundel County through 180 presentations and rainscaping events

*Reported on calendar year basis.



Anne Arundel County
WATERSHED
Protection & Restoration
PROGRAM

ANNE ARUNDEL COUNTY
MARYLAND

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

Photo Credits: Susan O'Brien (Cover); Kate Boicourt (26);
Melissa Jo Keever Bridges (3); Chesapeake Bay Program (5);
Mary Hollinger (6,18); John Koontz (10,11,12,21); South River Federation (27,29);
Jane Thomas (2,8,25,31); Watershed Stewards Academy (30).