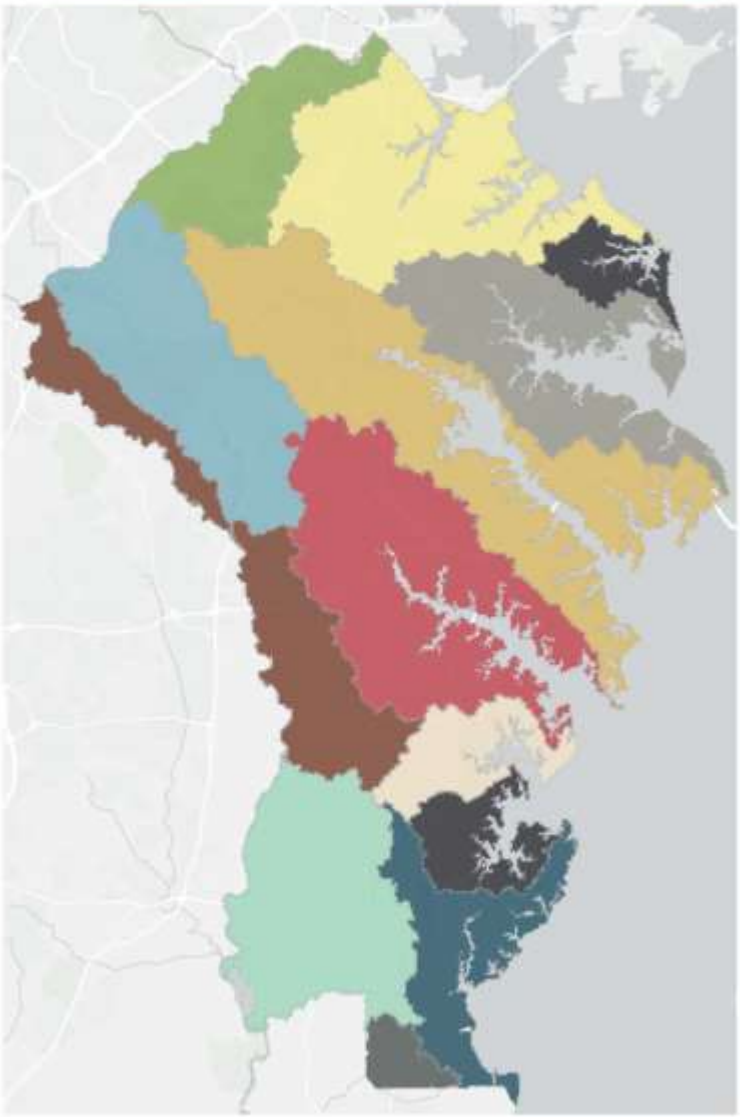

ANNE ARUNDEL COUNTY
MARYLAND

# FISCAL YEAR 2020 ANNUAL REPORT

## NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

Municipal Separate Storm Sewer System
Discharge Permit

Permit Number MD0068306

Effective Date: February 12, 2014

**SUBMITTED: FEBRUARY 11, 2021**

Department of Public Works
2662 Riva Road
Annapolis, MD 21401

# Fiscal Year 2020 Annual Report for
# Anne Arundel County
# National Pollutant Discharge Elimination System
# Municipal Separate Storm Sewer System Discharge Permit

## Permit Number MD0068306; 11-DP-3316

Submitted to:

Water Sciences Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230

February 2021

Submitted by:
Anne Arundel County
Department of Public Works
2662 Riva Road
Annapolis, MD 21401

Prepared by:

VERSAR
Your Needs, Our Mission

# TABLE OF CONTENTS

# LIST OF TABLES

## LIST OF FIGURES



## LIST OF APPENDICES

## *I. INTRODUCTION*

This Annual Report describes compliance activities for the County and State Fiscal Year (FY) 2020 (July 1, 2019 – June 30, 2020), in association with Anne Arundel County's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Discharge Permit (Permit Number: 11-DP-3316, MD0068306). The current permit was issued on February 12, 2014 and, in February 2019, was administratively continued until the next permit is issued. This is the sixth Annual Report prepared under this permit.

The Annual Report describes the components of the stormwater management program and associated implementation status and summarizes the monitoring programs implemented by Anne Arundel County (County) including data collection and analysis. Digital data and specific reports for the major programs conducted during the reporting term can be found within the report's **Appendices**. Digital data found in **Appendix A** is submitted in the format consistent with the MS4 Geodatabase structure as described in the May 2017 document entitled *National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4), Geodatabase Design and User's Guide, Version 1.2* (MDE 2017).

## *II. STORMWATER MANAGEMENT PROGRAM*

Components of Anne Arundel County's stormwater management program were established to address the requirements outlined in the County's NPDES MS4 permit. The major components also address stormwater Waste Load Allocations (SW-WLAs) associated with Total Maximum Daily Loads (TMDLs), and overall water quality improvement within the County's waterways. Program components include the following features:

- Storm Drain Infrastructure and Impervious Area Inventory;
- Erosion and Sediment Control Program;
- Stormwater Management Program;
- Illicit Discharge Detection and Elimination;
- Litter and Floatables;
- Management and Maintenance of County-owned Facilities (e.g., roads, parking lots);
- Public Education and Outreach;
- Watershed Assessment;
- Watershed Restoration Plans;
- TMDL Compliance;
- Watershed Restoration Assessment;
- Stormwater Management Assessment; and
- Program Funding.

The County believes the above programs address the major water quality interests within County watersheds. Monitoring efforts have shown that implementation of these programs results in the improvement of water quality, which motivates the County to continue its dedication to these programs. Efforts in these program areas during the reporting period are described under the appropriate permit condition sections in **Part IV** of this report.

## *III. WATER QUALITY*

The NPDES MS4 Permit issued to Anne Arundel County in February 2014 requires implementation of a stormwater management program to effectively prohibit pollutants in stormwater discharges, to attain applicable WLAs as set forth in approved TMDLs, and to comply with all provisions of the permit. Compliance with permit conditions shall constitute compliance with the Clean Water Act (§402(p)(3)(B)(iii)) and adequate progress toward compliance with Maryland's water quality standards and any U.S. Environmental Protection Agency (EPA) approved stormwater WLAs.

Anne Arundel County endeavors to manage, implement, and enforce a stormwater management program in accordance with the Clean Water Act and corresponding NPDES regulations. The activities undertaken in support of permit compliance, and documented herein, show progress toward reducing pollutants in stormwater discharges, prohibiting unauthorized discharges to the County's storm drain system, and attaining stormwater WLAs for established TMDLs.

## *IV. STANDARD PERMIT CONDITIONS*

### *A. Permit Administration*

***Anne Arundel County shall designate an individual to act as a liaison with the Maryland Department of the Environment (MDE) for the implementation of this permit. The County shall provide the coordinator's name, title, address, phone number, and email address. Additionally, the County shall submit in its annual reports to MDE an organizational chart detailing personnel and groups responsible for major NPDES program tasks in this permit. MDE shall be notified of any changes in personnel or organization relative to NPDES program tasks.***

**Status:**

Anne Arundel County's NPDES MS4 Permit coordination was performed by the Department of Public Works (DPW) Bureau of Watershed Protection and Restoration (BWPR) for FY2020 (FY20). The program coordinators during this reporting year are listed below:

Mr. Erik Michelsen
Deputy Director
Bureau of Watershed Protection and Restoration
Anne Arundel County Department of Public Works
2662 Riva Road, MS 7409
Annapolis, MD 21401
410-222-7520
pwmich20@aacounty.org

Ms. Ginger Ellis
Environmental Planning Administrator
Bureau of Watershed Protection and Restoration
Anne Arundel County Department of Public Works
2662 Riva Road, MS 7409
Annapolis, MD 21401
410-222-0549
pwelli16@aacounty.org

Ms. Janis Markusic
Program Manager/Senior Planner
Bureau of Watershed Protection and Restoration
Anne Arundel County Department of Public Works
2662 Riva Road, MS 7409
Annapolis, MD 21401
(410) 222-0551
pwmark02@aacounty.org

Figure 1 shows the County's organizational chart for FY20. Information on specific positions and personnel responsible for permit compliance and stormwater program tasks follows.

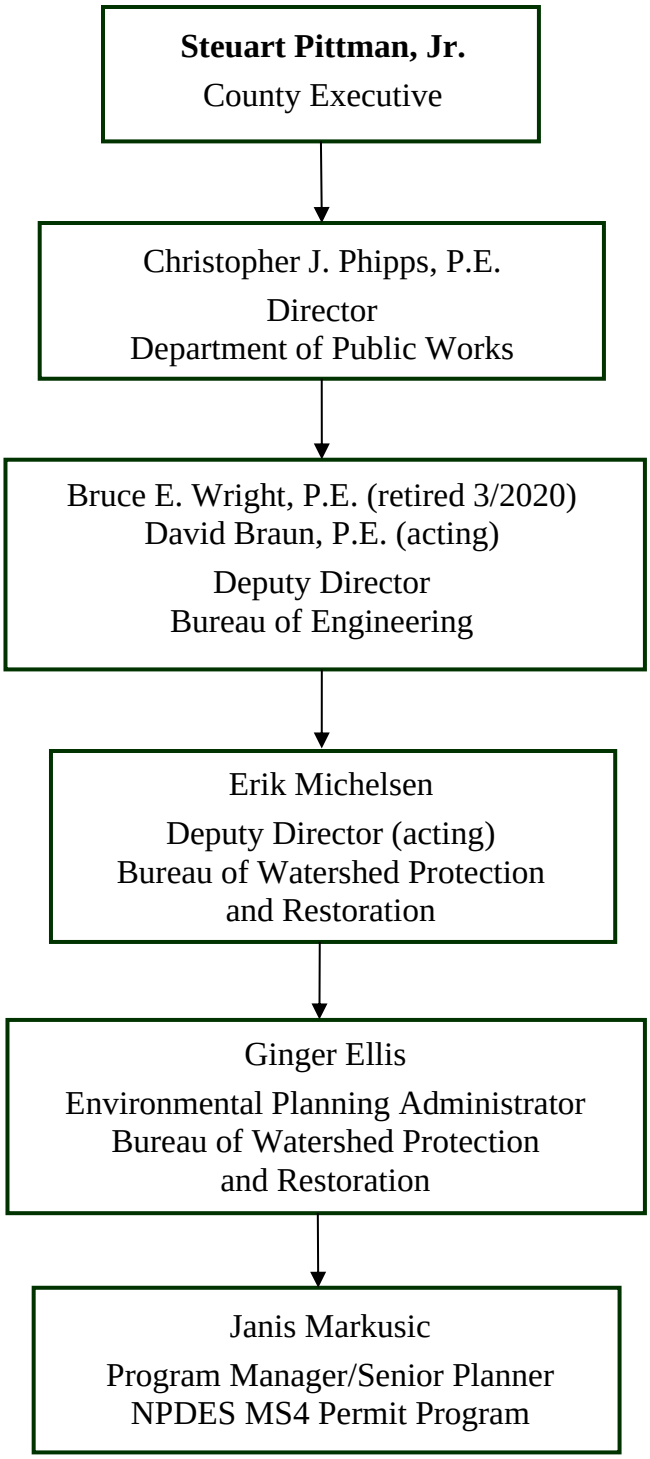


**Figure 1. Organization Chart for NPDES MS4 Permit Administration (7/1/2019 through 6/30/2020)**

Additional County staff responsible for components of the NPDES MS4 Permit requirements during FY20 include those listed below.

Department of Public Works (DPW)

- Jens Geratz, Engineer Manager, Restoration Implementation
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Administers the CIP Restoration Project Implementation unit responsible for design and construction of BWPR stream restoration projects.

- Karen Jennings, Senior Engineer, Restoration Implementation
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Manages design and construction of watershed restoration projects.

- James Woods, Senior Engineer, Restoration Implementation
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Manages design and construction of watershed restoration projects.

- Nasrin Dahlgren, Project Manager, Restoration Implementation
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Manages design and construction of watershed restoration projects.

- Gerry Inglesby, Project Manager, Restoration Implementation
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Manages design and construction of watershed restoration projects.

- Larry Mathena, Project Manager, Restoration Implementation
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Manages design and construction of watershed restoration projects.

- Joe Ports, Project Manager, Restoration Implementation
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Manages design and construction of watershed restoration projects.

- Jeff Ratteree, Project Manager, Restoration Implementation
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Manages design and construction of watershed restoration projects.

- Gregory LeBlanc, Project Manager, Restoration Implementation
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Manages design and construction of watershed restoration projects.

- Brenda Morgan, Engineer Manager, Modeling and Analysis
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Administers the Modeling and Analysis Unit responsible for providing water quality, pollutant loading, and impervious area data management, analysis, tracking and reporting for NPDES

MS4 permit, TMDL and the County's Phase II Watershed Implementation Plan (WIP); and Stormwater Remediation Fee oversight and support.

- Luc Claessens, Ph.D., Senior Engineer, TMDL Support (11/2018 – 8/2019)
- Joshua Thompson, Ph.D. Senior Engineer, TMDL Support (2/2020 – Present)
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Administers the TMDL Support Program; manages watershed assessment contracts; manages the technical engineering and water quality models in support of NPDES MS4 Permit activities, individual TMDL compliance, and the Phase II WIP; coordinates data, tracking, and reporting of impervious surface reduction and pollutant load credit; manages the County's impervious surface and land cover GIS layers; and documents the locations and descriptions of watershed restoration projects.

- Joshua Thompson, Ph.D., Engineer III, TMDL Support (12/2019 – 2/2020)
- Brennan Smith, Engineer III, TMDL Support (5/2020 – Present)
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Maintains, updates, and provides quality control of GIS data layers (e.g., impervious surfaces, land cover) that support the engineering and water quality models utilized for supporting NPDES MS4 and TMDL Restoration Plan activities.

- Melissa Bragg, GIS Specialist, TMDL Support
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Provides GIS analysis to support the engineering and water quality models utilized for supporting NPDES MS4 and TMDL compliance activities. Maintains, updates and provides quality control of GIS data.

- Sally Szydlowski, Program Manager, Stormwater Fee (acting 9/2018; Effective 9/2019)
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Administers the SW Remediation Fee Support Unit, oversees fee assessment, appeals and credit processing and tracking. Assists with Historic BMP record database update and input into MS4 Geodatabase.

- Sally Szydlowski, Program Specialist II, Stormwater Fee (through 9/2019)
- Vacant
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Provides program management support to the Modeling and Analysis Stormwater Remediation Fee Unit carrying out assignments related to fee assessment, appeals and credit processing and tracking, and stormwater Best Management Practice (BMP) performance review.

- Bertha Berrios, GIS Specialist, Stormwater Fee
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Assists the Stormwater Remediation Fee Unit with researching and tracking fee assessment, appeals and credits.

- Chris Victoria, Water Quality Compliance Specialist, Ecological Assessment and Evaluation
  Bureau of Engineering, Bureau of Watershed Protection and Restoration

Assists in documenting ecological condition of County watersheds and waterways and conducts applied research to ensure the credibility of BWPR monitoring and assessment. Assists with NPDES MS4 Permit compliance and TMDL and watershed support.

- Douglas Griffith, Planner II, Ecological Assessment and Evaluation
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Provides consultant oversight for stormwater monitoring, biological monitoring, and geomorphic assessment of County stream reaches including those identified in Part IV. F of this permit. Assists Program Manager with implementation of the Illicit Discharge Detection and Elimination (IDDE) Program as identified in Part IV.D.3 of this permit, and assists in the development of TMDL Restoration Plans and plan implementation.

- Bryan Perry, Program Specialist II, Ecological Assessment and Evaluation
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Provides program support for surface water and biological monitoring projects and coordinates projects with ecological restoration permit requirements.

- Rachel Denby, Program Specialist I, Ecological Assessment and Evaluation
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Provides technical support for surface water, stormwater, and ecological monitoring projects.

- Robb Fish, Public Education and Outreach Specialist
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Fulfills the public education and outreach requirements of the County's NPDES MS4 permit ensuring that continual outreach regarding the development of watershed assessments and restoration plans, and TMDL compliance, is achieved and public input is solicited and incorporated. Administers the public outreach and support to all BWPR units.

- Katherine Hart, Grants Administrator (through 8/2019)
- Sally Albright, Grants Administrator (12/2019 – Present)
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Identifies and secures grant funding for watershed restoration projects and projects that further the mission of the Bureau of Watershed Protection and Restoration.

- Mike Hrubiak, Financial Services Management Assistant II
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Provides management, oversight and accountability for all revenue and expenditures associated with the Watershed Protection and Restoration Fund (WPRF). Ensures that the integrity of the dedicated revenue fund and structure is maintained to support compliance with the MS4 permit.

- Maria Ramallosa, Financial Services Management Aide
  Bureau of Engineering, Bureau of Watershed Protection and Restoration
  Supports the Financial Management Assistant in tracking revenues and expenditures associated with the WPRF, processing procurements for restoration work, and maintaining established reports to ensure Fund integrity.

- Doug Burkhardt, Engineer Manager
  Bureau of Engineering, Technical Engineering
  Provides managerial support and oversight for geographic information systems (GIS) data collection and geodatabase development activities associated with urban best management practices (BMPs) and closed storm drain system records.

- Michele Polino, GIS Specialist, Watershed Support (through 3/2020)
- Vacant
  Bureau of Engineering, Technical Engineering
  Provides Quality Control services for GIS data collection for BMPs created through the grading permit process.

- Richard Beier, GIS Specialist, Watershed Support
  Bureau of Engineering, Technical Engineering
  Performs BMP GIS data capture for newly constructed BMPs created through the grading permit process. Assists with updates to GIS layers for Closed Storm Drain system piping and structures.

- Steve Britschge, Program Manager
  Bureau of Engineering, Technical Engineering
  Provides direct oversight of the Closed Storm Drain and BMP GIS layers maintenance and publishing processes.

- Darryl Hockstra, Engineer Administrator (through 7/2019)
- Blake Lightcap (8/2019-Present)
  Bureau of Highways, Infrastructure Management Division (IMD)
  Administers the Infrastructure Management Division and oversees the capital program associated with publicly owned stormwater management practices that include repair and maintenance; and the storm drain/culvert conveyance system inspection, repair and maintenance program.

- Jeff Cox, Program Manager
  Bureau of Highways, Infrastructure Management Division
  Programs and maintains GIS databases for the closed storm drain system, associated infrastructure databases, and the County's roads inventory.

- Wayne McCready, GIS Specialist
  Bureau of Highways, Infrastructure Management Division
  Maintains associated infrastructure databases, develops GIS inspection tools, and creates CADD drawings of closed storm drain system and culverts.

- Ken Pensyl, Senior Engineer
  Bureau of Highways, Infrastructure Management Division
  Administers the Stormwater Management Section that is responsible for the inspection, repair and maintenance of IMD maintained (public) stormwater management practices

- Rich Olsen, Program Specialist II (through 1/2020)
- Ryan Rich, Construction Inspection Supervisor (8/2020 – present)
  Bureau of Highways, Infrastructure Management Division
  Manages, inspects and maintains a subset of urban stormwater BMPs that are the responsibility of DPW. Investigates stormwater management practices complaints and provides construction inspection services for resulting projects.

- Chuck Henney, Program Specialist II
  Bureau of Highways, Infrastructure Management Division
  Manages, inspects and maintains a subset of urban stormwater best management practices that are the responsibility of DPW. Investigates BMP and SWM pond complaints and provides construction inspection services for resulting projects

- Rick Davis, Senior Engineer (through 2/2020)
- Vacant
  Bureau of Highways, Infrastructure Management Division
  Administers the Culvert & Storm Drain Section that is responsible for the inspection, repair and maintenance of publicly owned storm drain/culvert systems.

- Bob Murphy, Engineer III
  Bureau of Highways, Infrastructure Management Division
  Northern District storm drainage and culverts project manager.

- Robert Savidge, Engineer III
  Bureau of Highways, Infrastructure Management Division
  Central/Southern District storm drainage and culverts project manager

- Rick Larrimore, Construction Inspector Supervisor, Northern District
  Bureau of Highways, Infrastructure Management Division
  Investigates storm drainage complaints and provides construction inspection services for drainage projects in the northern district

- Daniel Verrette, Construction Inspector Supervisor, Central & Southern Districts
  Bureau of Highways, Infrastructure Management Division
  Investigates storm drainage complaints and provides construction inspection services for drainage projects in the central and southern districts.

- Clark Rosendale, Construction Inspector Supervisor
  Bureau of Highways, Infrastructure Management Division
  Video inspection of culverts and closed storm drain systems.

- Alex Baquie, Chief Road Operations (through 2/2020)
- Rick Davis, Chief Road Operations (3/2020 – Present)
  Bureau of Highways, Road Operation Division
  Administers the County's Road Operation Division; maintains the Bureau's permit coverage under the MDE General Permit No. 12-SW (General Discharge Permit for Stormwater

Associated with Industrial Activity); develops and implements Stormwater Pollution Prevention Plans (SWPPPs) associated with seven Road Operations district yard facilities; documents the use of pesticides, herbicides, fertilizers, and de-icing materials associated with road maintenance activities; implements the County's street sweeping and inlet cleaning programs; directs the County's winter weather de-icing program, conducts roadside litter clean-up activities; and provides support for volunteer watershed and stream clean-up activities.

- David Watts, Utility Administrator, Infrastructure (7/2019 – 2/2020)
- Larry Parsons, Acting Utility Administrator, Infrastructure (2/2020 – Present)
  Bureau of Utility Operations
  Responsible for SWPPP development/implementation and ensuring compliance with the MDE General Permit No 12-SW (General Discharge Permit for Stormwater Associated with Industrial Activity) for the Bureau of Utility Operations Central Utility Operations Center.

- Christian Tait, Regulatory Compliance Manager, Wastewater Operations
  Bureau of Utility Operations
  Responsible for SWPPP development/implementation and ensuring compliance with the MDE General Permit No. 12-SW (General Discharge Permit for Stormwater Associated with Industrial Activity) for Bureau of Utility Operations Water Reclamation Facilities. Oversees Utility Operations compliance with individual NPDES point source permits for County Water Reclamation Facilities.

- Rhody Holthaus, Deputy Director
  Bureau of Waste Management Services
  Responsible for ensuring implementation of the Waste Management Services facilities' permit coverage under the MDE General Permit No. 12-SW (General Discharge Permit for Stormwater Associated with Industrial Activity) for the County's three landfill facilities.

- Mark Morris, Environmental Monitoring Manager
  Bureau of Waste Management Services
  Responsible for maintaining the Waste Management Services facilities' permit coverage under the MDE General Permit No. 12-SW (General Discharge Permit for Stormwater Associated with Industrial Activity), and for the development and implementation of SWPPPs associated with the County's three landfill facilities.

<u>Department of Inspections & Permits (I&P)</u>

- Raghu Badami, P.E., Acting Assistant Director (5/2019-12/2019)
- Eva Kerchner, Assistant Director (12/2019 – present)
  Oversees implementation of the County's Erosion and Sediment Control Program and Stormwater Management Program that are the responsibility of the Department of Inspections and Permits

- Sarah Fowler, P.E. Acting Engineer Manager, Engineering Division (effective 6/2019 – 12/2019)

- Raghu Badami, P.E. Engineer Manager, Engineering Division (9/2018 – 6/2019; 12/2019 - present)
  Oversees the review of stormwater management on development projects and ensures that the requirement for all proposed new stormwater management plans comply with the Environmental Site Design (ESD) standards in accordance with the County Code, State Code, and the current edition of Maryland Stormwater Management Design Manual.

- John Igbinovia, P.E., Code Enforcement Administrator
  Administers the County's Stormwater Management Program and the County's Erosion and Sediment Control Program to ensure compliance with State regulations. Tracks, inspects, and enforces all permits for private and public stormwater management BMPs related to new development and redevelopment projects. Oversees triennial inspection of stormwater BMPs. Tracks development projects disturbing more than one acre and reports this information to MDE as required by the Program and the NPDES MS4 Permit. Oversees staff who respond to County Environmental Compliance Hotline and provides follow-up enforcement for IDDE Program.

- Gene Patterson, Code Enforcement Administrator – Critical Area Program (through 12/2019)
- Jim Johnson, Acting Code Enforcement Administrator – Critical Area Program (1/2020 to present)
  Supervise the County's Code Compliance Division, including investigation of non-permitted and environmental complaints, forestry program management, and building site review processes to ensure compliance with County construction code, and federal, State and local laws. Tracks standard grading plans required when disturbance is less than 5000 sq.

- Stephen Trumpler, Stormwater Inspection Supervisor, Watershed Program
  Manages stormwater inspection staff responsible for inspecting private stormwater BMPs, construction inspection of water quality restoration projects (County and private), and supervises illicit discharge enforcement.

- Stormwater Inspection Staff
  Seven (7) inspectors are dedicated to the stormwater management program. The FY20 inspection staff is listed below.

| | |
|---|---|
| Zach Bradley | Robert Branch |
| Mary Ford | Dennis Gills |
| Daniel Hall | Andrew Hein |
| Veronica Robbins | |

<u>Anne Arundel Soil Conservation District (AASCD)</u>

- John Czajkowski, District Manager
  Oversees development plan review for erosion and sediment control compliance.

Anne Arundel Department of Health

- Don Curtian, Deputy Director
  Bureau of Environmental Health
  Oversees the Housing and Food Protection Services and Sanitary Engineering divisions of the Environmental Health Bureau, including Environmental Sanitarian response to hotspots associated with food service facilities that are identified through the IDDE program. Oversees programs associated with administering the Bay Restoration Fund within the County, and recreational water quality monitoring at designated bathing beaches.

- Sharon Pawlowski, Program Manager
  Bureau of Environmental Health
  Provides support and response for IDDE program compliance with respect to food service facilities within the County, ensuring good housekeeping for disposal of waste cooking oil/grease and trash dumpsters.

## *B. Legal Authority*

***Anne Arundel County shall maintain adequate legal authority in accordance with NPDES regulations 40 CFR Part 122.26 throughout the term of this permit. In the event that any provision of its legal authority is found to be invalid, the County shall notify MDE within 30 days and make the necessary changes to maintain adequate legal authority. All changes shall be included in the County's annual report.***

**Status:**

Anne Arundel County maintains the authority to comply with the terms of this permit. As documented in prior Annual Reports, this includes implementation of the 2000 Maryland Stormwater Design Manual (MDE 2009) as well as the 2007 Stormwater Management Act. Over the past decade, and as reported in previous Annual Reports, the County Code was revised to incorporate these stormwater management requirements and subsequently renumbered. The entire County Code can be found online through the County website at http://www.aacounty.org/our-county/county-code/, under the link for the County Code. There were no updates or revisions to County Code, affecting the County's legal authority pertaining to this permit, during the reporting year.

The County Stormwater Management Practices and Procedures Manual (Manual) was revised May 1, 2017. The revised Manual became effective October 30, 2017, and a copy of MDE's approval letter was submitted with the FY18 NPDES MS4 Annual Report. There were no updates to the Manual in FY20.

The prior MDE triennial review of the County stormwater management program noted that the program performance was acceptable. Due to COVID-19 coronavirus-related restrictions, the most recent triennial review was accomplished remotely as discussed in **Part IV.D.1**.

On March 19, 2019, MDE granted Anne Arundel County's request for continued delegation of erosion and sediment control authority. This delegation of authority is effective through June 30, 2021. The next Delegation Review is scheduled for Fall 2020 (FY21).

As reported in previous Annual Reports, Anne Arundel County established a Watershed Protection and Restoration Program (Program) in 2013, as mandated by Maryland Environmental Code Ann §4-202.1, for the purpose of supporting compliance with the requirements of the County's NPDES MS4 permit, the Chesapeake Bay TMDL, local watershed TMDLs, and stormwater Watershed Implementation Plans (WIPs) through stormwater management practices and stream and wetland restoration activities. The Program also maintains and administers the Watershed Protection and Restoration Special Revenue Fund established under Article 13 Title 7 §4-11-119 of the Anne Arundel County Code.

During FY19, the County Council approved legislation (Bill 40-19) to provide for an increase in the stormwater remediation fee and to repeal certain obsolete provisions of Article 13 Title 7. The legislation became effective on July 1, 2019. A copy of the approved legislation was included in the FY2019 Annual Report. The updated County Code can be found at the URL referenced above.

Concurrent with the beginning of FY21, the Program became the stand-alone Bureau of Watershed Protection and Restoration (BWPR) within the Department of Public Works. Additional information on this status change will be included in the FY21 MS4 Annual Report.

### *C. Source Identification*

***Sources of pollutants in stormwater runoff countywide shall be identified and linked to specific water quality impacts on a watershed basis. The source identification process shall be used to develop watershed restoration plans. The following information shall be submitted annually for all County watersheds within the permit area in geographic information system (GIS) format with associated tables as required in PART V of this permit.***

1. ***Storm drain systems: all infrastructure, major outfalls, inlets, and associated drainage areas delineated;***

**Status:**

In 2008, Anne Arundel County completed a County-wide inventory of storm drain inlets, manholes, outfalls, culverts, and pipes for all County watersheds. This inventory is continuously updated and the information is incorporated into County storm drain maps and the County GIS.

As of June 2020, there were 38,618 storm drain inlets, 1,002 miles of storm drain pipes, and 6,433 storm drain outfalls, based on the County's infrastructure inventory. The major storm drain outfalls, a subset of all storm drain outfalls (see definition below), were then identified in the GIS by querying for storm drain structures with no hydraulic connection to any other downstream storm drain structure and based on outfall diameter. Next, the upstream contributing areas of these major storm drain outfalls were delineated using GIS. According to 40 CFR 122.26, a major municipal

separate storm drain outfall is defined as a single outfall pipe with an internal diameter of 36 inches or greater or its equivalent (discharge from other than circular pipe which is associated with a 50-acre or greater drainage area); or a single outfall pipe with an internal diameter of 12 inches or greater or its equivalent (discharge from other than a circular pipe associated with a 2-acre or greater drainage area) that discharges stormwater from industrially zoned lands. Of the 6,433 storm drain outfalls in the FY20 County inventory, 2,353 are categorized as major outfalls.

Updates to the MS4 Geodatabase *Outfall* feature class in FY20 include the removal of four previously submitted major outfall records (**Error! Reference source not found.**) and the addition of 46 new major outfalls. For reporting purposes, an additional 18 minor outfalls are included with the major outfalls in the MS4 Geodatabase *Outfall* feature class because these minor outfalls were screened as part of the Illicit Discharge Detection and Elimination (IDDE) Program (Part IV.D.3); thus, the total number of outfalls included in this feature class is 2,371 for the current reporting year.

The major storm drain outfalls and the corresponding drainage area are included in the accompanying MS4 Geodatabase (feature classes *Outfall* and *OutfallDrainageArea*). An additional geodatabase is included in **Appendix A** of this report that contains the County's complete storm drain system, including major and minor outfalls, inlets, pipes, and other storm drain infrastructure.

**Table 1. Changes to Existing Outfall Database Records in FY20**

| MDE_OUTFALL_ID | LOCAL_OUTFALL_ID | COMMENT |
|---|---|---|
| AA16OUT001148* | S15O015 | Deleted. Correction made to storm drain inventory. |
| AA16OUT001256* | R20O003 | Deleted. Correction made to storm drain inventory. |
| AA16OUT001995* | W16O003 | Deleted. Correction made to storm drain inventory. |
| AA16OUT001997* | T16O008 | Deleted. Correction made to storm drain inventory. |

*Outfalls also removed from the Industrial & Commercial Sources Geodatabase in **Appendix A.**

The County will continue to update the storm drain inventory and incorporate the information in the County storm drain maps and the County GIS.

***2. Industrial and commercial sources: industrial and commercial land uses and sites that the County has determined have the potential to contribute significant pollutants:***

**Status:**

The NPDES MS4 Permit requires that sources of pollutants in stormwater runoff be identified and linked to specific water quality impacts on a watershed basis. Compliance with this permit requirement includes the annual submittal, in GIS format with associated tables, of the "…industrial and commercial land uses and sites that the County has determined have the potential

to contribute significant pollutants." A methodology for determining these land uses and the associated outfalls is described below. These outfalls and land use data are included in Industrial & Commercial Sources Geodatabase in **Appendix A.** The outfalls are a subset of the major outfalls found in the *Outfall* feature class of the MS4 Geodatabase of this report.

Attachment 2 to the Basis for Final Determination to Issue Anne Arundel County's NPDES MS4 Permit (11-DP-3316; MD0068306) is a memorandum from the U.S. EPA to MDE dated November 29, 2012. This memorandum lists specific objections to draft language proposed for the 4th generation NPDES MS4 Permits. Specific to the development of the above methodology is a paragraph on Page 4 of this memorandum that addresses Industrial/Commercial Monitoring as a component of the MS4 permit. In this paragraph, EPA objects to the permit on the basis that it does not require the permittee to maintain an inventory of industrial and commercial sites having the potential to contribute pollutants to the storm drain system. EPA proposes the language (above) be included in the permit as part of the Source Identification Section (**Part IV.C.2**), further indicating that these identified sites correlate to the required visual surveys of commercial and industrial areas that are conducted under the Illicit Discharge Detection and Elimination (IDDE) program as described in the NPDES MS4 Permit (**Part IV.D.3**).

Page 6 of the Anne Arundel County NPDES MS4 Permit Fact Sheet, developed by MDE as a companion document to the Permit, describes requirements for an effective IDDE program. Included in this program description, is the requirement that the County routinely survey commercial and industrial areas, and monitor major storm drain outfalls to identify illicit discharges. Major storm drain outfalls are defined by the Clean Water Act (40 CFR 122.26) as follows:

> A municipal separate storm sewer outfall that discharges from a single pipe with an inside diameter of 36 inches or more or its equivalent (discharge from a single conveyance other than circular pipe which is associated with a drainage area of more than 50 acres); or for municipal separate storm sewers that receive stormwater from lands zoned for industrial activity (based on comprehensive zoning plans or the equivalent), an outfall that discharges from a single pipe with an inside diameter of 12 inches or more or from its equivalent (discharge from other than a circular pipe associated with a drainage area of two acres or more).

To meet the **Part IV.C.2** requirement of identifying commercial and industrial land uses and sites that have the potential to contribute pollutants to the storm drain system, and to correlate this requirement with that found in **Part IV.D.3.b**, the County has developed a GIS coverage and geodatabase predicated on intersecting the following GIS layers and data:

- Industrial and commercial polygons from Anne Arundel County 2017 Land Cover; and
- County closed storm drain system major outfall drainage areas.

Specifically, if a drainage area to an outfall contained commercial and/or industrial land uses, that outfall and its drainage area were included in the Industrial & Commercial Sources Geodatabase in **Appendix A**.

Thirty-eight of the 46 new outfalls added to the County's MS4 Geodatabase *Outfalls* feature class in FY20 were identified for inclusion in the Industrial & Commercial Sources Geodatabase. The four outfalls that were removed from the *Outfalls* feature class were also removed from the Industrial & Commercial Sources Geodatabase (**Error! Reference source not found.**). The final updated data set, with a total of 1,303 commercial and industrial outfalls, is included in the Industrial & Commercial Sources Geodatabase in **Appendix A**.

The County is currently working on an update to the County's 2017 Land Cover data set, based on orthoimagery from early 2020. When the 2020 Land Cover data set is available, the County plans to re-analyze all outfalls for inclusion in the Industrial & Commercial Sources Geodatabase.

3. ***Urban best management practices (BMPs): stormwater management facility data including outfall locations and delineated drainage areas;***

**Status:**

Information on the County's stormwater management facilities (e.g., urban BMPs, alternative BMPs, restoration BMPs) is incorporated into the MS4 Geodatabase and included as part of the County's FY20 NPDES MS4 Annual Report submittal (**Appendix A**).

This reporting year, the County is submitting 15,088 BMP POIs (*BMPPOI* feature class); as noted in the comments of this feature class, 125 of these POIs solely represent restoration BMPs and therefore have no associated record in the BMP table. The BMP table includes records for 26,029 BMPs, including 414 BMP records added in FY20 and 195 BMPs with a status of "Removed." There are 14,794 drainage areas delineated for these BMPs (*BMPDrainageArea*), with multiple BMPs represented by a common drainage area to a single POI.

The County continued to collect BMP data in FY20 from newly completed grading permits. These data are entered from as-built plans into a database structure and geospatial framework developed to manage the County's BMP inventory. Quality assurance and quality control procedures (QA/QC) are performed, providing review and verification of BMP information, including but not limited to: BMP type, location, drainage area, water quality treatment, built date, and any modifications to a BMP resulting from subsequent land development or other changes in site condition. Additionally, these data are also reviewed in context with restoration BMPs to ensure that required adjustments to BMP POIs and drainage areas are made in cases where more than one BMP may provide stormwater management for a given area.

The County continues to work on the challenge of data formatting for loading into the MS4 Geodatabase. Particularly for older BMPs, there are mandatory data fields that will never be populated because either the data are missing from the plan drawings or the design of the BMP pre-dated the type of information required. For example, sometimes, certain practices are identified on a set of as-built drawings as contributing to the stormwater management required for a site, but these practices no longer fit into a current suite of BMP practices; or BMP practices are only vaguely indicated on the plans and lack clear drainage areas. The County understands that certain data are mandatory for crediting purposes, but the County is also required to perform triennial inspections and report on all BMPs regardless of their contribution to TMDL or managed

impervious surface crediting. In our efforts to report on all BMPs and to account for these data formatting issues, this year the County continued its practice of incorporating error codes into the MS4 Geodatabase and the reader is referred to the ReadMe document associated with **Appendix A** for explanations of null and/or blank values and for explanation of error codes. For example, the "99999" error code represents a missing descriptive value (e.g., location, permit number). Dates coded as "1/1/1899" are used for missing or inapplicable values. For example, in the *BMP* table, projects that are proposed but not complete will not have the mandatory built-date and are coded "1/1/1899".

4. ***Impervious surfaces: Public and private land use delineated, controlled impervious areas based on, at a minimum, Maryland's hierarchical eight-digit sub basins;***

**Status:**

During FY20, the County continued efforts to maintain an accurate impervious surface dataset. Currently, the County relies on an impervious surface dataset derived from imagery captured in early 2017 for the State of Maryland's High-Resolution Aerial Ortho-photography. New imagery was captured by Maryland in 2020 and the County has a contract in place with Sanborn Map Company, Inc. to utilize the 2020 imagery in updating the 2017 impervious surface dataset. This FY20 report includes an analysis of the County's 2017 data to identify controlled versus uncontrolled impervious areas, as well as a description of a pilot analysis to identify changes in impervious surface acreage over time.

**Controlled vs. Uncontrolled Impervious Surface Analysis**

Jurisdictional and Non-Jurisdictional Land within the County

For NPDES MS4 reporting, the County is responsible for accounting for all impervious surface and BMP information pertaining to County-owned land and private lands directly under the jurisdiction of the Anne Arundel County government. Land areas that are outside the stormwater authority of Anne Arundel County include the City of Annapolis, Baltimore Washington International Thurgood Marshall Airport (BWI), Fort George G. Meade, the Patuxent Research Refuge, State Highway and Federal Highway roads, and State and Federal facilities. As the County does not maintain data regarding the stormwater management associated with federal, State, or municipal land not under its jurisdiction, these lands were excluded from the analysis of controlled versus uncontrolled impervious areas.

Controlled Impervious Areas

For the purposes of this analysis, the County considered a controlled impervious area to be any impervious surface within the drainage area of an existing structural or ESD BMP. This includes BMPs that were constructed for the purposes of stormwater management related to new development or re-development, or for restoration. Alternative BMPs, such as those that provide equivalent impervious management credit (e.g., inlet cleaning, stream restoration, shoreline stabilization, etc.), were not included. While those practices provide benefits that are equivalent to the direct management of impervious areas, alternative practices are not directly tied to and do not,

strictly speaking, provide control of runoff from a specific area of impervious surface. A full discussion of such practices and the associated credit is already provided in **Part IV.E.2.a** of this report.

The County did not exclude structural or ESD BMPs from this analysis based on practice type or the level of stormwater management provided by a BMP when designating an impervious area as controlled. Guidance from MDE does not allow MS4 impervious surface baseline or restoration credit for practices such as dry ponds and does not consider less than 1-inch of water quality treatment as full management of an impervious surface. However, in other contexts, such as in the Phase 6 Chesapeake Bay Model, dry ponds are considered to provide some water quality treatment. The County has already made a full accounting according to MDE guidance of the baseline water quality management provided for all impervious surfaces (see **Appendix H** of the FY18 MS4 Annual Report) and provides updates in its annual reports regarding impervious restoration credit (see **Part IV.E.2.a**), so the County opted not to duplicate in this report section analyses already presented elsewhere.

**Error! Reference source not found.** provides the results of the impervious area analysis using the 2017 dataset, showing that 10,060 impervious acres (29%), out of a total of 34,210 acres under County jurisdiction, are subject to some degree of stormwater control by a BMP. The percentage of controlled versus uncontrolled impervious surface is approximately the same for both County and private lands, with 27% vs. 73% and 30% vs. 70%, respectively.

**Table 2. Controlled vs. Uncontrolled Impervious Acreage for Anne Arundel County Jurisdictional Land Based on the 2017 Impervious Surface Dataset**

| MDE 8-Digit Watershed Name | MDE 8-Digit Watershed Code | Controlled Impervious Acres | | | Uncontrolled Impervious Acres | | | All Impervious Acres |
|---|---|---|---|---|---|---|---|---|
| | | County | Private | County & Private | County | Private | County & Private | County & Private |
| Baltimore Harbor | 02130903 | 442 | 1,631 | 2,073 | 1,640 | 3,890 | 5,530 | 7,603 |
| Bodkin Creek | 02130902 | 68 | 119 | 187 | 178 | 398 | 576 | 763 |
| Little Patuxent River | 02131105 | 302 | 1,153 | 1,455 | 526 | 1,367 | 1,893 | 3,348 |
| Lower North Branch Patapsco River | 02130906 | 227 | 1,208 | 1,435 | 420 | 1,378 | 1,798 | 3,233 |
| Lower Patuxent River | 02131101 | - | 3 | 3 | 24 | 104 | 128 | 131 |
| Magothy River | 02131001 | 444 | 761 | 1,205 | 979 | 2,276 | 3,255 | 4,460 |
| Middle Patuxent River | 02131102 | 15 | 55 | 70 | 184 | 862 | 1,046 | 1,116 |
| Severn River | 02131002 | 561 | 1,634 | 2,195 | 1,126 | 3,016 | 4,142 | 6,337 |

| MDE 8-Digit Watershed Name | MDE 8-Digit Watershed Code | Controlled Impervious Acres | | | Uncontrolled Impervious Acres | | | All Impervious Acres |
|---|---|---|---|---|---|---|---|---|
| | | County | Private | County & Private | County | Private | County & Private | County & Private |
| South River | 02131003 | 288 | 824 | 1,112 | 822 | 2,152 | 2,974 | 4,086 |
| Upper Patuxent River | 02131104 | 52 | 141 | 193 | 234 | 846 | 1,080 | 1,273 |
| West Chesapeake Bay | 02131005 | 17 | 44 | 61 | 199 | 619 | 818 | 879 |
| West River | 02131004 | 14 | 57 | 71 | 198 | 712 | 910 | 981 |
| **Total** | | **2,430** | **7,630** | **10,060** | **6,530** | **17,620** | **24,150** | **34,210** |

The County continues to track the control of stormwater runoff from impervious surfaces through the maintenance and update of its urban BMP inventory and its inventory of restoration projects, provided in **Appendix A**, within the following feature classes of the FY20 MS4 Geodatabase:

| | | |
|---|---|---|
| *BMPPOI* | *RestBMP* | *AltBMPPoint* |
| *BMPDrainage Area* | *AltBMPLine* | *AltBMPPoly* |

**Analysis of Impervious Acreage over Time**

In the FY19 Annual Report, the County noted that the initial analysis of the impervious surface data showed an increase of 290 impervious acres between 2014 and 2017. The County recognized that this was likely not an accurate accounting of growth and development for that time period and was probably the result of corrections and minor adjustments to more accurately define the extent of an impervious area during the 2017 data update. These corrections may be the result of improvements made over time to the orthophotography resolution or due to issues impacting orthophoto interpretation in a particular year. Although the development of an impervious surface dataset is highly automated, it also involves a significant level of best professional judgement. Impervious surface data development involves defining the specific edges of features through interpretation of a 2-dimensional image of a 3-dimensional surface and although issues that impact orthophotography such as shadows and camera tilt are corrected in post-processing, not all the distortions are eliminated. In addition, shadows, tree cover, and temporary die-off of vegetation during a particular year are also liable to impact orthophoto interpretation and may lead to an underestimation or overestimation of impervious surface area that is then corrected in a future year.

To more accurately determine the true increase in impervious acreage, the County developed a procedure to evaluate the changes between the 2014 and 2017 impervious datasets. For the FY20 Annual Report, a pilot study was conducted using this procedure in the Lower Patuxent Watershed.

To create the dataset used in the pilot analysis, the 2014 and 2017 impervious datasets were merged, resulting in a single impervious dataset, with the source of each feature being identified as either the 2014 dataset only, the 2017 dataset only, or an area present in both the 2014 and 2017 datasets. Additional attribute information was then added to the merged dataset, which included the following:

- Spatial data representing the 2014 and 2017 land cover types;
- The built date on file with the State Department of Assessments and Taxation for a property; and
- Whether a grading permit with a limit of disturbance greater than 1 acre was completed in the area between 2014 and 2017.

An analysis based on this information classified each impervious feature as one of the following: 1) No change (i.e. an area of agreement in both datasets), 2) Correction or adjustment to data between years (i.e. a slight shift or reshaping of an impervious feature that is not connected to any change on the ground), 3) Incorrectly removed (i.e. a feature should have been carried over from 2014 to 2017 but was instead deleted during the update), 4) Misclassification of a surface as impervious (e.g., a barren area that was identified as a non-natural impervious area and should be classified as pervious), or 5) True addition or removal of impervious acreage between 2014 and 2017 ( Table 3). If the attributes of a feature were not sufficient to make this determination, a visual inspection of the aerial imagery was performed to allow for correct classification.

**Table 3. Impervious Acreage in the Lower Patuxent Watershed by Category and Year**

| Category | Impervious Acres | | |
|---|---|---|---|
| | 2014 Only | 2017 Only | 2014 and 2017 |
| No change | - | - | 147.48 |
| Correction or adjustment[1] | 8.26 | 8.40 | 0.00 |
| Incorrectly removed[2] | 0.51 | - | 0.00 |
| Misclassification[3] | 1.00 | 0.43 | 0.00 |
| True addition or removal | 0.73 | 4.92 | 0.00 |

*[1]The 2017 acreage was used for both 2014 and 2017 in the revised impervious accounting.*
*[2]The 2014 acreage was added back to 2017 in the revised impervious accounting.*
*[3]This acreage was not included in the revised impervious accounting.*

The result of this pilot analysis was a revised accounting of impervious surface for both 2014 and 2017 ( Table 4). For 2014 this accounting included the following:

- The "No change" acreage;
- The 2017 "Correction or adjustment" acreage;
- The 2014 "Incorrectly removed" acreage; and
- The 2014 "True addition or removal" acreage.

For 2017 this accounting included the following:

- The "No change" acreage;
- The 2017 "Correction or adjustment" acreage;

- The 2014 "Incorrectly removed" acreage; and
- The 2017 "True addition or removal" acreage.

The total area of the Lower Patuxent Watershed is 3,217 acres, and approximately five percent of that area is impervious. Between 2014 and 2017, there were no major changes in subdivision activity in this location but there were changes to the impervious area throughout the watershed on individual properties. Table 4 shows the increase in impervious acreage between 2014 and 2017, according to the original raw data and according to the pilot analysis results. The original analysis indicated a difference of 3.25 acres between 2014 and 2017, while the pilot analysis found a 4.19-acre difference. Analyzing the raw data resulted in a 0.94-acre under-calculation of new impervious area in 2017.

**Table 4. Change in Impervious Area Between 2014 and 2017 in the Lower Patuxent Watershed**

| Year | Impervious Acres | |
|---|---|---|
| | **Analysis of Raw Data (Original)** | **Analysis of Revised Data (Pilot Study)** |
| 2014 | 157.98 | 157.12 |
| 2017 | 161.23 | 161.31 |
| **Change in Acreage between 2014 and 2017** | **+3.25** | **+4.19** |

The pilot watershed was selected for its relatively small size and low impervious acreage. This allowed the County to test and manually verify the accuracy of different automated methods of classification. Limiting the number of areas and features that require a manual review for classification was critical to creating a process that is efficient enough to be applied across the entire County and implemented every two to three years as impervious data are updated. The pilot results show that additional post-processing of the raw data will help refine the quantification of changes in impervious acreage over time. The County anticipates that when this method is applied across a larger geographic area with more existing impervious, subject to correction during the update process, and a higher level of development activity, that the revised data will show a greater increase in impervious area between 2014 and 2017. A better understanding of the true increase in the County's impervious acreage will allow for a better accounting of growth and inform the planning required to maintain the progress towards achieving the County's MS4 and TMDL goals and improve water quality.

Now that the County has identified an effective analytical approach, the initial steps of this analysis have been completed for the other watersheds in the County. Visual inspection of areas that cannot be classified through data attribution and other contextual data is ongoing. Additional results will be presented in the FY21 Annual Report. When the update of the impervious dataset based on 2020 imagery is available, this analysis will be replicated to allow for more accurate accounting of the change in impervious acreage in the County between 2017 and 2020.

5. ***Monitoring locations: locations established for chemical, biological, and physical monitoring of watershed restoration efforts and the 2000 Maryland Stormwater Design Manual; and***

**Status:**

Parole Plaza, Church Creek, and Picture Spring Branch

In compliance with the NPDES MS4 Permit, **Part IV.F**, the County maintains three monitoring sites, Parole Plaza, Church Creek, and Picture Spring Branch, where the required chemical, physical, and biological monitoring of watershed restoration efforts and stormwater management application is conducted. A summary of the FY20 monitoring efforts at these sites is found in **Part IV.F**, and the complete monitoring reports for the reporting year are included in **Appendix C** (*Chemical, Biological, and Physical Characterization of the Church Creek and Parole Plaza NPDES Monitoring Stations: 2019-2020*) and **Appendix D** (*Biological and Geomorphological Condition in the Picture Spring Branch Subwatershed, Severn River Watershed, Anne Arundel County, Maryland: 2019-2020)*.

The *MonitoringSite* and *MonitoringDrainageArea* feature classes contained in the MS4 Geodatabase represent the locations of the Parole Plaza, Church Creek, and Picture Spring Branch monitoring sites. The *ChemicalMonitoring* table contains results from FY20 and is included in the MS4 Geodatabase provided in **Appendix A**.

County-wide Biological Monitoring Program

Since 2004, the County has implemented a County-wide biological monitoring program focusing on benthic macroinvertebrates and modeled after the Maryland Biological Stream Survey (MBSS). The program uses a probability-based stratified random sampling design so that overall watershed condition can be evaluated and comparisons between different watershed units can be made. A total of 24 Primary Sampling Units (PSUs) are sampled in a five-year rotation called a Round. Round 1 began in 2004 and ended in 2008. Round 2 began in 2009 and concluded in 2013.

In 2017, the County re-launched its County-wide Biological Monitoring Program (Program) following an extensive reevaluation and update, which was completed during the 2016 reporting period. Complete information on the Program update can be found in the Quality Assurance Project Plan – Round 3 at https://www.aacounty.org/departments/public-works/wprp/ecological-assessment-and-evaluation/biological-monitoring/index.html . In summary, fish and water quality sampling have been added to the benthic macroinvertebrate sampling already conducted under the Program. In addition, a second set of random sites was established using a finer scale stream coverage to supplement sample sites established on the coverage used in Rounds 1 and 2. This was done to better evaluate small streams in the County.

The complete collection of biological monitoring reports for Rounds 1 and 2, and the Round 3 reports completed to date, are available for download at https://www.aacounty.org/departments/public-works/wprp/ecological-assessment-and-evaluation/biological-monitoring/biological-monitoring-reports/index.html .

Surface Water Quality Monitoring Program

In addition to the work performed in the Church Creek subwatershed, during FY20, the County assessed water quality in Cowhide Branch, a tributary to tidal Weems Creek and the Severn River. Continuous flow and rainfall data are collected at the monitoring station, and monthly stormwater and baseflow monitoring are performed. Parameters currently analyzed include the following:

| | | |
|---|---|---|
| Calcium | TKN | Hardness |
| Copper | NH3 | Alkalinity |
| Lead | TP | Total Phenols |
| Zinc | TSS | Oil and Grease |
| Magnesium | PO4 | *E. coli* |
| Iron | COD | VOC (EPA 624) |
| BOD5 | Turbidity | TPH |
| $NO_3/NO_2$ | TOC | |

Cowhide Branch receives runoff from the Parole Town Center drainage area. One continuous monitoring station is maintained by the County on Cowhide Branch. As part of the Parole Town Center, this site has been monitored since the late 1980s. The automated station was taken out of service in September 2016 prior to stream restoration work. The station remained out of service until March 2019 when post-restoration monitoring was initiated.

Post-restoration monitoring includes the above referenced water quality data collection during baseflow and storm events, habitat assessment, biological monitoring for benthic macroinvertebrates and fish community health, geomorphic assessment of the restored stream reach as well as several unrestored reaches upstream, and riparian vegetation community assessment. Post-restoration monitoring will continue through Spring 2024 (FY24).

***6. Water quality improvement projects: projects proposed, under construction, and completed with associated drainage areas delineated.***

**Status:**

The NPDES MS4 Permit requires the reporting of watershed restoration projects that are under design, under construction, and completed during the reporting year. The County continuously updates the inventory of watershed restoration projects as new projects are planned or completed. These projects are documented in the MS4 Geodatabase (**Appendix A**) across four feature classes: *RestBMP*, *AltBMPLine*, *AltBMPPoint*, and *AltBMPoly*.

This report section summarizes the inventory of the watershed restoration projects, while **Part IV.E.2** (Restoration Plans) details the corresponding water quality improvements. The County attained its restoration goal of treating the equivalent of 20% of the County's unmanaged impervious surfaces as of June 24, 2020. Therefore, this year's project inventory includes a small number of projects completed on or after that date that will be applied to the County's anticipated

restoration goal in the fifth generation MS4 permit goal, which is expected to be finalized in spring of 2021.

All new watershed restoration projects that have progressed to the schematic (30%) design phase as of the end of FY20 have been added to the appropriate feature classes in the MS4 Geodatabase. During the FY20 restoration project and data review, the County identified existing restoration projects that were completed prior to FY21, but not previously accounted for or reported to MDE. Projects added include the following:

- A community rain garden (AA20RST000006) that was installed by a volunteer group in 2016, but was lacking the requisite treatment values; treatment calculations were completed using available GIS data to account for the missing values;
- An infiltration trench (AA20RST000011) constructed FY18, a dry pond conversion (AA16RST000061) completed in FY19, and a living shoreline (AA19ALN000028) completed in FY19, where notification of the project's completion or data required for calculating credit was not received until after the FY19 Annual Report was submitted to MDE; and
- Two living shoreline projects (AA14ALN000004 and AA14ALN000005) completed in 2002 and one stream restoration (AA14ALN000003) completed in 2013 that were recently discovered to be missing from the County's inventory. These projects would have contributed to the County's managed impervious surface total during the baseline assessment. The projects are now included in the restoration inventory and are credited at 20% of the available equivalent managed impervious acreage. Credit values for one living shoreline (AA17ALN000059), completed in FY17, were updated to reflect the removal of the sand reduction factor from the Protocol 1 nitrogen and phosphorus reduction calculations.

**Error! Reference source not found.** provides a summary of the FY20 project inventory. In FY20, a total of 250 new restoration projects were completed, with a cumulative total of 1,851 projects completed from FY14 through FY20. These projects represent the portion of the County's inventory required to meet the current (fourth generation) permit's 20% ISR goal. The three remaining projects completed in FY20, as well as the 102 projects currently under construction or design, will be applied towards the ISR goal that is anticipated in the County's next (fifth generation) permit.

**Table 5. FY20 Restoration BMP Project Inventory Summary**

| | Projects Completed in FY20 (Current Permit) | Projects Completed – Cumulative through FY20 (Current Permit) | Projects Completed – Cumulative through FY20 (Next Permit) | Project Under Design or Under Construction in FY20[1] (Next Permit) |
|---|---|---|---|---|
| **Restoration BMPs** | | | | |
| - ESD | 0 | 23 | 0 | 5 |
| - Structural | 15 | 157 | 0 | 45 |

| | Projects Completed in FY20 (Current Permit) | Projects Completed – Cumulative through FY20 (Current Permit) | Projects Completed – Cumulative through FY20 (Next Permit) | Project Under Design or Under Construction in FY20[1] (Next Permit) |
|---|---|---|---|---|
| **Alternative Restoration BMPs** | | | | |
| - street sweeping *(annual practice)*[2] | 391 tons | 422 tons/yr. | - | - |
| - impervious surface elimination | 2 | 6 | 0 | 0 |
| - reforestation | 1 | 2 | 0 | 0 |
| - catch basin and storm drain cleaning *(annual practice)*[2] | 133 tons | 175 tons/yr. | - | - |
| - stream restoration | 3 (5,340 ft.) | 27 (28,484 ft.) | 2 (4,065 ft.) | 39 (86,313 ft.) |
| - outfall stabilization | 17 (696 ft.) | 66 (4,079 ft.) | - | - |
| - shoreline management | 4 (4,434 ft.) | 73 (24,302 ft.) | 0 (0 ft.) | 13 (14,070 ft.) |
| - septic pumping *(annual practice)*[2] | 15,609 units | 9,566 units/yr. | - | - |
| - septic denitrification | 180 | 1,329 | 3 | 0 |
| - septic connections to WWTP | 28 | 168 | 0 | 0 |
| - aquaculture nutrient credit trading | - | - | 1 (21.5 acres) | 0 (0 acres) |
| **Total number of projects (excl. annual practices)** | **250** | **1,851** | **3** | **102** |

[1]Two ESD and nine structural BMPs in the *RestBMP* feature class, as well as five stream restoration projects in the *AltBMPLine* feature class, with an implementation status of "Under Design" are on hold or cancelled (see comments in MS4 Geodatabase) and are not included in these tallies.

[2]For annual practices, Projects Completed – Cumulative through FY20 is the average annual quantity of materials collected (street sweeping and catch basin cleaning) or number of units serviced (septic pumping), dating from the full implementation of the programs. Averages for street sweeping and septic pumping are based on FY16-FY18 implementation, and the average for catch basin cleaning is based on FY17-FY18 implementation.

## *D. Management Programs*

***The following management programs shall be implemented in areas served by Anne Arundel County's MS4. These management programs are designed to control stormwater discharges to the maximum extent practicable (MEP) and shall be maintained for the term of this permit. Additionally, these programs shall be integrated with other permit requirements to promote a comprehensive adaptive approach toward solving water quality problems. The County shall modify these programs according to needed program improvements identified as a result of periodic evaluations by MDE.***

***1. Stormwater Management***

***An acceptable stormwater management program shall continue to be maintained in accordance with the Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland. Activities to be undertaken by the County shall include, but not be limited to:***

***a. Implementing the stormwater management design policies, principles, methods, and practices found in the latest version of the 2000 Maryland Stormwater Design Manual. This includes:***

***i. Complying with the Stormwater Management Act of 2007 (Act) by implementing environmental site design (ESD) to the MEP for new and redevelopment projects;***
***ii. Tracking the progress toward satisfying the requirements of the Act and identifying and reporting annually the problems and modifications necessary to implement ESD to the MEP; and***
***iii. Reporting annually the modifications that have been or need to be made to all ordinances, regulations, and new development plan review and approval processes to comply with the requirements of the Act.***

**Status:**

The 2000 Maryland Stormwater Design Manual was fully implemented by the County. However, this condition was superseded by the Maryland Stormwater Management Act of 2007. During FY20, the Department of Inspections & Permits (I&P) continued the requirement for all proposed new stormwater management plans to comply with the Environmental Site Design (ESD) standards in accordance with the County Code, State Code, and the current edition of Maryland Stormwater Management Design Manual.

A comprehensive review and update to the County's Stormwater Management Practices & Procedures Manual was completed in FY18 and approval was received from MDE on October 30, 2017. The approval letter was submitted with the FY18 NPDES MS4 Annual Report. There were no updates in FY19 or FY20.

As of September 2011, the County has an MDE-approved Stormwater Management Code, which incorporates the current edition of the Maryland Stormwater Management Design Manual. Copies of the County legislation (Bill 74-11) and the MDE approval letter were provided in the 2011 Annual Report. During this reporting period, no modifications to the Code were required to address programmatic concerns.

MDE conducted the triennial inspection of the County's stormwater management program during FY15 finding, overall, that the program is acceptable. The County continues to implement the recommendations from this inspection. As noted in the FY17 MS4 Annual Report, the County's development review engineers were relocated from the Office of Planning and Zoning (OPZ) to I&P, improving communication and interaction between the review engineers and the field

inspectors. The County continues improving communication and interaction between engineers and field inspectors through collaborative field visits to various job sites.

The onset of the COVID-19 coronavirus resulted in certain changes to County government operations in FY20. On March 18, 2020, County government buildings were closed to non-County employees to prevent the spread of COVID-19, social distancing and use of a facemask were advised, and on March 30, Governor Hogan issued an Executive Order requiring all persons in the State (except essential personnel) to "stay at home" except when engaged in certain activities. During the last half of FY20 and while County government buildings remained closed to non-County staff, stormwater program implementation continued through a combination of remote/teleworking activities, scheduled in-office staff rotations to ensure social distancing while inside, and the on-going field review/inspection of construction sites and stormwater facilities.

Due to the COVID-19 coronavirus, the triennial inspection specific to the County's stormwater program did not occur. Instead, MDE implemented a State-wide review for all jurisdictions comprised of information gathering via survey and participation in three interactive online training sessions entitled "What's in Your Pond". The online sessions were designed to refresh the local jurisdictions' understanding of program legal and regulatory authorities and ensure that program requirements continue to be interpreted correctly and consistently when reviewing stormwater management design plans and when interpreting stormwater management policy. The County participated in each of the online interactive workshops held in the fall of 2020 (FY21).

As reported in the FY19 MS4 Annual Report, during 2018 and 2019, the County's Stormwater Workgroup (Workgroup), a group comprised of developers, engineers, homeowners' association and Non-governmental Organization (NGO) representatives, realtors, County agencies, and representatives of the building trades, met routinely with program approval authorities. The purpose of these meetings was to discuss issues of concern, identify recommendations, and develop an action plan for each of those recommendations. The results of this effort are summarized in Tables 6 and 7. The Workgroup proposed that the lead agency provide primary guidance and direction, working with stakeholders (County agencies, Homeowner Associations (HOAs), development community, other stakeholders) to discuss recommendations in detail and develop a road map for the action plan implementation. The work group recommendations were finalized in March 2019. During this reporting period, the County continued to meet with workgroup members to discuss implementation of action plan items from **Error! Reference source not found.**.

**Table 6. Anne Arundel County Stormwater Workgroup Action Plan (March 2019)**

| # | Item | Action Plan | Lead Agency |
|---|---|---|---|
| 1. | HOA Documents | Code Changes and Policy Changes | OPZ |
| 2. | Turnover | Hand-off; Code changes | I&P |
| 3. | Education | One-stop BMP portal | DPW BWPR |
| 4. | Warranty | Code change | I&P |
| 5. | Budget | Roll into #1 | OPZ and I&P |
| 6. | Inspections | Work flow changes | I&P |
| 7. | Notices | Work flow changes | I&P |
| 8. | BMP Database | Public mapping interface | DPW BWPR |

| # | Item | Action Plan | Lead Agency |
|---|---|---|---|
| 9. | Inspection checklists | Roll into #3 | DPW BWPR |
| 10. | Flooding Concerns | Meet with I&P Staff | I&P |
| 11. | New Infill Lots | Coordination | I&P |
| 12. | Public Ponds | Roll into #3 | DPW |
| 13. | BMP Designs | Stormwater manual changes | I&P |

OPZ – Office of Planning and Zoning
I&P – Inspections and Permits
DPW BWPR – Department of Public Works Bureau of Watershed Protection and Restoration

**Table 7. Stormwater Workgroup Actions and Lead Agency**

| Work Group | Lead Agency | Discussion Items |
|---|---|---|
| #1 HOA Documents | OPZ | HOA docs, disclosures, covenants, conditions, reserve study, plat, transparency, clarity, education, budget, private/HOA infrastructure |
| #2 Transition | I&P | Warranty (bond similar to street tree maintenance, reforestation), surety, third party inspections, facility maps/inventory, turnover/transition, inspections, work flow, process, timing, SWMA agreement |
| #3 Education | DPW | One stop website, checklists, education, contractors, maintenance guidance, training, other municipality examples, education, Database |
| #4 Design and Construction | I&P | Maintenance costs (routine and non-routine), design issues, inspection, construction issues, details on plan, design manual updates |

As reported in FY19, the DPW BWPR created a one-stop BMP portal for the public https://www.aacounty.org/departments/public-works/wpwp/bmp_maintenance/index.html and added the locations of public and private stormwater BMPs to its public mapping interface, to make it easier for property owners to identify the number, nature, and location of the stormwater practices on their property.

Throughout FY20, I&P worked with the Office of Law (OOL) to develop legislation addressing responsibility requirements with respect to stormwater management practices that will be owned or maintained by HOAs by requiring the grading permit applicant to post a warranty and security to correct any deficiencies that occur within a 2-year warranty period. Via this legislation, the applicant would be responsible for repair or restoration of stormwater BMPs to be owned or maintained by HOAs for at least two years after approval of the as-built plan. The resulting legislation (County Bill 67-20, **Appendix B**) was introduced to Council on September 8, 2020 (FY21), approved on October 5, 2020, and will take effect on January 1, 2021. The County will address BMP Hand-off between the Developer and HOA during FY21.

OPZ and OOL continue efforts to revise HOA document requirements to better outline the location of stormwater practices, their anticipated maintenance costs, and the party responsible for that maintenance before they are handed over to HOAs. This work will continue into FY21.

***b. Maintaining programmatic and implementation information including, but not limited to:***

***i. Number of Concept, Site Development, and Final plans received. Plans that are re-submitted as a result of a revision or in response to comments should not be considered as a separate project;***
***ii. Number of redevelopment projects received;***
***iii. Number of stormwater exemptions issued; and***
***iv. Number and type of waivers received and issued, including those for quantity control, quality control, or both. Multiple requests for waivers may be received for a single project and each should be counted separately, whether part of the same project or plan. The total number of waivers requested and granted for qualitative and quantitative control shall be documented.***

***Stormwater program data shall be recorded on MDE's annual report database and submitted as required in PART V of this permit.***

**Status:**

During FY20, County records indicate the following information regarding stormwater management program data (Table 8).

**Table 8. Concept, Site Development, Final Development, and Redevelopment Plans Received During FY20**

| Type | Number of Projects Received |
|---|---|
| Concept Plan[(a)] | 107 |
| Site Development Plan[(a)] | 139 |
| Final Development Plan[(b)] | 73 |
| Final Redevelopment Plan[(c)] | 4 |
| Stormwater Exemptions | 0 |
| Waiver Requests Received | 0 |
| Waiver Requests Approved | 0 |

Notes:
(a) Concept Plan and Site Development Plan based on submittal date for each unique Project Number (e.g., P2015-0050-00-NF)
(b) Final Plan based on unique Grading Permit No.
(c) Redevelopment data only available for Final Redevelopment Plan

***c. Maintaining construction inspection information according to COMAR 26.17.02 for all ESD treatment practices and structural stormwater management facilities including the number of inspections conducted and violation notices issued by Anne Arundel County.***

**Status:**

Stormwater construction inspections are conducted by the County's erosion control inspectors in conjunction with the required erosion and sediment control plan inspections. All stormwater construction violations must be resolved and abated prior to the completion of the associated grading permit. For the reporting period, the following inspections were performed:

- 1212 Stormwater Construction Inspections and
- 211 Stormwater Correction Notices.

***d. Conducting preventative maintenance inspections, according to COMAR 26.17.02, of all ESD treatment systems and structural stormwater management facilities at least on a triennial basis. Documentation identifying the ESD systems and structural stormwater management facilities inspected, the number of maintenance inspections, follow-up inspections, the enforcement actions used to ensure compliance, the maintenance inspection schedules, and any other relevant information shall be submitted in the County's annual reports.***

**Status:**

The State and County Stormwater Management Codes require preventive maintenance inspections once during the first year of operation and every three years thereafter for all stormwater management facilities. For the reporting period, the following maintenance inspections were performed:

- 6,394 Three -Year Maintenance Inspections;
- 660 Three-Year Maintenance Correction Notices; and
- 29 Three-Year Maintenance Violation Notices.

There were 6,394 three-year inspections of stormwater BMPs conducted in FY20 and included in the *BMPInspections* table of the MS4 Geodatabase (**Appendix A**). In addition to these inspections, the County's dedicated stormwater management inspection staff performed numerous site visits in response to property owners requesting guidance, to obtain permission for site access in some situations, and to follow up on required maintenance activities.

The County realized an increase in correction notices issued during FY20. This is attributed to inspection staff review of previously issued and current correction notices to confirm and ensure compliance. When additional action was required to bring a facility into compliance, additional Phase I enforcement notices were issued as appropriate. In prior reports the County has documented the inspection process, including issuance of correction notices and Phase 1, 2, and 3 violation notices. During the FY20 reporting period, all correction notices were successfully enforced at the Phase 1 and Phase 2 levels; there were no Phase 3 violation notices required. Additional information relating to inspection and enforcement activities in FY20 is provided in the *SWM* table of the MS4 Geodatabase (**Appendix A**).

Alternative BMP inspections are also documented in the MS4 Geodatabase and, for FY20, the following alternative BMP inspection data are provided:

- The FY20 *AltBMPPointInspections* table contains 334 records associated with inspections of alternative BMPs such as septic system upgrades, connections to Water Reclamation Facilities (WRF), and septic pumpouts. Septic system upgrade (SEPD) inspections are conducted via a service provider visit from MDE's Best Available Technology Management Network (BATMN); inspection results are housed in MDEs BATMN database. It should be noted that 20 of the SEPD inspection records are annotated with an error code in the inspection date field to indicate SEPD BMPs that were due for inspection this year, but for which the MDE inspection record is incomplete and should be revisited by MDE. An additional 45 records are for inspections that occurred outside of the FY20 reporting period. These are the most recent inspections available in BATMN for SEPD BMPs that were due for inspection in FY20.
- The FY20 *AltBMPPolyInspections* table contains 686 inspection records associated with vacuum street sweeping, inlet and catch basin cleaning and other associated alternative BMPs.
- The FY20 *AltBMPLineInspections* table contains 16 inspection records associated with stream restoration and shoreline stabilization projects; 5 of these inspections occurred in previous reporting years but are included this year to demonstrate triennial inspection compliance of BMPs constructed in FY17.

Lastly, restoration stormwater BMPs are also subject to maintenance inspection to ensure their efficacy within the landscape. The FY20 *RestBMPInspections* table contains 44 restoration BMP inspection records; 14 of these inspections occurred in previous reporting years, but are included this year to demonstrate triennial inspection compliance of BMPs constructed in FY17.

***2. Erosion and Sediment Control***

***An acceptable erosion and sediment control program shall continue to be maintained and implemented in accordance with the Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland. Activities to be undertaken by the County shall include, but not be limited to:***

***a. Implementing program improvements identified in any MDE evaluation of the County's erosion and sediment control enforcement authority;***

**Status:**

On December 11, 2018, MDE completed a review of the County's erosion and sediment (E&S) control enforcement authority delegation application. As a part of this evaluation, MDE conducted field inspections and a review of E&S control enforcement procedures in accordance with the County's approved ordinance. During this review, MDE noted concern regarding timely site stabilization and re-stabilization. Throughout FY19 and FY20 the County implemented improvements to address the issues documented in that Delegation Review. The current MDE delegation of authority continues through June 30, 2021. In August 2020, the County submitted an application to continue delegation of authority beyond June 2021 and, in October 2020, participated in the field inspection component of MDEs Delegation Review.

The County also took action to recognize and address requirements of Maryland HB 703 (approved by the State legislature in FY19). This state legislation requires certain new reporting from delegated jurisdictions with respect to environmental violations within the critical area and designated sensitive areas. In July 2020, the County notified developers and their engineers that information related to the total acreage of disturbed area and the acreage of disturbance within the critical area and/or designated sensitive areas (e.g., habitat protection area, wetlands, buffers) is required on grading permit plan cover sheets (new and revised grading permit submittals) effective September 1, 2020. This information will be used to satisfy Maryland HB 703 reporting requirements.

***b. At least three times per year, conducting responsible personnel certification classes to educate construction site operators regarding erosion and sediment control compliance;***

**Status:**

Anne Arundel County continues to require a valid Responsible Personnel Certification be held by construction site operators and includes a place on the approved construction plans for the cardholders' name and certification number. Moreover, the County checks for a designated card-holder at the project pre-construction meeting.

Responsible Personnel Certification classes are no longer conducted by County staff. Beginning in FY15, MDE assumed responsibility for this training, which is offered on-line via the MDE website. The optional MS4 Geodatabase table *RespPersonnelCertInfo* is not submitted with the FY20 Annual Report.

***c. Program activity shall be recorded on MDE's annual report database and submitted as required in PART V of this permit; and***

**Status:**

As noted above Anne Arundel County is no longer responsible for providing Responsible Personnel Certification training as it is available on-line on the MDE website. Therefore, no certification information is submitted in this narrative or with the MS4 Geodatabase. Other relevant program information is found in the *ErosionSedimentControl* table within the MS4 Geodatabase (**Appendix A**).

***d. Reporting quarterly, information regarding earth disturbances exceeding one acre or more. Quarters shall be based on calendar year and submittals shall be made within 30 days following each quarter. The information submitted shall cover permitting activity for the preceding three months.***

**Status:**

Based on previous guidance from MDE, submission of quarterly reports is not required provided that the Construction General Permit Activity Database continues to be submitted with the annual

report. Information regarding grading permits from the County's Construction General Permit Activity Database is provided in the *QuarterlyGradingPermits* feature class and *QuarterlyGradingPmtInfo* table of the MS4 Geodatabase submittal (**Appendix A**).

***3. Illicit Discharge Detection and Elimination (IDDE)***

***Anne Arundel County shall continue to implement an inspection and enforcement program to ensure that all discharges to and from the MS4 that are not composed entirely of stormwater are either permitted by MDE or eliminated. Procedures shall include, but not be limited to, the following activities.***

***a. The County shall conduct field screening for at least 150 outfalls annually. A sample from each outfall having a discharge at the time of the inspection shall be tested using a chemical test kit. Within one year of permit issuance, an alternative program may be submitted for MDE approval that methodically identifies, investigates, and eliminates illegal connections to the County's storm drain system.***

**Status:**

Anne Arundel County has developed, and continues to maintain, an extensive program designed to detect and eliminate illicit discharges into the municipal storm drain system and upland pollutant sources resulting from dumping, poor housekeeping, and other non-permitted activities. The program includes the dry-weather inspection of a minimum of 150 storm drain outfalls annually. This outfall inspection records the presence of dry-weather flow, the structural integrity of the outfall, and relevant maintenance issues.

Each year, the Anne Arundel County NPDES MS4 Permit Coordinator, or a delegated staff member, coordinates with the support consultant to identify priority assessment areas in the County that should be investigated for possible illicit discharges to the stormwater system. GIS desktop analysis is used to identify target outfalls primarily draining commercial, industrial, and residential land uses. As deemed appropriate, the County also revisits outfalls that had exhibited illicit discharge during previous assessments to confirm illicit discharge elimination. By assessing a different area of the County each year and incorporating the option of returning to sites that exhibited possible illicit discharge conditions in previous survey periods, the County achieves an area-wide review of likely sources of dry-weather discharge throughout the permit period.

The areas targeted for the FY20 field effort included the southern portion of the County (south of the intersection of I-97 and Route 3) and areas within the Upper Patuxent River Watershed along the southwestern edge of the county. In addition, the County revisited all locations that had shown documented evidence of illicit discharge dating back to the 2013 screening year. Field crews successfully inspected 155 outfalls draining commercial, industrial, and residential land uses. For the FY21 effort, the County's outfall screening efforts will return to the Route 2 corridor from Arnold north to Route 100/Mountain Road (including Severna Park, Pasadena, and parts of Glen Burnie), and the Route 97/Veterans Highway corridor in the Millersville area. In addition, the County will conduct outfall and upland screenings on 30 previously unscreened County-owned properties.

Anne Arundel County's GIS coverage of storm drains and closed storm drain utility grids provided the base data for maps to guide field activities. These maps assisted field crews in identifying the extent of the storm drain systems, locations of outfalls, and any contributing businesses or facilities. The maps included parcels for commercial and industrial facilities and their storm drain systems for screening efforts, as per the guidance provided by MDE (MDE 1997).

Field crews recorded the physical condition of each outfall structure and conditions surrounding the outfall on field datasheets for each site visit. When crews found a dry-weather discharge, they tested the discharge using a Chemetrics color comparator test kit (tested parameters included detergents, phenols, copper, chlorine, and ammonia), a Hanna Instruments single analyte tester (for fluoride), and an YSI sonde (for water temperature and pH). Physical parameters noted at each outfall included structural condition, vegetative condition, erosion, floatables, algae growth, discharge odor, and discharge clarity.

If field tests determined that an outfall's discharge had a concentration above the action criteria for any of the analytes during the first visit, the protocol stipulated that crews revisit the outfall within 24 hours, but at least four hours after the first test. The second visit helps determine if the initial result was an anomaly, or, if the outfall continues to exhibit flowing discharge, confirm the results of the chemical tests conducted on the first visit.

If both inspections revealed dry-weather flows and concentrations above the action criteria, the outfall is qualified as having a possible illicit connection. Another site condition that implied possible illicit connections included any situation where an observable pollutant had been discharged through a storm drain system, but, at the time of inspection, the system was not flowing, or the discharge test did not reveal detectable levels of the pollutant.

To identify the source of any possible illicit discharge, the field crews systematically investigated access points in the storm drain system upstream of the outfall, testing flows through manholes and inlets as necessary and practical, until either the source was identified or the discharge could not reasonably be tracked further. Field crews photo-documented evidence of illicit discharges, including the probable cause(s). Staff prepared site-specific reports for each identified potential illicit discharge and structural issue found in the field; staff submitted the reports to the Anne Arundel County MS4 Program Manager. The potential illicit discharge reports were then forwarded to the County's I&P, the County's Infrastructure Management Division (IMD), or the Anne Arundel County Department of Health (Health Department), as appropriate, for further investigation and enforcement.

A full report of the procedures and data collected from the illicit detection and elimination field investigations is found in the Illicit Discharge Detection and Elimination – 2020 Annual Report (**Appendix E**); relevant digital data are included in the *IDDE* table of the MS4 Geodatabase provided in **Appendix A**. The complete report (**Appendix E**) contains details of the findings from the 2020 reporting period, and the corrective actions associated with these sites.

Of the screened outfalls containing dry-weather flow during the initial screenings in the 2020 reporting period, seven yielded a result above the action-criteria limit for one or more of the tested

contaminants. The cloudy discharge conditions at one of the seven outfalls interfered with the accuracy of the visual test interpretation to the extent that the values were likely not correct. The field team surmised that the sample's cloudy conditions may have been due, in part, to particulate matter associated with high levels of iron flocculant in the water, and possibly fine sediment transported from a nearby golf course if the maintenance crews had been irrigating the course in the drought conditions of September 2019. The County will revisit this outfall in Spring 2021 as part of the FY2021 IDDE program. Field crews returned to screen the six remaining outfalls and, of those, four had concentrations that were above at least one action level when re-tested. The County inspectors performed follow-up site visits and inspections for the outfalls with reported potential illicit discharges. Complete investigation details, including site-specific reports, agency responses, and detailed corrective actions, are found **Appendix E**. The full report also includes details regarding the resolution of previously unresolved cases described in the 2019 reporting year. Closed investigations where the discharge source was not able to be identified (e.g., inconclusive) will be prioritized for future re-screening, and open cases will continue to be investigated with results reported in FY21.

The County consultant's field teams identified seven locations where physical issues significantly affected stormwater infrastructure within the targeted areas of Anne Arundel County during the 2020 reporting period. The site-specific reports were then forwarded to IMD for appropriate corrective action. Complete investigation details, including site-specific reports, agency responses, and corrective actions, are found in **Appendix E**.

***b. The County shall conduct annual visual surveys of commercial and industrial facilities, as identified in PART IV.C.2 of the current MS4 Permit, for discovering, documenting, and eliminating pollutant sources. The County shall submit reports for the inspected facilities annually.***

**Status:**

During the permitting period, field personnel perform a visual inspection of accessible commercial and industrial sites within the target screening areas that have the potential to contribute significant pollutants (a.k.a. potential upland pollutant sources). The inspections are designed to identify poor housekeeping, dumping, and other non-permitted discharges (e.g., vehicle wash water) that may be intercepted by the County's storm drain system.

For the FY20 reporting period, field crews evaluated approximately 370 specific commercial or industrial sites for evidence of upland pollutant sources; 35 of these sites were subject to additional evaluation due to site conditions that were more likely to produce subjectively qualifying amounts or types of pollution. As a result, field crews identified 16 upland pollutant sources within the target areas while conducting these routine visual inspections; these sources demonstrated the potential to discharge pollutants into County storm drains or Waters of the United States. Staff reported upland pollutant sources to the County MS4 Permit Coordinator; the Permit Coordinator or designee sent copies of the reports to I&P or the Health Department, as appropriate, to initiate corrective action. The County also conducted a separate special investigation of the source of bacteria to a County waterway. Complete investigation details, including site-specific reports,

agency responses, corrective actions, and the report of the special investigation are found in **Appendix E**.

***c. The County shall maintain a program to address, and, if necessary, respond to, illegal discharges, dumping, and spills.***

**Status:**

There are two departments within the County government that address reports of illegal dumping and spills. The I&P department is the County agency primarily responsible for enforcing regulations regarding spills and illegal dumping into both publicly and privately owned storm drain systems. The Health Department addresses complaints specifically relating to food service facilities (e.g., overflowing dumpsters or waste grease containers) and documents violations during regular facility inspections.

Twenty (20) illicit discharge, dumping, or storm drainage complaints were reported to I&P during the 2020 reporting period; these cases were supplemental to the survey results of the commercial and industrial facilities, as described in Part b, above. The complaints included referrals from the Department of Public Works as part of the department's IDDE Program and referrals from other sources. Illicit discharge complaints and referrals are logged into the I&P Compliance Case Database; this is used to track cases from the receipt of a complaint or referral to closure. Case numbers facilitate tracking the progress of any individual Illicit Discharge complaint or referral received by I&P.

Compliance case data pertinent to the complaints received during the 2020 reporting year are documented in **Appendix E**. All complaints and referrals were investigated and enforced as appropriate.

The I&P department utilizes a phased approach to eliminating and enforcing illicit storm drain discharges. Phase I Enforcement consists of a Violation Notice sent by first class and certified mail to the property owner. The Phase I Violation Notice includes an explanation of the violation and requests a written commitment to immediately cease the illicit discharging activity. Upon written receipt of the commitment to comply, the Department monitors the site for up to 60 days. If compliance is maintained, the violation is considered abated. Should the Department fail to receive the written commitment to comply, or if further violations are observed, the Department proceeds to Phase II Enforcement.

At the Phase II level of enforcement, I&P posts a Stop Work Order on the property and issues a $1,000 civil citation to the property owners. The civil citation must be paid, and the violation abated, or the civil citations are litigated in court. If a violation were to remain unabated by the court date, the Department requests the full payment of the fines and an abatement order from the District Court judge. The failure to comply with any Court-issued abatement order results in Contempt of Court charges being filed by the County Office of Law.

Significant violations are screened with the County Office of Law for possible criminal enforcement as authorized in the County Code, or for referral to MDE for enforcement under the

State Code. During the 2020 reporting period, it was not necessary to issue any civil citations for failure to eliminate illicit storm drain discharges.

As part of its general activities associated with food service facilities, the Health Department has protocols for abatement of leaking or overflowing dumpsters. Enforcement is conducted under State of Maryland Regulations dealing with Food Service Facilities (COMAR 10.15.03.19) which requires that each facility retain a sufficient number of durable refuse containers capable of holding the facility's garbage between periods of removal; the containers must be adequately covered and not leaking. Violation of this regulation would be marked on the food facility inspection report and would require correction typically within 30 days of the investigation. Failure to comply by the second re-inspection would result in $175 re-inspection fees until compliance is achieved.

The Health Department also routinely inspects food service facilities to monitor the sanitary and physical conditions of each establishment. If the County receives a complaint about a specific issue relevant to a food service facility, the Health Department conducts an investigation applicable to the issue; these inspections augment those conducted under the routine schedule for facility assessments. The Health Department also conducts re-inspections, as necessary, to supplement routine inspections or complaints; these ensure corrective actions and facility compliance.

For the 2020 reporting period, issues with dumpsters or waste grease bins specifically related to food service establishments were sent to the Health Department for further inspection and enforcement. The Health Department addressed four issues reported to the Department by County consultants during the reporting period; I&P addressed seven issues, in the Health Department's stead (the Health Department focus was redirected to the COVID-19 pandemic response in March 2020 and for the remainder of the reporting period); and I&P forwarded information about one issue to the City of Annapolis for further inspection and enforcement. Details regarding the reported conditions, agency responses, and corrective actions are in **Appendix E**.

***d. The County shall report significant illicit discharges to MDE.***

**Status:**

During the 2020 reporting period, no illicit discharge complaints were referred to MDE. Four illicit discharge complaints and referrals received during the period were successfully enforced by I&P. One site requires additional monitoring into the following period to continue to obtain evidence to better understand the nature of the discharge conditions and activities causing them; conditions at another site, at which field crews have observed unusual discharges and activities on more than one occasion, warranted sending a correction notice to the property owner to close a portion of the business operations to address potential maintenance issues. I&P also resolved six compliance cases that were initiated in previous reporting periods; one issue from the 2019 reporting period remains unresolved. Details regarding these cases are in **Appendix E**.

***e. The County shall report illicit discharge detection and elimination activities as specified in PART V of the current MS4 Permit.***

**Status:**

The report in **Appendix E** provides descriptions of all procedures undertaken and activities completed, findings from follow-up investigations, and data collected as part of the County's FY20 IDDE program. Additionally, the County follows the requirements in the Permit for reporting IDDE data. The *IDDE* table in the MDE Geodatabase included in **Appendix A** contains the required information related to screenings of 155 outfalls conducted during the 2020 reporting period.

***4. Litter and Floatables***

***This section of the permit requires Anne Arundel County to address problems associated with litter and floatables in waterways that adversely affect water quality. Increases in litter discharges to receiving waters have become a growing concern both nationally and within Maryland and cannot be ignored. Anne Arundel County needs to evaluate current litter control problems associated with discharges from its storm drain system and develop and implement a public outreach and education program as needed on a watershed by watershed basis.***

***a. As part of Anne Arundel County's watershed assessments under PART IV.E.1 of this permit, Anne Arundel County shall document all litter control programs and identify potential sources, ways of elimination, and opportunities for overall improvement.***

**Status:**

All comprehensive watershed assessments for the County, as required under Part IV.E.1, were completed in FY18. Those watershed studies completed during this permit term included a summary of potential litter sources, and the observed locations of riparian area dump sites and upland areas where trash and litter were observed. As reported in the FY18 Annual Report, please see Section 5 of the final Herring Bay, Middle Patuxent, and Lower Patuxent Watershed Assessment Report (found at www.aacounty.org/departments/public-works/wprp/herring-bay-middle-patuxent/index.html ) for detailed information related to this permit requirement and a map of the dump site locations within the study areas. The County's programs for addressing trash and litter are also documented in the County's FY20 Litter and Floatables Comprehensive Plan Annual Update (**Appendix F**).

The County continues to identify and eliminate sources of litter through screening for upland pollutant sources as part of the County's Illicit Discharge Detection and Elimination program (Part IV.D.3). Under this program, observed sources of litter such as inadequately covered or overflowing dumpsters, improper trash disposal, and illicit dumping are reported to the appropriate County agencies, which can compel the tenant and/or landowner to properly dispose of trash and make the necessary corrections.

The County's Bureau of Waste Management Services (WMS) continued to employ an effective education and outreach program targeting both homeowners and businesses with an emphasis on recycling and waste reduction. Together with the County's Bureau of Highways (BOH), WMS

supported numerous community cleanup and watershed cleanup events in FY20. The County's full efforts in reducing and eliminating sources of litter are detailed in the County's FY20 Litter and Floatables Comprehensive Plan Annual Update (**Appendix F**).

During the reporting period, the County continued to explore additional methods of eliminating or reducing certain types of trash and litter on a County-wide basis, such as catch basin inserts and trash traps. The County has coordinated with NGOs that are actively managing trash trap programs (e.g., South River Federation, Anacostia Watershed Society) to gain insight into locating, building, and maintaining these facilities. The County has yet to identify a suitable location for trash trap installation. Due to cost and maintenance concerns, the County has decided not to pursue the use of catch basin inserts as a litter reduction strategy at this time.

***b. Within one year of permit issuance, as part of the public education program described in PART IV.D.6., Anne Arundel County shall develop and implement a public education and outreach program to reduce littering and increase recycling. This shall include:***

***i. Educating the public on the importance of reducing, reusing, and recycling;***
***ii. Disseminating information by using signs, articles, and other media outlets; and***
***iii. Promoting educational programs in schools, businesses, community associations, etc.***

***c. Evaluating annually the effectiveness of the education program.***

***d. Submit annually, a report which details progress toward implementing the public education and outreach program. The report shall describe the status of public outreach efforts including resources (e.g., personnel and financial) expended and the effectiveness of all program components.***

**Status:**

Anne Arundel County has implemented public education and outreach programs addressing litter, recycling, and overall waste management. These programs are integral to the services provided by the WMS and BOH. In FY20, the County reviewed and updated the Litter and Floatables Comprehensive Plan. This Plan details existing conditions in the County, highlights all County and County-supported programs pertaining to reduction of litter and floatables, and describes future actions the County may take towards preventing litter from entering waterways. A copy of this plan is found in **Appendix F**.

Documented below is a summary of the County's litter and recycling education and outreach programs for FY20.

*Litter Cleanup, Waste Management, & Recycling*

The County's WMS developed and operates a robust public education and outreach program targeted to waste reduction and recycling, as well as household hazardous waste disposal.

WMS Recycling Division's successful recycling program is achieved through effective, consistent communication and education. Maintaining adequate program promotion and education are key to keeping customers informed and motivating them to continue and improve recycling as programs change and evolve. Lack of a comprehensive communication strategy can result in higher contamination levels in collected recyclables; less recycling by new residents; and existing customers may lose interest or become frustrated with changing program guidelines. Therefore, the Recycling Division has made communication and education its primary focus and the mechanism by which to cause a steady incremental growth in the residential recycling rate.

WMS recognizes the importance of keeping citizens educated about its programs, particularly regarding its changes and advancements, and to encourage residents to recycle more often. Recycling Program Specialists attend fairs, festivals, HOA meetings, community outreach events, and more. WMS also provides technical assistance with recycling at larger-scale events such as the County Fair, the Annapolis Greek Festival, and more. A total of 11 fairs and festivals were attended in FY20, and recycling assistance was provided to 13 events in the County. Anne Arundel County promotes its recycling program to the public through several methods including:

- Providing technical assistances, and services when possible, to small business and multi-family units;
- Improving communication with customers by maximizing the use of various media including direct mail, broadcast media, social media, newspaper advertisements, and its websites (http://www.recyclemoreoften.com/ and http://www.aacounty.org/departments/public-works/waste-management/);
- Attending civic and community meetings and events, workshops, displays, and special promotions;
- Specially designed programs and contests for school aged children; and
- Educating customers on new programs, changes to existing programs, source reduction, schedule updates, and holiday collections.

In FY20, the County partnered with Recycle Coach, the largest recycling education network, to launch an app that will further enhance the County's ability to effectively and quickly communicate information to residents regarding the recycling program, curbside collection services, Recycling Centers and the Millersville Landfill. The Recycle Coach app (https://recyclecoach.com/), which launched in April 2020, is available to County residents on mobile devices and desktop computers.

Education programs are offered to students, faculty, parents, and more throughout Anne Arundel County's public and private schools, as well as day care and home-schooling groups. Technical assistance with recycling is also provided upon request, as well as assistance with obtaining Green School Certification through the Maryland Association for Environmental and Outdoor Education (MAEOE) program. In FY20, Recycling Program Specialists provided information to 14 elementary school programs, 12 middle school programs, and two high school programs, as well

as providing five tours of our County Landfill. The Recycling Division also administers three contests annually for County students, including a poster contest for elementary schools, a sculpture contest for middle schools, and a fashion contest for high school students. This helps generate even more excitement about the importance of recycling. The County utilizes a multi-media outreach approach. In addition to attendance and participation in the multiple community events, recycling-themed mailers and brochures are distributed and advertisements supporting recycling can now be heard on music streaming services. Additional information on the County's recycling and household hazardous waste programs may be found at the following websites:

- www.recyclemoreoften.com/
- www.aacounty.org/services-and-programs/household-hazardous-waste-drop-off-days
- www.facebook.com/annearundelrecycling/
- https://recyclecoach.com/anne-arundel/

This ongoing and extensive outreach effort has proven to be very successful. Since the inception of the education and outreach program in 2008, the County-wide recycling rate has increased from 31% to 40%. Increases in recycling indicate less material being contributed to the landfill stream and, thus, less material (e.g., potential litter) that could be distributed by wind at pick-up locations or blown out of private vehicles traveling to a landfill for disposal.

The WMS Recycling Division offers a Small Business Recycling Program for offices looking to recycle. This operation is an extension of the residential program with contractors servicing the businesses on the roster with weekly pick-up of containers up to 96 gallons. In FY20, 195 small businesses were signed up for Small Business Recycling and more than 1,300 tons of single-stream recycling was collected. WMS Recycling Division staff is available for presentations, technical support, and Maryland Recycling Act (MRA) assistance regardless of whether a business elects to use the County for collection of recyclables. Currently there are 235 County-based businesses that report to the County for MRA purposes and thus are known to be actively participating in a recycling program.

With recycling being so heavily promoted in the County, it is only fitting that the County employees lead by example and practice recycling as well. The County Office Recycling Program (CORP) was developed to assist in providing County offices and facilities with the necessary tools behind an effective recycling program (e.g., containers, signage, and pick-up service); all offices and facilities have a Recycling Coordinator that directly communicates with the recycling program office. Approximately 1,047 tons of single-stream recycling was collected at 113 County sites (offices, parks, pools, etc.) in FY20.

In FY20, WMS held three household hazardous waste events (one at each of the three Recycling Centers). These successful events kept 107 tons of household hazardous waste materials out of the landfills, roadside ditches, and County waterways. These events also discourage illegal dumping of hazardous materials. All hazardous waste collected at the facilities during these events is packaged, transported, and disposed of by a licensed hazardous waste contractor. The County does not accept hazardous waste for disposal at their landfill.

The County also provides 40 cubic-yard roll-off bins throughout the year for citizen groups, communities, and the County's BWPR to aid in community and watershed cleanup activities. WMS assists in hauling the trash and recyclable material collected from these activities. In FY20, WMS was scheduled to assist with 200 community cleanups by providing dumpsters and/or hauling services.

In support of activities designed to capture and eliminate litter before it enters County waterways, in 2018 the County purchased custom designed storm drain stencils and medallions for use by NGOs, schools, and other organizations. The stencils and medallions can be used to mark County-owned storm drain structures. In FY20, 33 medallions were given to two communities for placement on all the storm drains in both communities.

The County BOH is responsible for all maintenance activities associated with County-maintained roads. Litter is collected from County roadways on a routine basis. In addition, BOH conducts weekday and weekend roadside litter and trash removal throughout the year, using supervised inmate labor in partnership with the County Department of Detention Facilities. The program was first started in 2007 with a focus on high-litter-count road segments, dump sites, and illegal roadside signs that were proliferating across the County. Since the inception of the program, BOH has constructed a list of high-litter areas based on staff and citizen observations.

Weekend roadside litter pickup occurs every other weekend throughout the year, dependent on weather. The overall effectiveness of the program ultimately depends on the number of inmates eligible for the program. The goal of the weekend pickup program is to realize an improvement in the condition of roadsides in Anne Arundel County without a reduction to other Highways services. Weekend litter removal activities follow a programmed frequency throughout the year. Litter removal crews bag recyclables and other trash items separately, and crews are asked to empty the recyclable items out of their collection bags into containers provided by the WMS Recycling Division.

A total of 10,798 forty-gallon bags of litter were removed from roadsides from July 1, 2019, to June 30, 2020, with 7,519 bags collected during the routine work week and 3,279 bags collected by the weekend litter removal program (in previous years, BOH used thirty-gallon bags). Since FY10, the County's roadside litter cleanup program has removed an average of 10,560 bags of litter from roadsides each fiscal year.

The County BOH also collects large debris from roadside rights-of-way (e.g., discarded appliances, tires, furniture, tree limbs). In FY20, BOH collected over 1,015 tons of roadside debris, an increase of 239 tons from the previous reporting period.

*Stream Cleanups*

BOH and WMS supported watershed cleanup initiatives during the reporting period. In partnership with these efforts, the County supported three events and hauled away more than eight (8) tons of material for proper disposal. Specific examples of clean-up events supported by the County are listed in **Error! Reference source not found.**.

**Table 9. Community Clean-Up Activities Supported by the County in FY20**

| Date | Organization/Location | Location | Amount of Trash Removed |
|---|---|---|---|
| 2/15/2020 | Project Clean Stream | 8298 Brock Bridge Rd. – Laurel, MD | 0.74 tons |
| 2/22/2020 | Restore Rock Creek | 1343 Cape St. Claire Rd. – Annapolis, MD | 7.22 tons |
| 5/4/2020 | South Forest (SoFo) | Forest Dr. and Bay Ridge Rd. | 30 bags (30 gal) |

In addition to the stream cleanup activities supported by BOH and WMS, the Anne Arundel Watershed Stewards Academy (WSA) organized watershed and stream cleanup initiatives during FY20. Stewards, and Stewards-in-Training, removed 7.3 tons of trash from County streams and watersheds.

***5. Property Management and Maintenance***

***a. Anne Arundel County shall ensure that a Notice of Intent (NOI) has been submitted to MDE and a pollution prevention plan developed for each County- owned municipal facility requiring NPDES stormwater general permit coverage. The status of pollution prevention plan development and implementation for each County-owned municipal facility shall be reviewed, documented, and submitted to MDE annually.***

**Status:**

Anne Arundel County's Water Reclamation Facilities (WRFs) NPDES discharge permits are current or continue in force pending MDE issuance of a revised permit. The County-owned WRFs with NPDES discharge permits are listed in **Error! Reference source not found.** below.

**Table 10. County Water Reclamation Facility Discharge Permits**

| Facility | Permit | Permit Coverage Period |
|---|---|---|
| Annapolis WRF | 12DP0838A | Oct. 1, 2015 – Sept. 30, 2020 |
| Broadneck WRF | 14DP0677A | Nov. 1, 2017 – Oct. 31, 2022 |
| Broadwater WRF | 14DP0813A | Nov. 1,2017 – Oct. 31, 2022 |
| Cox Creek WRF | 14DP0698 | Jan. 1, 2020 – Dec. 31, 2024 |
| Maryland City WRF | 11DP2393A | April 1, 2015 – Mar. 31, 2020 |
| Patuxent WRF | 11DP0132A | April 1, 2015 – Mar. 31, 2020 |
| Piney Orchard WRF | 15DP1936A | July 1, 2019 – Feb. 28, 2022 |

NPDES wastewater discharge permit renewals for the Maryland City WRF and the Patuxent WRF were submitted to MDE and are pending issuance. Until the new permits are issued, the current permit conditions remain in force.

Effective July 1, 2019, the Piney Orchard WRF ownership was transferred to Anne Arundel County and the associated discharge permit modified to indicate the new ownership. All permit

conditions and limitations not affected by ownership transfer remained as specified in the original permit.

The State's General Discharge Permit for Stormwater Associated with Industrial Activities, Permit 12-SW or 12-SR, became effective January 2014. County-owned facilities requiring general discharge permit coverage submitted NOIs to MDE. These facilities, their General Permit Number, the date MDE received the NOIs and Stormwater Pollution Prevention Plans (SWPPPs), and the permit coverage period is listed in **Error! Reference source not found.**. The General Permit coverage expired at the end of 2018 and MDE administratively extended the permit term until a new general permit is issued. In the interim, all covered facilities are required to maintain compliance with the existing permit conditions.

**Table 11. County 12-SW-Permitted Facilities**

| Facility | Permit | NOI & SWPPP Received by MDE | Permit Coverage Period |
|---|---|---|---|
| **Bureau of Highways (BOH) – Northern District Road Yards** | | | |
| 200 Dover Rd | 12-SW-1176 | July 8, 2014 | Sept. 12, 2014 – Dec. 31, 2018 |
| 318 Mountain Rd | 12-SW-1181 | July 8, 2014 | Aug. 21, 2014 – Dec. 31, 2018 |
| **BOH – Central District Road Yards** | | | |
| 1427 Duckens St | 12-SW-1177 | July 8, 2014 | Aug. 21, 2014 – Dec. 31, 2018 |
| 1847 Crownsville Rd | 12-SW-1179 | July 8, 2014 | Aug. 21, 2014 – Dec. 31, 2018 |
| 415 Broadneck Rd | 12-SW-1182 | July 8, 2014 | Aug. 21, 2014 – Dec. 31, 2018 |
| **BOH – Southern District Road Yards** | | | |
| 350 West Central Ave | 12-SW-2298 | July 8, 2014 | Aug. 21, 2014 – Dec. 31, 2018 |
| 6657 Old Solomons Island Rd | 12-SW-1180 | July 8, 2014 | Aug. 21, 2014 – Dec. 31, 2018 |
| **Bureau of Waste Management Services (WMS)** | | | |
| Millersville Landfill & Resource Recovery Facility (MLFRRF) | 12-SW-1304A | July 16, 2019 | Aug. 15, 2014 – Dec. 31,2018 |
| Northern Recycling Center (NRC) | 12-SW-0298A | December 7, 2018 | Aug. 15, 2014 – Dec. 31, 2018 |
| Southern Recycling Center (SRC) | 12-SW-0297A | December 7, 2014 | Aug. 18, 2014 – Dec. 31, 2018 |
| **Bureau of Utility Operations (BUO)** | | | |
| Annapolis WRF | 12-SW-0756 | May 20, 2014 | June 16, 2014 – Dec. 31, 2018 |
| Broadneck WRF | 12-SW-0758 | June 27, 2014 | July 30, 2014 – Dec. 31, 2018 |
| Broadwater WRF | 12-SW-0757 | June 18, 2014 | June 26, 2014 – Dec. 31, 2018 |
| Cox Creek WRF | 12-SW-0760 | June 30, 2014 | Aug. 11, 2014 – Dec. 31, 2018 |
| Patuxent WRF | 12-SW-2459 | June 27, 2014 | Aug. 6, 2014 – Dec. 31, 2018 |
| Maryland City WRF | 12-SW-0761 | June 11, 2014 | July 14, 2014 – Dec. 31, 2018 |
| Piney Orchard WRF | 12-SR-0727 | Nov 18, 2014 | Jan. 16, 2015 – Dec. 31, 2018 |
| Anne Arundel County Utility Operations Center | 12-SW-2345 | July 16, 2014 | Sept. 8, 2014 – Dec. 31, 2018 |

At a minimum, each facility performs quarterly and annual inspections as well as staff training on stormwater pollution prevention plans. Compliance documentation, as required by General Permit 12-SW, is maintained at each facility and is available for inspection upon request. Information specific to these facilities and their permit compliance activities is presented in the *MunicipalFacilities* table of the MS4 Geodatabase. Copies of the most recent quarterly inspection and the most recent annual comprehensive site inspection, as well as training records for the above-listed facilities are found in **Appendix G**.

*Bureau of Highways (BOH) Stormwater Pollution Prevention Plan Development and Implementation*

During the period July 1, 2019, through June 30, 2020, the following items related to General Permit 12-SW at the County's Road Operations Yards were completed:

- Implemented each SWPPP, including
  - Performed routine facility inspections of each facility, at least quarterly;
  - Completed quarterly outfall visual assessments of each facility;
  - Completed comprehensive annual inspections of each facility;
  - Provided training to Road District personnel during the reporting period to support SWPPP implementation;
  - Completed an internal document review during comprehensive annual inspections of each facility. These records are maintained at each facility;
  - Continued maintenance improvements to further prevent stormwater impacts, including
    - Use of coir log wattles and/or straw bales to protect inlets,
    - Use of asphalt curbing to contain bulk road maintenance materials, and
    - Added wooden bulkheads to entryway of salt barns, in addition to straw bales;
- Completed underground storage tank testing and inspection of Bureau of Highways facilities using Maryland Department of the Environment Certified UST Inspectors for the following conditions:
  - Annual testing of spill buckets (catchment basins) at two facilities in March 2020;
  - Third Party Inspections at two facilities in calendar year 2020 based upon MDE notification; and
  - Five-year tank tightness testing and five-year containment sump testing were completed at all applicable facilities; and
- Completed capital improvements to underground storage tank infrastructure at the following facility:
  - Northern District, 318 Mountain Rd., waste oil tank replaced, July 2019.

*Bureau of Waste Management Services Stormwater Pollution Prevention Plan Development and Implementation*

The State's General Discharge Permit 12-SW also applies to the three County-owned facilities managed by WMS identified in Table 10. During the reporting period, annual comprehensive SWPPP compliance inspections were performed at these facilities in November 2019 and will be

performed again in November 2020; visual inspections occur on a quarterly basis. In addition, the stormwater management facilities at these sites are routinely inspected and all identified repairs are immediately reported and scheduled for maintenance. WMS employs two technicians who inspect and manage the stormwater facilities to ensure proper function.

As reported in the FY19 MS4 Annual Report, MDE conducted a Permit 12-SW compliance inspection at the Millersville Landfill & Resource Recovery Facility (MLFRRF) in June 2019. This inspection resulted in MDE requesting an NOI and SWPPP modification to add Sector A (Timber Products), SIC Code 2499 (Wood Products, Not Elsewhere Classified) for the composting operation at this facility. The updated NOI and SWPPP for MLFRRF were submitted to MDE on July 16, 2019, and included in the FY19 MS4 Annual Report, Appendix G. In FY20, MDE subsequently conducted two unannounced compliance inspections at the MLFRRF and two announced compliance inspections at the Northern Recycling Center (NRC) and Southern Recycling Center (SRC) facilities.

*Bureau of Utility Operations Stormwater Pollution Prevention Plan Development and Implementation*

During this reporting period, Anne Arundel County's Bureau of Utility Operations (BUO) continued SWPPP implementation specific to the seven WRF facilities and the Utilities Operations Center site listed in **Error! Reference source not found.** (above). In support of the NOI and in compliance with the SWPPP, staff perform monthly inspections, quarterly dry weather inspections, quarterly wet weather inspections, annual comprehensive site inspections, annual record review, and annual training to ensure compliance. Records are maintained at each facility.

***b. The County shall continue to implement a program to reduce pollutants associated with maintenance activities at County-owned facilities including parks, roadways, and parking lots. The maintenance program shall include these or MDE-approved alternative activities:***

***i. Street sweeping;***

**Status:**

Anne Arundel County's street sweeping program is intended to provide a continuous level of street cleanliness while keeping debris (including litter and floatables) and pollutants out of storm drains, creeks, rivers and ultimately the Chesapeake Bay.

The County's neighborhood streets are relatively clean because of the work of conscientious residents who assist us by keeping the areas in front of their homes free of litter and debris. Residential streets were not included in the County's program for routine street sweeping during the reporting period. Roads with higher traffic volumes are prioritized to maximize collection. The primary focus of the County's street sweeping program is on main thoroughfares (arterial roads, local and collector streets, roads with high traffic volume), business parks and industrial areas, County park-and-ride lots, NPDES priority areas, and facility parking lots subject to SWPPP implementation. These areas were scheduled for twice-monthly street sweeping.

During Fiscal Year 2020, the County swept 6,654 curb miles, which equates to 554 curb miles per month – the same as the last reporting period. Accomplishments may vary 5% annually depending on disposal costs and other factors. The current funding level supports sustainable accomplishment of approximately 6,800 curb miles annually, a 40% increase over FY16 levels. This contracted street sweeping program collected more than 391 tons of material from County-maintained streets in FY20.

***ii. Inlet inspection and cleaning;***

**Status:**

Anne Arundel County BOH conducts manual and mechanical storm drain inlet cleaning throughout the County. For FY20, the County manually cleaned and removed debris from catch basins, inlets, and outlets of pipes to maintain proper drainage for 6,637 structures. This is a 35% increase from the previous reporting period in which 4,932 structures were cleaned by hand.

In addition, the County inspects catch basins, manholes, and associated pipes to identify structures for cleaning with a sewer vacuum or power rodder. A total of 2,237 structures required cleaning with a sewer vacuum, a decrease of 44% from the last reporting period in which 3,987 were cleaned with a sewer vacuum. A total of 88,756 linear feet of pipe were cleaned, a decrease of 26% from the last reporting period in which 120,752 linear feet were cleaned.

*Ditch & Curb-line Cleaning*

During the reporting period, the County cleaned and removed debris from roadside inlet and outlet ditches and concrete swales, removed leaves from ditch lines and curbs using a leaf vacuum, and cleaned and reshaped roadside ditches by machine for a total of 129,747 feet during the reporting period. This is a decrease of 28% from the last reporting period in which the County cleaned 180,217 feet. Year-to-year variability in linear feet of ditch and curb-line cleaning is routinely around 30%.

***iii. Reducing the use of pesticides, herbicides, fertilizers, and other pollutants associated with vegetation management through increased use of integrated pest management;***

**Status:**

*Pesticides & Herbicides*

Anne Arundel County makes a financial contribution annually to support Maryland Department of Agriculture (MDA) programs for gypsy moth control (http://mda.maryland.gov/plants-pests/Pages/gypsy_moth_program.aspx) and mosquito control (http://mda.maryland.gov/plants-pests/Pages/mosquito_control.aspx). The County does not maintain information regarding the quantity of materials used by these State programs.

Herbicide use associated with road maintenance performed by the BOH is limited to the application of glyphosate (e.g., Roundup ™) on County rights-of-way to control vegetative growth around guardrails, concrete structures, and prior to crack sealing operations in the traveled portion of the roadway. A total of 30 gallons of glyphosate was used during the reporting period. This is a 14% decrease over the previous reporting period in which a total of 35 gallons was applied. The change can be largely attributed to the total number of application cycles scheduled during the reporting period. The BOH recorded no other herbicide, pesticide, or fertilizer application.

The BOH employs a contractor who holds a Pest Control Applicator Certificate. The applicator categories are 3A - Ornamental, 3C - Turf, and 6 - Right-of-Way. The contractor is required to attend re-certification training per MDA guidelines to include Integrated Pest Management and pesticide safety. Each time there is chemical use, a pesticide report is completed and filed, which is available to be reviewed during MDA's biennial inspection.

Anne Arundel County Recreation and Parks (AACRP) is committed to providing parks with pest-free environments through the implementation of preventive methods, integrated pest management (IPM), and chemical strategies when necessary. Because AACRP properties, facilities, and programs are often contiguous physically, programmatically, geographically, and operationally to Anne Arundel County Public School properties, it was deemed imperative that there be a high degree of standardization, commonality, and uniformity in pest management philosophy. As such, AACRP Turf Division has reported using the compounds listed in Table 12 at AACRP properties during FY20.

**Table 12. Herbicides Used at AACRP-Managed Properties During FY20**

| Trade Name | Active Compounds | Units | Total Amount Applied |
|---|---|---|---|
| Ranger Pro | Glyphosate (41%) – 2 oz/gal | Gallon | 136 |
| Finalsan Organic | Ammonium soap of fatty acids (22.10%) | Gallon | 100 |

Anne Arundel County Facilities Maintenance Division (FMD), Horticulture Unit, maintains landscaping on County properties including all Administrative Buildings, Libraries, Police and Fire Stations, Senior Centers, and Health Centers throughout the County. In Table 13, the herbicides and fertilizer quantities used by the FMD Horticulture Unit are reported for FY20.

**Table 13. Herbicides and Fertilizers Used by the FMD Horticulture Unit During FY20**

| Trade Name | Active Compounds | Units | Total Amount Applied |
|---|---|---|---|
| Ortho GroundClear | Glyphosate (2.97%), Imazapyr (0.47%) | Gallon | 30 |
| Monsanto RoundUp Pro liquid | Glyphosate (50.2%) | Gallon | 4 |
| Monsanto RoundUp QuickPro –granular | Glyphosate (73.3%), Diquat dibromide (2.9%) | Pounds | 81.6 |
| Garlon 3A Herbicide | Triclopyr triethylamine salt (44.4%) | Gallon | 5 |

| Trade Name | Active Compounds | Units | Total Amount Applied |
|---|---|---|---|
| Liquid | | | |
| Lesco Prosecutor – granular | Glyphosate (41%) | Pounds | 6 |
| SedgeHammer granular | Halosulfuron-methyl, methyl 3-chloro-5-(4,6-dimethoxypyrimidin-2-ylcarbamoylsulfamoyl)-1-methylpyrazole-4-carboxylate (75%) | Ounces | 1.6 |
| Lesco sprayable fertilizer 20-20-20 | Total Nitrogen (N; 20.00%) Nitrate Nitrogen (5.98%), Ammoniacal Nitrogen (6.00%), Urea Nitrogen (8.02%), Available Phosphate ($P_2O_5$; 20.00%), Soluble Potash ($K_2O$; 20.00%) | Pounds | 30 |
| Lesco granular fertilizer 24-0-11 | PolyPlus (50%), Fe (2%), Mn (1%) | Pounds | 500 |

Landfills and recycling centers managed by WMS do not use herbicides to control unwanted woody and herbaceous vegetation. Weeds and other problematic vegetation at these facilities are removed almost entirely by physical and mechanical means. Occasionally, however, limited application of herbicide (RoundUp, active ingredient Glyphosate) is used around the WMS Administrative Building and parking lot. WMS recorded one gallon of herbicide application in FY20. In addition, fertilizer use on WMS properties such as the side slopes to Cell 9 or the Cell 567 capping project are limited to only when grass needs nutrients to encourage proper growth that helps with the prevention of soil erosion and limits runoff.

WMS employs a contractor who holds a Pest Control Applicator Certificate. Pesticides are applied indoors at WMS facilities and outside around buildings. In FY20, outside pesticide use was approximately 195.52 grams of active pesticide ingredients. Active ingredients for outside use include Bifenthrin (0.358 grams), Bromadiolone (0.194 grams), Orthoboric Acid (193.370 grams), Brodifacoum (0.033 grams), Zinc Phosphide (1.417 grams) and Cyfluthrin (0.142 grams). Each time there is a chemical application, a pesticide report is completed and filed.

*Integrated Pest Management (IPM)*

The maintenance plan for all FMD properties and rights-of-way includes IPM. Key elements include the following:

- Use of herbicides only when pulling or cutting weeds have not proven effective;
- Use of insecticides only when natural methods have not proven effective;
- Elimination of fertilizer use, proper use of hand weeding and mulching, and sparing use of herbicides on roadway medians;
- Limiting fertilizer use on FMD properties, and using only when grass needs nutrients to encourage proper growth that helps with the prevention of soil erosion and limits runoff;
- Selecting disease- and insect-resistant plants for new plantings; and
- Selecting the least toxic product available, using appropriate storage facilities and techniques, and compliance with all applicable laws and regulations.

During the reporting period, the AACRP continued implementation of an IPM program for County parks and athletic facilities. The IPM plan is required pursuant to County legislation that became effective July 1, 2013, and that modified Article 14 of the County Code by adding §14-1-105 (Integrated Pest Management Plan). The updated Article 14 of the County Code can be found online at http://www.aacounty.org/our-county/county-code/index.html. Pursuant to this legislative requirement, the public is provided prior notification of pesticide application at Recreation and Parks public facilities. Key elements of the IPM program at AACRP facilities include the following actions:

- Minimize the amount and toxicity of pesticides used in the park facilities;
- Eliminate unnecessary pesticide applications;
- Provide IPM education to the public, park users and park staff;
- Improve landscape and grounds cleanliness;
- Utilize only Licensed, Certified and Registered Technician pesticide applicators;
- Reduce or eliminate exposure of children, vulnerable adults, nursing mothers with infants and pets to pesticide applications; and
- Provide universal public and staff notification.

***iv. Reducing the use of winter weather deicing materials through research, continual testing and improvement of materials, equipment calibration, employee training, and effective decision-making; and***

**Status:**

*Snow and Ice Control*

The amounts of de-icing chemicals used by the County BOH during FY20 are found in Table 14. De-icing chemical data for the four previous reporting periods are provided as a comparison. The quantity of de-icing chemicals used each year is highly variable because it is based on actual winter weather conditions including precipitation type, precipitation frequency, and factors such as road surface temperature.

**Table 14. De-Icing Material Applied by the Bureau of Highways, Fiscal Years 2014–2020**

| Material | 2015–2016 | 2016–2017 | 2017–2018 | 2018-2019 | 2019-2020 |
|---|---|---|---|---|---|
| Road Salt (tons) | 11,318 | 5,361 | 17,420 | 12,760 | 982 |
| Liquid Salt Brine (gal.) | 71,500[a] | 139,000[a] | 142,850[a] | 133,500[a] | 40,400[a] |
| Total Salt (tons) | 11,390 | 5,500 | 17,563 | 12,894 | 1,022 |
| Liquid Calcium Chloride (gal.) | 6,578[b] | 1,046[b] | 2,900[b] | 432[b] | 0[b] |
| NWS Snow Totals – BWI (in.) | 35.1[c] | 3.0[c] | 15.4[c] | 18.3[c] | 1.8[c] |
| NWS Avg. Winter Temp (°F) | 39.4 | 40.5 | 36.4 | 37.5 | 43.0 |

[a] One ton of rock salt produces 1000 gallons.
[b]Average winter temperature at BWI Thurgood Marshall Airport is 35.1 degrees per the National Weather Service (NWS). Calcium Chloride depresses the freezing point and is used more extensively during colder periods to prevent ice formation and to deice road surfaces. Increased use is likely when average temperature is near or below freezing, or in cases of ice and heavy snowfall.
[c] Average long-term annual snowfall total at BWI Thurgood Marshall Airport is 20.1 inches per the National Weather Service (NWS). Winter 2019-2020 snowfall total at BWI was 1.8 inches. Below-normal snowfall, moderate temperatures, anti-icing, and sensible salting practices partially offset two additional salting events and an ice event in 2019-2020; this resulted in a decrease in salt use from that recorded in the 2018-2019 winter season.

In 2014, subsequent to the promulgation of a Statewide Salt Management Plan, the County's BOH developed the Department of Public Works Salt Management Plan to outline the practices intended to effectively manage road salt for winter maintenance activities within the County. The Salt Management Plan is organized into the following areas:

- Winter maintenance policies;
- Trends and data analysis;
- Materials ordering, delivery, storage, handling and record keeping;
- Equipment upgrading, calibration and washing;
- Snow and ice control training;
- Weather forecasting, storm response, environmentally sensitive areas;
- Technology review; and
- Public outreach and education.

Near-Term Goals incorporated in the Salt Management Plan include:

- *Winter Maintenance Policies:* The Department has established level of service and maintenance standards which have been generally accepted by the community at large. These policies form the foundation for program delivery and can have a significant effect on the environment. The goal is to review the various departmental standards relating to the winter maintenance program and seek endorsement for the level of service and maintenance policies.
- *Record Keeping:* One of the keys to an effective winter maintenance program is to place the right amount of material in the right place at the right time. At the present time, the record of material usage is tracked manually and reconciled with the residual inventory but should be enhanced to document salt usage by route, by vehicle, and by storm.

- *Winter Maintenance Training:* A thorough understanding of good housekeeping practices, the measures of snow and ice control and the expectations of program delivery will result in a greater probability of success with the salt management plan. For this reason, it is essential that all staff involved with winter operations be provided with Winter Maintenance and Operations Training.
- *Communications:* The goal in this area is to communicate the Department's winter maintenance program and salt management initiatives to staff and to the public. The prime focus in this area will be to increase public awareness in the role of de-icing materials in snow and ice control through the development of appropriate information on the Department's webpage.
- *GPS Upgrade:* It is recommended that the Snow Operations fleet be upgraded by installing an Automated Vehicle Location system (AVL). Strategic and tactical decision making during a storm response, informed by an AVL system, improves effectiveness, resource allocation, and potentially reduces storm response duration. The GPS data provided by an AVL can assist with the analysis of complaints, trouble spots, and claims against the County. This is possible because the location of a truck can be pinpointed in time throughout the storm with a high level of accuracy.

Longer Term Goals identified in the Salt Management Plan include:

- *Equipment Upgrading:* It is intended that the winter maintenance fleet be capable of delivering appropriate levels of de-icing materials within a full range of climatic conditions. The most cost-effective way of fleet upgrading is to consider changes as vehicles within the fleet come up for replacement. In this regard, as the salt spreader fleet comes up for replacement within the County's heavy equipment replacement program, the vehicles are to be equipped with electronic controllers, infrared thermometers and pre-wet capabilities. The equipment upgrades will improve the capability of placing the right amount of de-icing material in the right place, at the right time and allow for an increased level of data collection which, in turn leads to more effective use of salt.
- *Environmentally Sensitive Areas:* Concentrations of chloride in the environment can have negative environmental impacts and the Statewide Salt Management Plan suggests a program to assess the levels of impact due to winter maintenance. Initially, the environmentally sensitive areas can be identified and ranked starting with the most vulnerable areas (highest ranked); a monitoring program can be developed, where appropriate, to explore the level of impact resulting from the County's winter maintenance practices. Over time, where appropriate, action plans are to be developed to reduce the chloride impacts on the environment.

In 2019–2020, the BOH continued its efforts to reduce the use of winter weather de-icing materials through application of best practices and improvement of materials, equipment calibration, employee training, and effective decision making. The County issued contracts to continue a County-wide anti-icing program during the 2019–2020 season, procured additional heavy-duty dump trucks equipped with the latest spreader controller technology and on-board liquid application capability, and continued to equip its plow fleet with AVL tracking hardware to monitor and optimize snow removal operations.

The BOH continued its use of a maintenance decision support system (MDSS), which uses real-time data from our Road Weather Information System (RWIS). The RWIS system is a series of pavement and bridge deck sensors and other instruments installed along certain County-owned bridges and roadways. The integration of RWIS data into an MDSS allows the management team to select the most appropriate winter treatment for actual weather conditions in each area of the County during a winter storm event. Studies have shown use of an MDSS can help reduce the use of de-icing chemicals.

Annual training on proper snow plowing techniques and safety is also offered to both County and contractor personnel responsible for maintaining the County's roadways during inclement winter weather. The training includes information on the application of de-icing products and proper application rates. Training sessions are held in October and November each year. Approximately 150 County personnel and 115 contractors attended the training sessions in FY20.

These training sessions present the concept of "Sensible Salting" to all winter operations personnel (County and contractors). "Sensible Salting" training creates an awareness of the need to protect the environment and is another way of saying "Enough and no more." Sufficient salt is required to produce the desired safety and mobility to achieve the level-of-service goal. "Excess" applications add cost but no further benefit, and harm the environment.

The Sensible Salting Practices include:

- Limited Salting During the Late Evening/Early Morning Hours (11:00 p.m. – 4:00 a.m.): During these hours, salting is not as effective due to low traffic volumes. In the late evening/early morning hours, the goal is to ensure passable roads which means only intersections, hills, curves, and bridges will be salted. Beginning at 4:00 a.m., the BOH prepares the roads for rush hour.
- Limited Salting on Secondary Roads: Secondary Roads (local streets) will be plowed as often as possible, but will only be salted at intersections, hills, curves, bridges, and school zones. "Spot Salting" will also be used when necessary.
- Proper Calibration of Equipment: All equipment will be calibrated to ensure that desired application rates are applied correctly and over-salting is avoided.

Activities at WMS facilities also require the use of de-icing materials, however, in FY 20, no bulk salt was used. The amount of bagged de-icer (mixture of sodium chloride, magnesium chloride, calcium chloride, and potassium chloride) used at each facility in FY20 was as follows:

- Millersville Landfill and Resource Recovery Facility & Central Recycling Center – 1,500 pounds;
- Northern Recycling Center – 2,000 pounds; and
- Southern Recycling Center – 500 pounds.

The County's BUO and the Utility Operations Center relies on BOH to ensure access roads to treatment facilities are plowed and remain open during the winter months. As such, no winter weather de-icing material usage is actively tracked by this Bureau.

***v. Ensuring that all County staff receive adequate training in pollution prevention and good housekeeping practices.***

**Status:**

The BOH held quarterly staff training sessions with Road District personnel during the reporting period to support SWPPP implementation, as summarized in **Error! Reference source not found.**.

**Table 15. SWPPP Training Summary for Bureau of Highways Facilities in FY20**

| Training Number | Training Location | Training Date | # Attendees | Training Session Topic |
|---|---|---|---|---|
| 19436726 | 1310ND | 08/23/2019 | 19 | Topic #1: When it Rains it Drains |
| 19436746 | 1310NM | 09/23/2019 | 18 | Topic #1: When it Rains it Drains |
| 19429437 | 1312SD | 08/07/2019 | 19 | Topic #1: Stormwater Pollution Prevention Plan & Good House Keeping |
| 19429429 | 1311CO | 08/27/2019 | 11 | Topic #1: Sediment Control |
| 119427032 | 1311CC | 07/09/2019 | 13 | Topic #1: After The Storm |
| 19429435 | 1311CS | 08/13/2019 | 11 | Topic #1: After The Storm |
| 19436729 | 1310ND | 11/25/2019 | 17 | Topic: Sediment Control |
| 19450748 | 1312SD | 11/01/2019 | 27 | Topic: Stormwater Pollution Prevention Plan & When it Rains, it Drains. |
| 19429447 | 1311CO | 11/22/2019 | 15 | Topic: Monitoring and Inspections |
| 19429450 | 1311CC | 11/22/2019 | 8 | Topic: When it Rains it Drains |
| 19429451 | 1311CS | 11/07/2019 | 9 | Topic: Good House Keeping |
| 19436748 | 1310NM | 11/26/2019 | 19 | Topic: Sediment Control |
| 19436750 | 1310NM | 03/13/2020 | 14 | Topic: Stormwater to Drinking Water |
| 19429457 | 1311CO | 02/10/2020 | 12 | Topic: When it Rains it Drains |
| 19429461 | 1311CC | 02/20/2020 | 10 | Topic: Potential Pollutant Sources and Control Measures |
| 19435448 | 1312SD | 02/06/2020 | 15 | Topic: When it Rains it Drains & Good House Keeping |
| 19436751 | 1310NM | 05/26/2020 | 14 | Topic: What Happens When it Rains? |
| 19436730 | 1310ND | 02/12/2020 | 16 | Topic: Stormwater to Drinking Water Process |
| 19429733 | 1311CO | 05/15/2020 | 9 | Topic: Secondary Containment |
| 19429737 | 1311CC | 05/14/2020 | 10 | Topic: Monitoring and Inspections |
| 19435727 | 1312SD | 05/20/2020 | 15 | Topic: Stormwater Pollution Plan? When it Rains it Drains |
| 19429739 | 1311CS | 06/05/2020 | 20 | Topic: Our Stormwater Pollution Plan |
| 19436744 | 1310ND | 05/26/2020 | 18 | Topic: What Happens When it Rains? |

The County's WMS staff continued their training on stormwater pollution prevention with formal SWPPP training sessions held in February, March, May, and June 2020, as summarized in Table 16 below.

**Table 16. SWPPP Training for Bureau of Waste Management Services in FY20**

| Training Date | # Attendees | Course Title |
|---|---|---|
| 2/28/2020 | 10 | Spill Response Non-Emergency HAZMAT SWPPP Annual Training (NRC) |
| 3/11/2020 | 19 | Spill Response Non-Emergency HAZMAT SWPPP Annual Training (MLFRRF) |
| 5/22/2020 | 8 | Spill Response Non-Emergency HAZMAT SWPPP Annual Training (SRC) |
| 6/24/2020 | 11 | Spill Response Non-Emergency HAZMAT SWPPP Annual Training (CRC) |

The BUO conducted SWPPP staff training sessions at the WRFs and Utility Operations Center facilities as summarized in Table 17 below.

**Table 17. SWPPP Training for Bureau of Utility Operations in FY20**

| Training Date | # Attendees | Course Title |
|---|---|---|
| 11/18/2019 | 11 | SWPPP Annapolis WRF |
| 11/1/2019 | 7 | SWPPP Broadneck WRF |
| 6/30/2020 | 8 | SWPPP Broadwater WRF |
| 5/6/2019 | 12 | SWPPP Cox Creek WRF |
| 6/12/2019 | 5 | SWPPP Maryland City WRF |
| 9/5/2019 | 6 | SWPPP Patuxent WRF |
| 9/5/2019 | 6 | SWPPP Piney Orchard WRF |
| 7/16/2019 | 9 | SWPPP Training: Utility Operations Center |
| 10/14/19 | 2 | SWPPP Training: Utility Operations Center |

### *6. Public Education*

***Anne Arundel County shall continue to implement a public education and outreach program to reduce stormwater pollutants. Outreach efforts may be integrated with other aspects of the County's activities. These efforts are to be documented and summarized in each annual report. The County shall continue to implement a public outreach and education campaign with specific performance goals and deadlines to:***

***a. Maintain a compliance hotline or similar mechanism for public reporting of water quality complaints, including suspected illicit discharges, illegal dumping, and spills.***

**Status:**

The Department of Inspections & Permits maintains a 24-Hour Environmental Hotline for citizens to report environmentally related complaints including critical area violations, spills, and illegal dumping into the County storm drain system. The Hotline has been in existence since 1988 and has been advertised in numerous ways including the County Inspections and Permits webpage: www.aacounty.org/departments/inspections-and-permits/index.html. In August of 2017, the Hotline number was changed. The current number is 410-222-7171.

In addition to the 24-hour environmental hotline, the County webpage provides a link for citizens to submit on-line requests for investigation of environmental concerns or any other observation or issue of concern: https://www.aacounty.org/services-and-programs/report-a-concern. This on-line reporting interface is in addition to the options for reporting concerns and issues through the mobile app SeeClickFix.com© (SeeClickFix,Inc., 2008-2017) or by dialing 311 (Mon–Fri from 8:00 to 4:30) to reach a County customer service representative. The County is committed to customer service and promptly responds to reported concerns.

In August of 2018, the County implemented a new complaint management system whereby complaints received via the above reporting mechanisms are entered into a database based on one of three major categories (Building, Environment, or Zoning) and assigned to one of numerous subcategories within each major category (e.g., Illegal Discharges is an Environmental subcategory). The complaint is then assigned to an inspector for follow-up and enforcement action, all of which is documented within the database. Information on complaints received and the subsequent actions taken can be viewed via the County's Inspections and Permits webpage by clicking on the hot link "Code Compliance Database" found on the right side of the webpage. This link takes you to: https://www.aacounty.org/departments/inspections-and-permits/code-compliance/review-system/index.html where case information can be searched by address, Tax ID, or Case ID number. Of note, the Case ID for all environmental complaints begins with "E" followed by the calendar year opened (e.g., 2020).

During this reporting period, 553 building and 1,151 environmental complaints were documented via the compliance database. The environmental concerns included illegal discharges (34 complaints), stormwater management issues (15 complaints), grading without a permit (219 complaints), and general drainage concerns (74 complaints) among other subcategories.

***b. Provide information to inform the general public about the benefits of:***

***i. Increasing water conservation;***
***ii. Residential and community stormwater management implementation and facility maintenance;***
***iii. Proper erosion and sediment control practices;***
***iv. Increasing proper disposal of household hazardous waste;***
***v. Improving lawn care and landscape management (e.g., the proper use of herbicides, pesticides, and fertilizers, ice control and snow removal, cash for clippers, etc.);***

***vi. Residential car care and washing; and***
***vii. Proper pet waste management.***

**Status:**

The County continues to provide residents with relevant information to make informed decisions regarding water quality issues and environmental stewardship. Several County departments have public education and outreach programs tailored to their specific discipline. In some cases, education and outreach occurs through organizations in partnership with the County. Examples of some of the outreach activities are described in this section of the report.

**Bureau of Watershed Protection and Restoration**

To increase stormwater pollution awareness throughout Anne Arundel County, the Bureau of Watershed Protection and Restoration (BWPR) has developed a comprehensive education and outreach program.

**BWPR Internet Resources**
A major component of this initiative was the development of the BWPR's webpage (www.aarivers.org) to provide residents with an overview of the BWPR program and stormwater fee, environmental restoration plans, watershed assessments and information about stormwater pollution in general. The webpage also provides links to other County departments such as Utilities for water conservation tips and Inspections and Permits for stormwater management and Chesapeake Bay Critical Area information. Below is a listing of BWPR's public facing resources:

- **BWPR Annual Reports** – BWPR's FY annual report summarizes the watershed protection and restoration actions initiated by the BWPR and our partners and the fiscal resources used to implement those actions.
    - https://www.aacounty.org/departments/public-works/wprp/annual-reports/index.html
- **Financial Assurance Plan** - This report constitutes Anne Arundel County's financial assurance plan, required by MDE per State regulations, identifying actions that will be required of the County to meet the requirements of its NPDES MS4 permit along with projected annual and 5-year revenues or other funds that will be used to meet the impervious surface restoration plan requirements of its NPDES MS4 permit.
    - https://www.aacounty.org/departments/public-works/wprp/financial-assurance-plan/index.html
- **Frequently Asked Questions** – Addresses common questions residents may have about the BWRP and the Watershed Protection and Restoration Fee (WPRF).
    - https://www.aacounty.org/departments/public-works/wprp/frequently-asked-questions/index.html
- **WPRF Credit Program** – Explains how eligible property owners in Anne Arundel County have the opportunity to reduce their WPRF assessments by up to 50% for proactive and sustainable uses of stormwater runoff controls.

    - https://www.aacounty.org/departments/public-works/wprp/wprf-credit-program/index.html
- **Stormwater Property Tax Credit Program** - Residential and commercial property owners can receive a credit on their property taxes by installing and maintaining stormwater treatment practices. It provides for a reduction in County property taxes for qualified stormwater improvements.
    - https://www.aacounty.org/departments/public-works/wprp/stormwater-property-tax/index.html
- **WPRF Appeal Program** – The WPRF Appeal Program is intended for property owners who feel that they have been billed in error.
    - https://www.aacounty.org/departments/public-works/wprp/wprf-appeal-program/index.html
- **BWPR Highlighted Projects** – Shows in-depth details about some of the restoration projects that are currently underway in the County. This is not an exhaustive list of projects.
    - https://www.aacounty.org/departments/public-works/wprp/restoration/WPRP_Projects
- **BWPR Restoration Project Interactive Map** – Shows the location and status of all BWPR programmed restoration projects. Also includes status of non-County projects which includes NGO, private, and Maryland State Highway Administration restoration projects.
    - http://annearundelmd.maps.arcgis.com/apps/webappviewer/index.html?id=e7e7fb6733e448a8809938140bed9e18
- **WPRF Mapping Application** – Interactive map shows the specific WPRF for each parcel in the County. Residents can also identify impervious surfaces on their property.
    - https://gis.aacounty.org/portal/apps/webappviewer/index.html?id=ee7d5336874541df8e65b082f2dc4c33
- **BWPR Watershed Application** – Interactive map identifying environmental information regarding watershed studies, stream assessment survey, as well as subwatershed and stream priorities for restoration and preservation.
    - http://gis-world3.aacounty.org/HTML5Viewer/index.html?viewer=WPRP
- **BWPR Goals Dashboard** – Shows the number of completed and anticipated projects by type. Also shows progress of impervious surface attainment goal.
    - https://www.aacounty.org/departments/public-works/wprp/WPRP_Goals
- **Targeted Biomonitoring** – The Anne Arundel County Bureau of Watershed Protection and Restoration's Ecological Assessment & Evaluation Program routinely collects biological, habitat, and geomorphological data from local streams as part of a long term targeted biological monitoring program. The sample sites are located on reaches of interest where certain stream restoration activities have occurred or are planned for the future.
    - https://www.aacounty.org/departments/public-works/wprp/targeted%20biomonitoring/index.html
- **TMDL Restoration Plans** - BWPR has developed several restoration plans to address certain local water quality impairments for watersheds with an approved Total Maximum Daily Loads (TMDL) issued by the Maryland Department of the Environment (MDE) and approved by the U.S. Environmental Protection Agency (EPA). This also includes progress reports as required by the MDE.

    - https://www.aacounty.org/departments/public-works/wprp/watershed-assessment-and-planning/chesapeake-bay-tmdl/index.html
- **NPDES MS-4 Permit** – Includes a link to the current Anne Arundel County NPDES-MS4 permit and all annual reports as required by MDE.
    - https://www.aacounty.org/departments/public-works/wprp/npdes-ms4-permit/index.html
- **Education and Outreach** – This section is for educating and motivating students, homeowners, and other stakeholders to take positive personal actions and work together for greater impact. Topics range from watershed identification, understanding impacts of stormwater, responsible boating, and actions residents can take to help minimize stormwater pollution.
    - https://www.aacounty.org/departments/public-works/wprp/education-outreach/index.html
- **Waterfront Homeowners Guide** - Anne Arundel County is lucky to have over 533 miles of shoreline. This resource outlines opportunities for waterfront homeowners to protect and enhance their waterfront properties and outlines their responsibilities in regard to the Critical Area Law.
    - https://www.aacounty.org/departments/public-works/wprp/waterfront-homeowners/index.html
- **BMP Maintenance** – Highlights a selection of typical stormwater BMPs found in the region and suggested maintenance actions to keep BMPs functional to ensure water quality is protected.
    - https://www.aacounty.org/departments/public-works/wprp/bmp_maintenance/index.html
- **Watershed Studies** - Since 2002, the County has conducted systematic and comprehensive assessments of the County's watersheds. These assessments were conducted to assess current water quality conditions and prioritize the County's streams and subwatersheds for restoration and preservation to improve the conditions of the County's watersheds.
    - https://www.aacounty.org/departments/public-works/wprp/watershed-assessment-and-planning/watershed-studies/index.html
- **Biological Monitoring** - In 2004, Anne Arundel County initiated a County-wide Aquatic Biological Monitoring Program. The County program is based upon the Maryland DNR MBSS program, scaled down to a County level. The program is structured such that all major watersheds of the County are sampled in a 5-year period.
    - https://www.aacounty.org/departments/public-works/wprp/ecological-assessment-and-evaluation/biological-monitoring/index.html
- **Illicit Discharge Detection & Elimination** – Examines the County's Illicit Discharge Detection & Elimination Program and provides resources for residents to identify and report potential illicit discharges.
    - https://www.aacounty.org/departments/public-works/wprp/illicit-discharge/index.html
- **Storm Drain Marking Program** – The storm drain marking program allows the community to work together to protect our waterways. Volunteers apply educational messages on storm drains to remind residents that whatever goes into storm drains travels untreated to our creeks, streams, and rivers.

    - https://www.aacounty.org/departments/public-works/wprp/storm-drain-markers/index.html
- **Explore Your Watershed** - Anne Arundel County consists of 12 primary watersheds and hundreds of sub-watersheds and all of them discharge directly into the Chesapeake Bay. Residents can learn about the specific watershed they live in.
    - https://www.aacounty.org/departments/public-works/wprp/watersheds/index.html
- **Science of Stormwater** - Many people believe that stormwater is "clean" and that it does not harm water quality. This perception is understandable since the amount of pollution from any one spot is not usually significant by itself. This resource explains how stormwater pollution occurs, where it goes, and how to minimize sources of pollution.
    - https://www.aacounty.org/departments/public-works/wprp/science-of-stormwater/index.html
- **Reduce Stormwater Pollution at Your Home** – Explains simple things property owners can do around their home and yard to help reduce the flow of stormwater pollution to the Bay. Strategies include: pet waste collection and disposal, proper lawn fertilization techniques and alternatives, rainwater collection methods, septic tank maintenance, proper household waste disposal options and alternatives, bay-friendly car maintenance tips, and responsible boating tips.
    - https://www.aacounty.org/departments/public-works/wprp/think-bay/index.html
- **Responsible Boating** - While most boaters appreciate the natural resources that abound in the watersheds in which they recreate, many are unaware of the impacts boating can have upon those resources.
    - https://www.aacounty.org/departments/public-works/wprp/clean-boating/index.html
- **Rhode River Bacteria Brochure** – A brochure was distributed to marinas on the Rhode River relating to bacteria pollution. The brochure was targeted to boaters to explain how boating can contribute to bacteria issues in the river.
    - https://www.aacounty.org/departments/public-works/wprp/education-outreach/Bacteria_Handout_FINAL_2.pdf

In addition to the BWPR webpage, several social media outlets including Facebook (https://www.facebook.com/aawprp) and Twitter (https://twitter.com/AAWPRP ), are used to help educate residents about water quality issues and to provide an avenue for timely updates of restoration projects, educational materials, links to local watershed groups, and relevant articles. These social media sites are updated daily and provide residents with an outlet to discuss local stormwater issues and allow the BWPR to continually educate residents about the program.

**BWPR in the Community**

The BWPR strives to keep residents apprised of current accomplishments of the program. One of the most effective ways to communicate those milestones is through the local media. Below are some select articles about the BWPR that were published during the reporting period:

- "Anne Arundel Awards Over $3 Million for Shoreline Restoration" June 9, 2020 Maryland Association of Counties, https://bit.ly/2G7BDPV; and

- "Anne Arundel County Public works recognized for environmental excellence" August 31, 2019, Eye On Annapolis, https://bit.ly/34auXZk.

The following (**Error! Reference source not found.**) is a list of informational presentations and events in which the BWPR participated during the reporting period:

**Table 18. BWPR Outreach Events During FY20***

| Date | Organization/Event | Topic |
|---|---|---|
| 8/13/2019 | CBT Board | Innovative Stormwater Financing |
| 8/27/2019 | Tri-Con | Innovative Stormwater Financing |
| 8/28/2019 | Tri-Con | Full Delivery Contracting |
| 10/2/2019 | Tour - Utilities HQ | BMP Tour - AACC |
| 10/1/2019 | CBF | BWPR Field Tour |
| 10/12/2019 | AA WSA | BWPR Program |
| 10/21/2019 | AACC Students | Tour of Utility Operations BMPs |
| 10/24/2019 | Glenstone | Stream Restoration |
| 11/13/2019 | Community Meeting | Sagamore Stream Restoration & Mountain Estates Pond |
| 11/18/2019 | MSRA Conference | Stream Restoration Crediting |
| 12/2/2019 | National Governor's Assoc | Stormwater Spotlight for Delaware River Basin States |
| 12/11/2019 | CWEA Conference | MS4 Permit Future |
| 12/12/19 | ACEC Conference | Anne Arundel's Watershed Program |
| 1/9/20 | WSA | Stormwater Success Class |
| 1/22/20 | Monarch Academy | BWPR Program |
| 1/30/20 | Girl Scout | BWPR Program |
| 2/7/20 | MDE Bacteria TMDL Workgroup | Development of a Bacteria Monitoring Plan |
| 2/19/20 | ACEC Conference | TMDL Symposium |
| 2/22/20 | WSA Conference | Climate Resilience and Forest Conservation |
| 2/28/20 | MWMC Stream Monitoring Roundtable | Biological and Chemical Monitoring Activities for 2020 |
| 3/3/20 | BeaverCon | How Can Research on the Effects of Beaver Activity Inform Better Stream and Wetland Restoration Design? |
| 3/11/2020 | CBP Finance and Investment Forum | Nutrient Trading and Full Delivery |
| 3/11/2020 | South River Colony | Glebe Stream Project Details |
| 3/15/2020 | West Haven HOA- **CANCELLED** | Tolstoy Lane Project |
| 3/18/2020 | Community Meeting- **CANCELLED** | Broad Creek Restoration Project |
| 3/18/2020 | Community Meeting- **CANCELLED** | Beards Creek Restoration Project |
| 3/19/2020 | Community Meeting- **CANCELLED** | Susans Branch Restoration Project |
| 3/21/2020 | Davidsonville Green Expo - **CANCELLED** | BWPR Program |

| Date | Organization/Event | Topic |
|---|---|---|
| 3/23/20 | Community Meeting- **CANCELLED** | Forked Creek Restoration Project |
| 3/26/20 | Parker Creek Coalition- **CANCELLED** | BWPR Program |
| 4/16/19 | Towson Env Conference - **CANCELLED** | Stream and Wetland Restoration |
| 4/14/20 | GBIA-**CANCELLED** | Furnace Creek Restoration Project Update |
| 4/24/20 | Bodkin Elementary - **CANCELLED** | BWPR Program |
| 4/25/20 | Severna Park Earth Day - **CANCELLED** | BWPR Program |
| 5/21/2020 | MAREP via Zoom | Biological Monitoring Program |
| * Due to the COVID-19 pandemic, in-person community events were cancelled in an abundance of caution. | | |

In addition to the above public outreach events and meetings, BWPR Project Managers provide continuous updates to members in the communities where our restoration projects occur. In many cases, feedback from the local community is taken into account from the design process through construction.

**Watershed Restoration Grant Program**

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

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

Below ( Table 19) is a list of organizations that were awarded funding from Anne Arundel County for water quality restoration projects in 2020:

**Table 19. Projects Awarded BWPR Grant Funding in FY20**

| Organization | Project Description | Watershed | Funding Amount | Match Amount | Impervious Acres Treated |
|---|---|---|---|---|---|
| Ulmstead CIA | Ulmstead Community Park Rain Garden | Magothy River | $18,900 | $19,762 | 0.36 |
| Loch Haven Civic Assoc. | Loch Haven Beach Restoration/Living Shoreline | South River | $129,034 | $152,534 | 3.4 |
| Arundel Rivers Federation | Broad Creek/Camp Woodlands Stream Restoration | South River | $43,198 | $895,093 | 40.03 |
| Arundel Rivers Federation | Beards Creek/Annapolis Landing Outfall & Stream Restoration | South River | $349,312 | $503,504 | 33.36 |
| Severn Riverkeeper | St. Dixon / Central Sod Farm Restoration | Severn River | $242,567 | $320,995 | 1.02 |
| Severn River Association | West Severna Park Living Shoreline | Severn River | $32,277 | $12,226 | 1.14 |
| Arundel Rivers Federation | Broad Creek Park Stream Restoration | South River | $364,225 | $1,430,420 | 129.13 |
| | | **TOTAL** | **$1,179,513** | **$3,334,534** | **208.44** |

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

## Bureau of Utility Operations

The County BUO is tasked with providing safe, clean drinking water and to manage the collection and processing of wastewater in public service areas throughout the County. As such, a major aspect of the BUO outreach program focuses on water conservation.

Resources have been developed to promote water saving actions, including the distribution of toilet tank leak detection kits. In addition to leak detection, other water conservation tips include the use of commercial car washes, limiting or eliminating lawn watering, use of low-flow showerheads, and the use of rain barrels to harvest rainwater for use in gardens.

During the reporting period, the BUO attended numerous community events to promote water conservation and conducted tours of various County-operated water treatment plants and wastewater reclamation facilities (**Error! Reference source not found.**).

**Table 20. Bureau of Utilities Community Events and Tours in FY20***

| Date | Organization/Event | Topic |
|---|---|---|
| 8/16/2019 | National Night Out | Outreach Event |

| Date | Organization/Event | Topic |
|---|---|---|
| 9/13/2019 | AAC Fair | Outreach Event |
| 9/14/2019 | Riviera Beach Community | Outreach Event |
| 9/21/2019 | Emergency Preparedness EXPO | Outreach Event |
| 10/5/2019 | Odenton Day | Outreach Event |
| 10/7/2019 | Anne Arundel Community College | Facility Tour |
| 10/17/2019 | CAT North Open House | Outreach Event |
| 10/19/2019 | Family Fun Day - State Hwy Admin. | Outreach Event |
| 10/29/2019 | Magothy Middle School | Outreach Event |
| 11/2/2019 | STEM Day - Glen Burnie Library | Outreach Event |
| 11/8/2019 | Small Business Event | Outreach Event |
| 11/9/2019 | Blue Collar STEM Conference | Outreach Event |
| 11/12/2019 | AACC Science Night | Outreach Event |
| 11/21/2019 | OMMS STEM | Facility Tour |
| 12/7/2019 | Prince of Peace Church | Outreach Event |
| 1/30/2020 | Boy Scouts Troop 396 | Facility Tour |
| 3/7/2020 | Science & Engineering EXPO | Outreach Event |
| 3/18/2020 | Citizen Group Tour - **CANCELLED** | Facility Tour |
| 3/23/2020 | CAT North - **CANCELLED** | Facility Tour |
| 3/26/2020 | AACC Environmental Students - **CANCELLED** | Facility Tour |
| 3/31/2020 | AACC Environmental Students - **CANCELLED** | Facility Tour |
| 4/11/2020 | Trade School Fair - **CANCELLED** | Outreach Event |
| 4/18/2020 | National Junior Ranger Day - **CANCELLED** | Outreach Event |
| 5/13/2020 | MAMSA - **CANCELLED** | Outreach Event |
| 5/16/2020 | DPW Open House - **CANCELLED** | Outreach Event |
| 6/6/2020 | Cape St. Claire Strawberry Fest.- **CANCELLED** | Outreach Event |
| * Due to the COVID-19 pandemic, community events were cancelled in an abundance of caution. | | |

The BUO produces an "Annual Water Quality Report" as required by the Safe Drinking Water Act which summarizes the state of the County's drinking water sources and production methods. The reports are found on the BUO webpage and are mailed to all direct bill customers. More details can be found here: https://www.aacounty.org/departments/public-works/utilities/forms-and-publications/water-quality-reports/index.html

Sanitary Sewer Overflows caused by sewer system obstructions, damage, or flows in excess of sewer capacity can have a significant impact on local water quality. In FY19 BUO developed a tool that residents can use to view information about Sanitary Sewer Overflows that have occurred in the County. Details can be found here: http://bit.ly/33gVbrG. The BUO works in partnership with the Anne Arundel County Department of Health to notify the community when a Sanitary Sewer Overflow causes a closure to a local waterway.

With nearly 1,800 miles of sewer lines throughout its service area, BUO appreciates notification from the public if a sewer backup is suspected. Citizens are directed to call the 24-hour Emergency Services at 410-222-8400 at any time to report water or sewer emergencies in Anne Arundel County. BUO is committed to protecting the health of the public and the environment.

**Bureau of Highways**

The County BOH performs maintenance activities to keep the County's roads safe and in good condition. Among other things, the BOH is responsible for roadside maintenance, drainage maintenance, and snow removal.

Roadside maintenance is mainly performed by three Road Districts. Some examples of the services performed in County-maintained roadways include:

- **Litter/Debris Removal** - Help keep roadways, stormwater inlets, and ditches free of litter and debris. Litter and debris are picked up along all County-maintained roadways. Residents may request litter/debris removal within the County-maintained road right-of-way by contacting their local Roads District.
    - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Roadside_Maintenance/litterdebris-removal
- **Leaf Removal/Recycling** - Helps keep ditches and curblines free of leaves. The page explains relevant County services, and suggests opportunities for homeowners to manage leaves responsibly. Residents may request removal of leaves that have accumulated on County-owned roadways or ditches and are causing a hazard or blocking the flow of water by contacting their local Roads District.
    - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Roadside_Maintenance/leaf-removalrecycling

Drainage maintenance is performed by various divisions within BOH including Road Operations and Infrastructure Management. Some examples of the services performed in County-maintained roadways include:

- **Culvert & Closed Storm Drain Program** - The Bureau of Highways is responsible for the inventory, inspection, and maintenance of the County's culverts and closed storm drain systems. The Road Operations Division performs routine maintenance on these systems. The Infrastructure Management Division, inventories and inspects these systems via a programmed approach. There are approximately 85,000 components in the inventory at this time. These components include inlets, manholes, pipes, culverts and outfalls. Residents may request Storm Drain System Maintenance by contacting their local Roads District.
    - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/culvert--closed-storm-drain-program
- **Ditch/Curb and Gutter Cleaning** - By completing necessary ditch or curb and gutter cleaning work on County-maintained property, we are reducing sediment and debris traveling to the bay during periods of inclement weather. Keeping ditches and curblines free of debris also protects the citizen's investment in our infrastructure by ensuring that these structures do not overflow and cause stormwater to pond on roadways causing

safety issues and pavement damage. Residents may request Ditch/Curb and Gutter Cleaning by contacting their local Roads District.

  - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/ditchcurb-and-gutter-cleaning

- **Drainage Construction** - Construction of new drainage systems including inlets, pipes, headwalls, and/or placement of outfall protection on County-maintained property. By completing necessary drainage construction work on County-maintained property, we help control the flow of water and sediment into the bay. Residents may request Drainage Construction by contacting their local Roads District.
  - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/drainage-construction
- **Drain Pipe Cleaning** - Drainage pipes are critical to carry the flow of water under the road so that it may continue its natural drainage course. Pipe obstructions may result in flooding and/or damage to the roadway surface. Work under this activity includes cleaning and removing debris from pipes and flushing pipes using a power rodder to remove any obstructions. Residents may request Drain Pipe Cleaning by contacting their local Roads District.
  - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/drain-pipe-cleaning
- **Drain Pipe Repair/Replacement** - This work protects the citizen's investment in our infrastructure by preventing the undermining of roadways due to a failing pipe. Work in this activity includes the repair or replacement of pipes, depending on the degree of deterioration. This activity is scheduled throughout the year, however, in the presence of a safety hazard, work is scheduled when detected. Residents may request Drain Pipe Repair/Replacement by contacting their local Roads District.
  - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/drain-pipe-repair-and-replacement
- **Emergency Storm Drain Program** - The BOH is responsible for resolving flooding or water ponding problems that are caused by storm runoff from County-maintained roadways. Residents may request flooding and/or ponding assistance by contacting their local Roads District.
  - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/emergency-storm-drain-program
- **Erosion Control** - Repair of eroded areas caused by water coming from a County-owned or County-maintained road. To reduce water pollution and prevent erosion, we place material such as topsoil, jute mats, grass seed, rip rap, etc. on County-maintained property. Residents may request Erosion Control by contacting their local Roads District.
  - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/erosion-control
- **Rain Gardens** - Explains relevant County requirements and outlines opportunities for homeowners to use rain gardens to provide flood control, groundwater recharge, and water-cooling benefits, while removing many types of pollutants and other contaminants from stormwater runoff.
  - https://www.aacounty.org/services-and-programs/rain-gardens
- **Storm Drain Cleaning** - Cleaning of storm drain inlets on County-owned property reduces sediment traveling to the Bay. Work is completed on a rotating basis using a vactor

(vacuum) truck on approximately 25,850 inlets. Inlets are cleaned every 3 years with special attention given during and after rainfall events to insure proper drainage. Residents may request Storm Drain Cleaning by contacting their local Roads District.
    - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/storm-drain-cleaning
- **Storm Drain Repair** - Repair to storm drain inlets and manholes on County-maintained property reduces sediment traveling to the Bay. This work also protects the citizen's investment in our infrastructure by preventing deterioration of the road network due to consistent ponding on streets. In addition, road shoulders and side slopes are protected from erosion caused by the flow of uncontrolled water. Residents may request Storm Drain Repair by contacting their local Roads District.
    - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/storm-drain-repair
- **Stormwater Management Facilities** - The BOH currently manages the maintenance of approximately 700 County-owned stormwater facilities. These facilities generally serve single-family residential developments. Other BMP's found in apartment and townhome complexes, industrial and business centers, or in developments under construction are privately maintained. Services provided on County-maintained BMP's include mowing, inspection, and general maintenance of these devices. Residents may report a problem with a County-maintained BMP by contacting the Infrastructure Management Division (IMD). Inquiries regarding privately maintained BMPs should be directed to the Department of Inspections and Permits.
    - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/stormwater-management-facilities
- **Street Sweeping** - Anne Arundel County's street sweeping program is designed to keep debris out of storm drains, our creeks, rivers and ultimately the Chesapeake Bay. The list of roads included in the street sweeping program is available for viewing. Street sweeping data is shared on social media and in the BWPR Annual Report.
    - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/street-sweeping

Snow removal on County-maintained roads is performed by the BOH. The BOH is dedicated to ensuring the safety of the traveling public while providing timely service to our citizen and business communities during inclement weather by planning and executing its winter operation activities on more than 6,700 County-maintained roads and streets, and doing it in an environmentally friendly way.

De-icing materials are an effective tool for maintaining safe winter road conditions. However, the County is aware that excessive use can have negative impacts on the environment. Heavy use of road salts has been assessed to cause damage to vegetation, organisms in soil, birds and to other wildlife. Chloride ions from road salts find their way eventually into waterways, whether by direct runoff into surface water or by moving through the soil and groundwater. In surface water, road salts can harm freshwater plants, fish and other organisms that are not adapted to living in saline waters. The BOH strives to only apply as much salt as necessary to achieve safe driving conditions. Use of salt management data is shared on social media and in the BWPR Annual Report.

The County's winter de-icing strategy and resources are discussed in **Part IV.D.5.b** of this Annual Report, and are well explained on the County webpage at www.aacounty.org/departments/public-works/highways /snow-information/index.html. This webpage succinctly explains the County's efforts toward winter preparations, what citizens and business should expect during snow storms, what County citizens can do to help during inclement weather events, and general winter weather tips.

**Bureau of Waste Management Services**

The County's WMS is responsible for collecting recycling, yard waste and trash from over 162,000 curbside customers. This Bureau also is responsible for the operation of the Millersville Landfill and Resource Recovery Center and the County's three Recycling Centers.

The Recycling and Waste Reduction Division of WMS administers an extensive outreach program geared toward residential and commercial recycling and other source reduction strategies and promotes the proper disposal of household hazardous waste (HHW) materials.

Outreach pertinent to HHW disposal has been reported in previous annual reports and is also documented in the County's Litter and Floatables Comprehensive Plan **(Appendix F)**; a summary of events related to HHW is found in **Part IV.D.4**. of the Annual Report. Additional information on HHW disposal is available on the County's website at: https://www.aacounty.org/services-and-programs/household-hazardous-waste-drop-off-days.

The County's WMS typically holds six resident-only HHW collection events each year; however, 3 events were cancelled in FY20 due to the COVID-19 pandemic. The 3 events that were held accounted for the proper disposal of 107 tons of HHW, successfully keeping these materials out of our landfills, roadside ditches, storm drains, and waterways. These collection events are vital to keeping harmful toxins out of our landfill, and discourage the improper disposal of hazardous materials. All HHW materials collected at the events are packaged, transported, and disposed of by a licensed hazardous waste contractor.

WMS also provides information such as what can be recycled; ways to get recycling and composting bins; dealing with yard waste and grass cycling; source reduction; amounts recycled in different areas of the County; local events that promote recycling; and question-and-answer forums at outreach events, in County offices, through the County website (www.recyclemoreoften.com), and on the Anne Arundel County Recycling Division Facebook page (https://www.facebook.com/annearundelrecycling/). Since the program's inception in 2008, the County-wide recycling rate has increased from 31% to 40%.

**Department of Health**

The Anne Arundel County Department of Health has published a fact sheet series entitled "Health Matters" (see examples in 2014 Annual Report). These fact sheets are distributed at events run by the Department of Health. Information can also be found on their website (www.aahealth.org). Some of the subjects covered in the series include the following:

- Water quality and swimming or fishing in Anne Arundel County rivers and creeks;
- On-site sewage disposal systems and private water wells;
- Bay Restoration Fund (BRF) Program, for nitrogen-reducing pretreatment units for septic systems to be installed within the Chesapeake Bay Critical Area;
- Collapsed septic tanks, overflowing septic systems and failing septic systems interim health and safety requirements; and
- Application procedures for property improvements where well or on-site septic systems are utilized.

**Recreational Water Quality**

The Anne Arundel County Department of Health continues to publicize a seasonal water quality information line (410-222-7999) on the Department of Health's website (www.aahealth.org). The water quality information line alerts the public to current advisories and closures of recreational water as the result of sewage spills and bacterial exceedances from over 80 bathing beaches that the Department monitors from Memorial Day through Labor Day. The Department also promotes an e-alert system so an individual can be notified by e-mail when the Department has an advisory or closure of recreational waters. Individuals can sign up for the e-alert system on the Department of Health's website. In addition, water quality advisories are communicated via the Department's Facebook and Twitter pages. The Department continued to recommend no direct water contact for 48 hours after a significant rain event due to predicted elevated bacteria levels.

The Department of Health, in conjunction with MDE and the Maryland Department of Health and Mental Hygiene, promotes the Maryland Healthy Beaches campaign (www.marylandhealthybeaches.com). The campaign makes people aware of everyone's impact to the waterways in the State of Maryland. One of the campaign's major focus areas is the importance of picking up pet waste. In 2013, the Department of Health created a 'Beach Swimming Guide' on its website to keep the public abreast of recreational water quality in the County.

The Anne Arundel County Department of Health also issues a closure when a sewage spill, leak, or other problem indicates human waste has impacted the water. Subscribers to the Department's Recreational Water Quality E-mail Alerts receive an e-mail notifying them when County waterways are closed and reopened. Alerts can also be received via text messages by following the Department of Health on Twitter or Facebook.

**Bay Restoration Fund (BRF)**

The Department of Health promotes the BRF Program. This program provides grant funding to qualified applications for assistance to install nitrogen reducing pretreatment units in conjunction with an onsite sewage disposal system that is in the Chesapeake Bay Critical Area. The grant funds the entire cost of the treatment unit and a five-year service and maintenance program for repairs of failing systems in the Critical Area. Additionally, the grant funds can be used to help qualified applicants connect to existing public sewer system. These connections can be funded if the existing dwelling, currently served by a septic system, is located where public sewer is available and immediately abuts the property. The Department of Health administers this grant, awarded by MDE.

The FY20 BRF-funded projects are included in the County's *AltBMPPoint* feature class of the MS4 Geodatabase (**Appendix A**). Implementation of these projects provide a direct reduction to the nitrogen load that is reaching the Chesapeake Bay.

The Department of Health publicizes information about on-site sewage disposal systems and private water wells. The Department also provides a DVD on the maintenance and care of an on-site sewage disposal system to each individual homeowner at the time of installation for each newly installed system. The videos are also available to view on the department's website (https://aahealth.org/).

**Department of Inspections & Permits**

The Department of Inspections and Permits (I&P) strives to provide the citizens of Anne Arundel County with the highest inspection standards consistent with the adopted codes and regulations. This is accomplished through the consistent and equitable application of regulations in the built and natural environment through plan reviews, inspections, enforcement, and the issuance of permits and licenses.

The I&P website contains general information available to the public regarding erosion and sediment control, buffer management, grading and permits, the Chesapeake Bay Critical Area, invasive species, and sensitive areas. This information can be found at https://www.aacounty.org/departments/inspections-and-permits/permit-center/index.html.

The Emergent Grasses Program is a County supported effort between the Department of Inspections and Permits and the Department of Recreation and Parks. Through this program, County residents with qualifying living shoreline or other tidal projects can receive appropriate Emergent Marsh Grasses for planting in marsh areas free of charge.

During this reporting period, a member of I&Ps Engineering staff completed the FY20 Leadership Anne Arundel (LAA) Flagship Program and the Neighborhood Leadership Academy Program. Leadership Anne Arundel's (LAA) mission is to provide people of diverse backgrounds with the education, resources, and networks necessary to become successful, proactive leaders. The vision of Leadership Anne Arundel is to develop and nurture community trustees who improve the quality of life in Anne Arundel County by convening diverse stakeholders, bridging their divides, and facilitating resolutions for the common good. Additional information about the program can be found at https://www.aacounty.org/news-and-events/news/2020/06/24/county-executive-pittman-recognizes-leadership-anne-arundel-program-graduates-for-2020.

I&P staff also participated in multiple events organized by the Watershed Stewards Academy to educate homeowners, contractors, and County citizens on BMP maintenance, local regulations, and County Code requirements related to inspections and approvals.

I&P maintains the Anne Arundel County Environmental Hotline at 410-222-7171 as previously described.

The Anne Arundel Soil Conservation District also plays a role in the prevention of erosion and sediment during construction activity.

## Anne Arundel Soil Conservation District

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

### Agricultural Programs

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

In FY20, the AASCD developed/updated 78 SCWQPs for County farms. These plans included more than 81 (32 WIP) BMPs. The design, installation and construction supervision of these practices are the responsibility of the District's technical staff. See Table 21 for FY20 accomplishments.

### Urban Programs

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

### Conservation Partners

The AASCD works with local, state, and federal agencies to carry out its mission, including the Maryland Departments of Agriculture, Natural Resources Conservation Service, Farm Service

Agency, University of Maryland Extension, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, Southern Maryland Resource Conservation and Development, and U.S Navy.

**Table 21. Anne Arundel Soil Conservation District Agricultural BMPs FY20**

| Best Management Practice | Achieved | Percent of WIP Goal Achieved | 2025 WIP III Goal |
|---|---|---|---|
| Cover Crops – Traditional (acres) | 4,707 | 101% | 4,667 acres |
| Soil Conservation & Water Quality Plans (cumulative acres) | 10,719 | 77% | 14,000 acres |
| Prescribed Grazing (acres) | 90.7 | 6% | 1,500 acres |
| Horse Pasture Management (acres) | 75 | 19% | 400 acres |
| Land Retirement to Open (acres) | 65.3 | 12% | 538 acres |

## Anne Arundel County Watershed Stewards Academy

The Anne Arundel County Watershed Stewards Academy (WSA) 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 BWPR continues to provide critical support in connecting Stewards and communities with watershed studies, planning, and restoration efforts. WSA trains citizens in Anne Arundel County to help neighbors reduce pollution in our local streams, creeks, and rivers.

WSA's hands-on training courses 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.

As noted in previous Annual Reports, the WSA developed and refined training and resources for Stewards to employ community-based social marketing to affect pollutant reducing behavior changes such as pet waste disposal, removal of leaves from impervious surfaces, and reduction in fertilizer use. Using face-to-face surveys, Stewards are taught to measure a baseline of behavior and measure a behavior change. They are also supported with template tools and sample behavior change campaigns for use in their own community. This and more can be found on the WSA website at http://aawsa.org/

The WSA continues to facilitate the networking of Anne Arundel County restoration resources via involvement of watershed organizations, the WSA Consortium of Support Professionals, County restoration projects, and private communities to avoid duplication and further common goals.

From stormwater design and land-use planning, to public opinion research and engineering, the WSA Board members bring a diverse set of skills to lead the organization. The Board is united in their passion to support the mission of WSA; each member contributes in a unique and significant way. The Board roles include strategic planning, partnership building, and fund-raising. In

addition, Board members led several stormwater tours designed to raise awareness of WSA and educate citizens of Anne Arundel County about the stormwater issues facing the County and successful solutions to those issues.

**2020 WSA Successes**

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

**WSA 12th Certification Course**

WSA recruited 34 Stewards as part of the 12th Certification Course, held from October 2019 through May 2020. Of the 34 Candidates, 50% come from priority communities and watersheds, particularly in Northern, Southern, and Western Anne Arundel County. In addition, 2 of the candidates are People of Color and 2 are Jewish. Parents with school-age children and millennials made up more than 1/3 of the class.

Despite complications arising from COVID-19, WSA introduced several new Initiatives for Class 12 including:

- *Adapting to Complications from COVID-19*: WSA staff migrated content that would typically be delivered in person to web-based platforms. Sessions utilize Google Meet and the class website migrated to a Google Site, which has an expanded suite of organizational possibilities beyond their previous platform.

- *Incorporating DEIJ Content*: WSA collaborated with the Chesapeake Bay Program's Diversity Workgroup, thinking through strategies for weaving Diversity, Equity, Inclusion and Justice (DEIJ) into the existing framework of the course. WSA then invited leaders from the Chesapeake Bay Program's Diversity Workgroup to present materials at several sessions, and to incorporate DEIJ-related issues seamlessly into topics already addressed by the course. For example, a session on GIS had an additional presentation about Baywide mapping tools like EJ Screen, which can be used to assess the demographic makeup of a region, and to see where more engagement and outreach can be done to inspire underrepresented communities to take action. By raising awareness about DEIJ throughout our Certification Course, WSA hopes to ensure that Certified Stewards have a clear understanding about how socio-economic factors and issues of access continue to impact engagement levels and the equitable distribution of restoration projects throughout our region.

During this reporting period, WSA hosted a number of events to keep Stewards and Consortium Members engaged. Prior to COVID-19, WSA events included:

- *WSA's Annual Conference (February 2020)*: The best conference yet with 300 people in attendance, including over 100 Stewards and over 35 Consortium Members. Using feedback and suggestions from Stewards and Consortium Members, WSA hosted the first ever keynote speaker, Doug Tallamy, moved the conference to a more central location in the County, and offered a robust selection of sessions, from winter tree ID to restoration project design. Additionally, attendees were engaged in the strategic planning process and provided opportunities to connect with the region's most prestigious funders in restoration.

- *Networking Events*: WSA offered both time tested traditional networking events along with new events, such as a Paint Night and a local food lecture with chef and author John Shields. These new events brought in Stewards who often do not attend networking events. Traditional networking events included Consortium on Tap, where Stewards had an opportunity to meet and connect with Consortium Members; Potluck and Paddle, which gave Stewards and Consortium a chance to take a paddle on the Severn. The Steward Action groups also held several planning and networking meetings.

- *Continuing Education*: Major events included WSA's Summer 2019 Restoration Expedition, a tour of restoration projects in Anne Arundel County, which featured a route especially designed to engage existing RiverWise Congregations and prospective congregations; Living Shoreline Workshop; Site Assessment workshops; and a Project WET Workshop for Master Watershed Stewards, designed to enhance and support continuing education opportunities for the Environmental Literacy Track.

WSA also held many networking and continuing education events through the year including maintenance and residential site assessment workshops, RiverWise Congregation networking events, environmental literacy and field trips to tour practices representing innovative approaches to stormwater management. WSA also partnered with Master Gardeners and Chesapeake Bay Landscape Professionals to offer joint continuing education and networking sessions.

**RiverWise Congregations**

WSA's participation in the One Water Partnership has made it possible to provide additional resources to faith communities that have been fighting for clean water since 2014, and to engage new congregations in environmental action. About half of the congregations engaged are Black Churches. WSA also engaged two synagogues and two mosques. Over the past year, WSA has

- Engaged 12 new congregations to take environmental action;
- Trained 12 Master Watershed Stewards from eight congregations; and
- Worked with 15 Congregational Stewards from 10 congregations through the Faithful Green Leaders Training, in conjunction with IPC.

*Engaging Faith Communities*

Over the past year, WSA hosted three major events that have 1) engaged members of the faith community in working for clean water and 2) highlighted the environmental actions taken by congregations dedicated to an ethic of Creation Care.

- *Action Expedition Tour of Congregational Restoration Projects* at Holy Family Catholic Church, Mt. Moriah AME, and St. Luke's Episcopal Church--this tour helped us build connections with two new faith communities.

- *Faithful Green Leaders, a Short Course for Congregational Leaders* included 2 sessions. Our first training, with field and classroom components, included a tour of Stormwater Projects, and mini sessions on project maintenance and leading behavior change initiatives. Our second training, in conjunction with Interfaith Partners for the Chesapeake, provided congregational leaders with a space to collaborate and plan their course of action for 2020.

- *WSA's Annual Conference* spotlighted the One Water Partnership and green congregational initiatives in our watershed by inviting representatives from IPC and IPL to lead panels, host mini sessions, and table.

*Training Congregational Stewards and Adopting Best Practices for Retention*

In Fall 2019, six Steward Candidates representing five congregations graduated from our 11th Certification Course for Master Watershed Stewards. In Class 12, there are four Steward Candidates representing three congregations, all of which are newly engaged with WSA: Our Lady of the Chesapeake (Patapsco Tidal); St. Andrew By the Bay (Magothy); and Temple Beth Shalom (Severn).

For two Class 11 Stewards, providing a greater level of support beyond what other Candidates received in the class was crucial for building trust and creating lasting relationships. Each of these Stewards was a member of a Black church and had been encouraged to take the class by a trusted pastor. Both worked full time. One was the father of a teenage son; one was the primary caregiver for her four-year-old grandson. Both Stewards were advocating for congregations with largely aging memberships, who were struggling to care for the BMPs they had acquired during the original RiverWise program in 2014. After only a few sessions, it became clear that neither of them had anticipated the level of time and commitment that the Certification Course demands. To ensure they completed the course successfully, WSA staff made an effort to reach out frequently by phone and email, keeping lines of communication open. Staff wanted these individuals to know that a late homework assignment or a missed class was not a sign of failure, that everyone understood the many pressing demands on their time, and that we were willing to make any accommodations necessary to put them on the path to success. When the time came for planning their capstone projects, the Restoration and Program Coordinators provided extra assistance with project design and grant funding. For project installation, Staff provided extra support for enlisting volunteers. WSA staff believe that the level of attention provided to each of these candidates helped strengthen WSA's relationships with their congregations. At each congregation, there are now a greater number of individuals actively engaged in volunteer efforts for clean water than there had been previously.

*Supporting Maintenance of Congregational BMPs*

A particular area of concern has been the continuing struggles with BMP maintenance that many RiverWise Congregations experience. Most congregations who received grant-funded restoration

projects through their participation in the 2014-17 RiverWise program have been unable to raise the funding or mobilize the volunteer support necessary to keep up with the maintenance of the BMPs on congregational property. Often, one of the biggest barriers to success is a lack of knowledge about how to care for the projects effectively. Even when volunteers are willing to help, they are unsure what to do, and concerned that their efforts could do more harm than good. To address this threat, we asked Stewards in our volunteer-led Maintenance Corps to consider prioritizing maintenance at congregations, rather than organizing clean-up events for their own neighborhoods, as they had in the past. Although the majority of Stewards in the Corps do not have strong personal connections to the faith community, they wholeheartedly embraced the effort to provide support and training to congregations in need of assistance. In summer/fall 2019, the Maintenance Corps hosted events at four RiverWise Congregations--three Black Churches and one mosque--providing thousands of dollars of volunteer service. With support from WSA Staff, members of the Maintenance Corps taught congregational volunteers best-practices for weed removal and inlet maintenance. Knowing that grant funding for project maintenance remains unavailable and recognizing the burden that project maintenance has placed on communities who are struggling to address food insecurity, homelessness, and other societal challenges, we believe that connecting our Maintenance Corps Stewards with faith-based communities has been a "win" for everyone involved.

*Leading New Projects*

*St. Mark United Methodist Church*

In late summer of 2019, the County approached WSA to investigate an ongoing stormwater issue at St. Mark United Methodist Church in Hanover, MD. Currently a 46-acre drainage area (33% impervious) flows through an inadequately sized storm drain system on the property of St. Mark's Methodist Church and the adjacent residential property of Mr. Curtis Parker, causing frequent and torrential overflows during rain events. These overflows have caused sinkholes resulting in property damage and extensive sediment loading into the storm drain system.

WSA, with assistance of a design contractor, developed a concept plan to mitigate the stormwater. This concept proposed to daylight the unnamed tributary on site (currently restricted to the undersized stormwater pipe) and convey it through a series of step pools toward a large bioretention area on what is currently an underutilized pervious area. To bring this concept design to completion, WSA applied for a Chesapeake Bay Trust Watershed Assistance Grant (WAGP), which was not awarded.

After the WAGP was denied, WSA applied for an Arundel Community Development Services, Inc. Local Development Council Grant which was awarded. The grant, equaling $87,770, allows for WSA to bring the design to completion. The design will produce a project that reduces flooding and treats stormwater to the maximum extent practical on the site. This design work will begin in fall of 2020. Once the design is completed, WSA will work with ARF to seek funding for the project's installation.

As part of this work, St. Mark's United Methodist Church will be included as a new congregation in our RiverWise Congregations program. By joining the RiverWise program,

congregants at St. Mark's UMC will have an opportunity to join the growing team of RiverWise Stewards, by learning about different rainscaping practices and pollution-reducing behaviors they can adopt to work together for clean water. Members of St. Mark's UMC will have an opportunity to train as Master Watershed Stewards by taking WSA's Certification Course, which will prepare them to serve as congregational leaders for promoting the principles of Creation Care and give them the knowledge to maintain the proposed BMP. Other members of the church will have an opportunity to participate in shorter Congregational Steward Trainings and Green Team Trainings to empowered them to also serve.

*Congregation Kol Shalom*
Through continued engagement with Congregation Kol Shalom in Annapolis, WSA applied for and received a BGE Impactful Project grant in the amount of $7,000. This grant, combined with subsidy from WSA's Impact Fund, allowed WSA to work with a contractor to address ongoing stormwater issues at the temple, which was broken into two components.

The first component was to produce a design that mitigated overland flow resulting from a building addition. At the time of the construction, a swale was installed which did not adequately convey stormwater to a bioretention. Working with the contractor, WSA developed a design that corrected the swale and reconnected it with the bioretention. This design is slated for installation in late summer of 2020. Concurrent with this component, WSA worked with the Congregational Steward at Kol Shalom to apply for a Unity Gardens grant to augment the installation with a 3,100 square feet conservation landscape, which will also be partially subsidized by WSA. If awarded, that planting will be installed in fall of 2020.

The second component of this project was to develop a design to mitigate stormwater coming from the temple's roof and parking lot, as well as the adjacent road to the property. This design proposes installing a step pool conveyance system and rain garden. The design is permit ready and WSA will be seeking funds for its installation in 2021.

**Clean Water Communities**

WSA has continued to work with the Glen Isle community to reach the following Clean Water Communities benchmarks:

- Community Stormwater Assessment;
- Minimum of 2 Master Watershed Stewards from the community certified;
- 10-15 Community Stewards trained;
- Launch a "Habits that Help" campaign, and secure pledges from 20% of residents; and
- Install rainscaping projects on 10 residential properties.

*Glen Isle*

As of the writing of this report, Glen Isle has reached all benchmarks except the installation of ten residential rainscaping projects. Through Fall of 2019, concept plans for the remaining five restoration projects were developed and include a 700 square feet invasives removal and

conservation landscape planting at a community property, two rain cisterns and 300 square feet of conservation landscape at a private residence, two rain cisterns and 250 square feet of conservation landscape at a private residence, and two rain cisterns and a 300 square feet rain garden at a private residence. The final, larger proposed project straddles the property line of two private residences and incorporates regrading with conveyances terminating in a large rain garden. The specific size and parameters of this project were to be determined in the finalized design process to occur early in 2020.

Glen Isle was on track to complete the design development and installation of these remaining five projects in early 2020 when COVID-19 halted the process of site assessments, homeowner engagement, and installation. As of the writing of this report, WSA is engaging a contractor to pick up the design and installation process, and these projects should be completed in Fall 2020. Concurrent with the hold on the finalized design and installation, Glen Isle's lead Master Watershed Steward completed Tree Trooper training for the Replant Anne Arundel program. He and his team of Community Stewards conducted outreach to interested community members to identify tree planting opportunities in Glen Isle. Twenty identified tree installations will complement the Clean Water Communities initiative.

*Columbia Beach*

A Class 11 Master Watershed Steward spearheaded the inclusion of the South County community of Columbia Beach into WSA's Clean Water Communities program. COVID-19 has delayed some of the benchmark goals for 2020, but the Master Steward continues working with a team of potential Community Stewards who will attend the WSAs Community Steward Short Course. This Master Steward also participated in the Tree Trooper training and 20 trees are to be planted in Columbia Beach in Fall 2020. Additional Clean Water Community actions will include implementing a Community Stormwater Assessment to identify nine additional residential rainscaping projects. WSA will continue to support Columbia Beach as it works through the remaining Clean Water Communities benchmarks**.**

*Millstone Village*

Millstone Village, in the northern part of Anne Arundel County, is a five-year-old subdivision built on marshy land in Severn, MD. The neighborhood consists of 116 homes and townhomes located just outside of the Fort Meade military installation. This is a diverse community with a rich mixture of racial and ethnic cultures, including Latin, Asian, African, Indian, European, and Caribbean residents; young, middle-age and mature families and singles live in the community.

Millstone Village HOA Members first contacted WSA in Summer 2019 about stormwater issues the community was experiencing. A resident joined the Master Watershed Steward Certification Course in Fall 2019, and is currently a Class 12 Steward Candidate; another resident, the HOA President, is enrolled in an upcoming Stormwater Success training. Concurrent with these efforts, WSA will work with the community's HOA to reach the benchmarks of Clean Water Communities Program, including certifying another Master Watershed Steward, training Community Stewards, looking at opportunities for a "Habits that Help" Campaign, and a Community Stormwater Assessment that will help identify rainscaping projects within the community.

**Short Course for HOAs and Property Managers**

WSA was on track to conduct two additional Short Courses for HOAs and Property Managers during the reporting period. This short course's goal is to provide property managers and HOA leaders with information and resources to help them reduce pollution coming from their properties while addressing key concerns including flooding, maintenance of stormwater management devices, reducing management costs, and engaging residents to reduce pollution from pet waste, litter and other sources. The short course targets property managers and HOA representatives who must live and work in Anne Arundel County.

The first of these offerings occurred in Winter 2019-2020 and at the culmination of Session 3, had 55 participants. The Winter 2019-2020 Short course had the following format and schedule:
Three in-person sessions:

1. December 10th, 2019: 8:30 a.m.- 11:30 a.m. (Classroom at Arlington Echo and Field)
2. December 12th, 2019: 8:30 a.m.-3:30 p.m. (in the Field)
3. January 9th, 2020: 8:30 a.m.-11:30 a.m. (Classroom at Arlington Echo)

In addition to the in-person sessions, a resource web page was developed to house course materials, webinars, resources and useful links.

The second offering of Stormwater Success was scheduled for March of 2020, but due to the COVID-19 pandemic, the course was transferred to an online format. Having to pivot the course's offering didn't change the stated goal of the course but did require adjusting and developing the sessions and resources to digital media.

In the future, participants have the option to take part in one or two virtual course components:

*Virtual Stormwater Success*

Course presenters have recorded their presentations into webinars that will become self-paced online learning material. This will be followed by two virtual Q&A sessions that will connect participants with stormwater experts. The course content will be available in mid-August through September 2020. The Q&A sessions are scheduled for Tuesday, September 8th, 2020 from 7:00-8:00 p.m. and Thursday, September 10th, 2020 from 7:00-8:00 p.m.

*Stormwater Best Management Practices Tour*

Depending on the status of the COVID-19 virus in our community, we hope to offer an in-person tour of local stormwater best management practices with strict safety protocols. As of the end of FY20, the tour is scheduled for Saturday, September 12th, 2020 from 9:00 a.m.- 3:00 p.m. WSA Staff are concurrently investigating videography for these tours such that they can become another virtual tool offered to participants.

**Replant Anne Arundel**

A GIS study, commissioned by Anne Arundel County and completed by the Chesapeake Conservancy, revealed that Anne Arundel County has lost more than 2,500 acres of forest since 2013, the highest loss of any urbanized Maryland County. To increase canopy, the County Executive put forth the most aggressive forest conservation bill of its time in fall 2019. Watershed Stewards testified to the benefits of trees for waterway health at the bill hearings. Although the bill was significantly amended, the final legislation (passed unanimously) was the strongest in the State at the time and led to several other counties passing similar legislation. Watershed Stewards were an important voice in that conversation.

Anne Arundel County then asked WSA to partner on a new tree planting program called "Replant Anne Arundel". The County invested $200,000 for trees and tree-related expenses, but provided no capacity or administrative funding to run the program. Recognizing additional capacity was necessary to run the new program, WSA secured funds for a Restoration Technician to administer the program and augmented some program development with additional funds.

To design Replant Anne Arundel, WSA researched and interviewed other programs around the State who implement tree planting programs to learn best practices and avoid pitfalls in this program design. A few lessons learned include the need to plant the right size tree stock - to get stormwater credits under the urban tree canopy BMP, trees must be a minimum height (4–6 feet) and diameter (1–2 inches); this size tree is small enough for volunteers to plant easily, large enough to be visible to mowers, and will adapt well when re-planted. All the existing programs stressed the importance of having good maintenance plans/programs to ensure survivability. Finally, education and community engagement are key to the long-term success of the trees.

From this research, WSA created Replant Anne Arundel to include the following pieces:

- *Tree Troopers*: The best way to plant the maximum number of trees is to train community leaders to plan, plant and maintain trees in their communities. WSA created a Steward Action Group called "Tree Troopers" whose mission is to plant trees in their communities. The program is open to both Certified Master Watershed Stewards and non-Steward Community Members. Within five days of opening the registration for Tree Troopers, 65 people representing 55 residential communities and nine congregations, applied. Through training, Replant Anne Arundel has 44 Tree Troopers. All Tree Troopers are within two miles of an area with significant tree canopy loss. WSA partnered with the Alliance for the Chesapeake Bay to offer a version of their newly created Tree Steward training, adapted for our Replant Anne Arundel program. This training was to be offered in March, just as the COVID-19 health crisis began, so it was converted to a series of 4 interactive webinars. On top of the four interactive webinars that covered the learning material from the cancelled in-person training session, WSA held two optional continuing education webinars. One with a GIS focus, and the other a Q&A on invasive species removal. Following the webinars, each Tree Trooper identified the areas in his or her own community where trees can be planted and will be able to "apply" for trees from Replant Anne Arundel to be planted this fall. From this application process, 20-30 projects were identified, equaling 900 trees.

- *Goals*: WSA aims to plant, with volunteers, over 4,000 trees. Approximately 2,500 trees are small bare root seedlings provided by the Maryland Department of Natural Resources. These were distributed in the spring and planted at over 100 residences across the County. WSA will also plant 750 bare root seedlings at restoration projects this fall. About 900 larger trees, those described above, will be planted in communities this fall by Tree Troopers. WSA will also facilitate a tree sale of 200 larger trees in the fall. Additionally, WSA aims to ensure that the trees are equitably distributed throughout the County, prioritizing underserved communities, such as northern Anne Arundel County and places with existing tree canopy loss.

- *Maintenance*: Replant Anne Arundel includes provisions for maintenance through training, maintenance plans, and option to purchase a reduced cost professional maintenance plan.

- *Education*: While planting new trees is important, protecting existing tree canopy is essential. Through the Tree Troopers, Replant Anne Arundel will educate and engage thousands of community members on the value of and ways to protect canopy trees in their communities.

A summary of Replant Anne Arundel can be found at: http://aawsa.org/replantannearundel, and a presentation about Replant Anne Arundel County may be found at: https://drive.google.com/file/d/1un4QU6qOwH5JvAlJ3og53s4kVYXM3cjD/view?usp=sharing

**Arlington Echo Outdoor Education Center - Chesapeake Connections**

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

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

The County 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 BWPR restoration projects. In 2020, over 850 Anne Arundel County Public School students participated in planting events at 1 newly restored water quality project site. Below is a listing of those opportunities that occurred during 2020 (Note: Because of the COVID-19 pandemic, the Chesapeake Connections Program, in an abundance of caution, was halted in March 2020. Several other restoration sites were scheduled for planting.): Barrensdale Outfall Repair: Old Mill Middle School South – 347 6th grade students and Severna Park MS – 510 6th grade students

***c. Provide information regarding the following water quality issues to the regulated community when requested:***

***i. NPDES Permitting requirements;***
***ii. Pollution prevention plan development;***
***iii. Proper housekeeping; and***
***iv. Spill prevention and response.***

**Status:**

Managers at each of the County-owned facilities subject to the stormwater general discharge permit (Permit 12-SW) updated their SWPPPs following the issuance of the new General Permit by MDE in January 2014 and perform pollution prevention training as set forth in their SWPPP. Furthermore, the facility staff implement all aspects of their SWPPPs including quarterly and annual compliance inspections to ensure proper good housekeeping and stormwater pollution prevention practices are maintained and functioning accordingly.

SWPPP training is performed yearly, at a minimum, which is critical to ensure staff are fully knowledgeable of the potential pollutant sources at each facility, how to properly store and handle these sources, and the procedures for responding to a spill or emergency. The County provides training for staff working at those County facilities with stormwater discharge permits as discussed in **Part IV.D.5.b.v.**

## *E. Restoration Plans and Total Maximum Daily Loads*

***In compliance with §402(p)(3)(B)(iii) of the CWA, MS4 permits must require stormwater controls to reduce the discharge of pollutants to the MEP. By regulation at 40 CFR §122.24, BMPs and programs implemented pursuant to this permit must be consistent with applicable WLAs developed under EPA approved TMDLs (see list of EPA approved TMDLs attached and incorporated as Attachment B).***

***Anne Arundel County shall annually provide watershed assessments, restoration plans, opportunities for public participation, and TMDL compliance status to MDE. A systematic assessment shall be conducted and a detailed restoration plan developed for all watersheds within Anne Arundel County. As required below, watershed assessments and restoration plans shall include a thorough water quality analysis, identification of water quality improvement opportunities, and a schedule***

***for BMP and programmatic implementation to meet stormwater WLAs included in EPA approved TMDLs.***

1. ***Watershed Assessments***

   a. ***By the end of the permit term, Anne Arundel County shall complete detailed watershed assessments for the entire County. Watershed assessments conducted during previous permit cycles may be used to comply with this requirement provided the assessments include all of the items listed in PART IV.E.1.b below. Assessments shall be performed at an appropriate watershed scale (e.g., Maryland's hierarchical eight or twelve-digit sub-basins) and be based on MDE's TMDL analysis or an equivalent and comparable County water quality analysis;***

   b. ***Watershed assessments by the County shall;***

      i. ***Determine current water quality conditions;***
      ii. ***Include the results of a visual watershed inspection;***
      iii. ***Identify and rank water quality problems;***
      iv. ***Prioritize all structural and nonstructural water quality improvement projects; and***
      v. ***Specify pollutant load reduction benchmarks and deadlines that demonstrate progress toward meeting all applicable stormwater WLAs.***

**Status:**

Anne Arundel County developed a TMDL Support program within the BWPR to facilitate NPDES MS4 permit compliance. One component of the program was oversight of watershed assessments for each of the County's 12 watersheds as stipulated by permit requirements (**Part IV. E.1.a and b**). These watershed studies involved a partnership between the County, various consultants, and citizen stakeholders. The field data collection was performed primarily by consultants for each watershed study effort. Modeling, analysis, subsequent action prioritization, and reporting were performed by County staff working with the consultants. The work effort also included coordination of professional management team meetings between the County, the consultants, and citizen stakeholders to reach consensus pertaining to assumptions and data interpretations, and desired restoration/preservation implementation strategies. Following consensus, the watershed study was advertised for a 30-day public comment period after which a summary of comments received and the County's response was incorporated into the final watershed study document. Environmental concerns and recommendations can be found in GIS files published on the County website and viewable on the interactive mapping application found at the following website address:
http://gis-world3.aacounty.org/HTML5Viewer/index.html?viewer=WPRP

Recommendations developed during watershed studies are used to advise and prioritize land use decisions and Capital Improvement Program (CIP) expenditures relating to environmental restoration and preservation in support of TMDL compliance.

As reported in the FY18 Annual Report, the County completed the assessment of all 12 County watersheds and satisfied this permit requirement. The watershed assessment documents, for each of the 12 watersheds (**Error! Reference source not found.**), are found on the County's website: https://www.aacounty.org/departments/public-works/wprp/watershed-assessment-and-planning/watershed-studies/

**Table 22. County Watersheds**

| County Watershed | MDE 8-Digit Watershed Code |
|---|---|
| Severn River | 02131002 |
| South River | 02131003 |
| Upper Patuxent River | 02131104 |
| Magothy River | 02131001 |
| Patapsco Non-Tidal | 02130906 |
| Patapsco Tidal | 02130903 |
| Bodkin Creek | 02130902 |
| Little Patuxent River | 02131105 |
| Rhode River | 02131004 |
| West River | 02131004 |
| Herring Bay | 02131005 |
| Middle Patuxent River | 02131102 |

***2. Restoration Plans***

***a. Within one year of permit issuance, Anne Arundel County shall submit an impervious surface area assessment consistent with the methods described in the MDE document "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits" (MDE, June 2011 or subsequent versions). Upon approval by MDE, this impervious surface area assessment shall serve as the baseline for the restoration efforts required in this permit.***

***By the end of this permit term, Anne Arundel County shall commence and complete the implementation of restoration efforts for twenty percent of the County's impervious surface area consistent with the methodology described in the MDE document cited in PART IV.E.2.a. that has not already been restored to the MEP. Equivalent acres restored of impervious surfaces, through new retrofits or the retrofit of pre-2002 structural BMPs, shall be based upon the treatment of the WQv criteria and associated list of practices defined in the 2000 Maryland Stormwater Design Manual. For alternate BMPs, the basis for calculation of equivalent impervious acres restored is based upon the pollutant loads from forested cover.***

**Status:**

Anne Arundel County's NPDES MS4 Permit (Permit), issued in February 2014, requires the County to complete restoration equivalent to twenty percent (20%) of the County's impervious surface area that has not already been managed to the maximum extent practicable (MEP).

In 2015, the County submitted to MDE an impervious surface area assessment and the associated baseline for impervious area restoration (*Establishing Baseline – Impervious Area Assessment; Anne Arundel County, May 2015*). As part of the County's FY18 Annual Report, the County proposed revisions to this assessment and the restoration baseline (*Revision of Anne Arundel County's 2014 Baseline & Impervious Surfaces Treated to the MEP, February 2019*). MDE indicated its acceptance of the County's proposed revisions in "Attachment 1: MDE's Review of Anne Arundel County's 2018 MS4 Annual Report," received by the County on May 15, 2019. The updated impervious area assessment identified 5,970 acres of managed impervious area and 24,981 acres as the baseline of unmanaged impervious area, which set the 20% restoration goal at 4,996 acres. Please refer to Part IV.E.2.a and Appendix H in the County's FY18 Annual Report for the complete details of the adjustments made to the County's impervious surface assessment, associated analyses, and supporting data.

**Impervious Area Restoration Plan Progress**

The County previously submitted an *Impervious Area Restoration Plan* (Appendix I of the FY15 Annual Report). This document provides a narrative description of the County's impervious area restoration completed to date, and projection of progress through the end of the permit term. Included in the County's *Impervious Area Restoration Plan* are County CIP restoration projects, alternative urban BMPs (e.g., street sweeping, septic system connections to WRF, and septic systems upgraded to enhanced denitrification systems), County-funded restoration grant projects, and other NGO restoration projects.

This report section summarizes the County's attainment of the 20% impervious surface restoration (ISR) goal. **Part IV.C.6** (Water Quality Improvements Projects) describes the inventory of watershed restoration projects. Table 23 provides a summary of the restoration projects completed in FY20 and impervious restoration credits, as well as cumulative restoration credit totals (FY14-FY20). Credits for annual BMPs (e.g., street sweeping, inlet cleaning, and septic pumping) are updated yearly and are not cumulative; averaged values representing full programmatic implementation are used for the cumulative restoration total (FY16-FY18 for street sweeping and septic pumping; FY17-FY18 for inlet cleaning).

**Table 23. FY20 Impervious Surface Restoration Credit Acres**

| Restoration Project | Impervious Acres Credited | |
|---|---|---|
| | Completed in FY20[2] | Completed – Cumulative through FY20 |
| Restoration BMPs | | |
| - ESD | 0 | 18.1 |
| - structural | 361.4 | 1,163.8 |
| Alternative Restoration BMPs | | |

| Restoration Project | Impervious Acres Credited | |
|---|---|---|
| | Completed in FY20[2] | Completed – Cumulative through FY20 |
| - street sweeping[1] | 156.6 | 168.9 |
| - impervious surface elimination | 0.1 | 0.5 |
| - reforestation | 1.0 | 1.5 |
| - catch basin and storm drain cleaning[1] | 53.2 | 69.8 |
| - stream restoration | 299.8 | 1200.8 |
| - outfall stabilization | 7.0 | 38.3 |
| - shoreline management | 868.2 | 1615.6 |
| - septic pumping[1] | 468.3 | 287.0 |
| - septic denitrification | 46.8 | 345.5 |
| - septic connections to WWTP | 10.9 | 89.3 |
| **TOTAL ACRES** | **1,595.2** | **4,999.1** |

[1]For annual practices, cumulative attainment values are based on the average equivalent impervious treatment achieved after full implementation of the programs. Averages for street sweeping and septic pumping are based on FY16-FY18 implementation, and catch basin cleaning is based on FY17-FY18 implementation. FY20 implementation of annual practices maintained the County's long-term averages at or above the level of programmatic effort required to maintain the cumulative attainment credit claimed.
[2]Completed total acreage for FY20 does not include acreage tallied for annual practices, which serves as maintenance of the annual practice credits claimed in the cumulative total acreage restored.

**Impervious Areas Restored:** Projects completed in FY20 restored and managed 1,595.2 equivalent impervious acres, and review of previously completed project documentation revealed a net addition of 234.4 acres of impervious restoration. These additions in FY20 increased the County's cumulative total to 4,999.1 equivalent impervious acres restored from FY14 through FY20. The slight exceedance of the County's 4,996-acre requirement will account for rounding errors and ensure complete replacement of the 1,827 acres acquired through nutrient trading in FY19.

The following list identifies the specific projects that contributed to net addition of 234.4 acres of impervious surface for projects completed prior to FY20. All these changes are also documented in the FY20 MS4 Geodatabase in **Appendix A**.

- The County identified one stream restoration and two shoreline stabilizations (AA14ALN000003, AA14ALN000004, and AA14ALN000005) that would rightfully have been included as existing restoration projects and credited towards the managed impervious surface acreage during the baseline assessment. These three projects are included in the FY20 MS4 Geodatabase, but credit is only being claimed at 20% of the actual equivalent impervious credit calculated for the projects to mimic the actual impact these projects would have had on the County's restoration goal at the time of the baseline assessment.

- The County obtained monitoring data for a completed stream restoration (AA16ALN000021) that allowed for the replacement of default rate credit with observed reductions in nutrients, sediment, and impervious credits based on monitoring data. Details of these reductions can be found in Thompson et al. 2018.[1]
- During a review of a set of older project plans, the County identified an error in its project inventory database that doubled the length of a completed stream restoration (AA15ALN000002). The length was corrected and the default rate credits for nutrients, sediment, and impervious surface were halved. Other minor corrections were made that decreased the credit for AA16RST000041 by 2.0 acres and the credit for AA18RST000033 by 0.9 acres.
- The County received notice that a shoreline stabilization and two structural BMPs (AA19ALN000028, AA16RST000061, and AA20RST000011) were completed in FY19 after the County had already submitted the FY19 Annual Report.
- The County identified two completed shoreline stabilizations (AA17ALN000059 and AA18ALN000004) for which Protocol-based nutrient and sediment reductions were available. The County updated the impervious credit for these projects to align with these updated values, resulting in an increase in credit for one project and a decrease in credit for the other.
- The County was able to fill in missing data values from GIS for AA20RST000006, which allowed for the calculation of credit (0.02 acres) for a small community rain garden completed in FY17 but included in the *RestBMP* feature class for the first time in FY20.
- The County noted that detailed data provided by the Health Department for septic connections to wastewater treatment plants (WWTPs) included the number of equivalent dwelling units (EDUs) for eleven previously reported connections. These data allowed the County to properly account for larger septic tanks, typically sized to provide treatment for non-residential properties; credit for these sites was updated to reflect the increased benefit provided by the retirement of these larger-scale septic systems.

**Attainment of the 20% ISR Goal & Beyond**

As of the end of FY20, the County has met its 20% ISR goal of 4,996 acres. This goal was attained through restoration project implementation and alternative BMPs (4,473 equivalent impervious acres), which in FY20 allowed the County to replace all credits acquired through nutrient trading with Anne Arundel County's WRFs in FY19 (**Part IV.E.3**). The remainder of the County's 20% ISR goal was met through a suite of annual practices (526 equivalent impervious acres) that will be continued at the current level of effort through programmatic implementation.

Attainment was achieved with the completion of a stream restoration project on June 18, 2020. ISR credit for other projects (not included as part of the current permit's ISR attainment), completed on or after that date, as well as for projects currently under construction or under design, will be applied towards the anticipated ISR goal (2,998 acres) in the County's fifth generation MS4 permit ( Table 24). Restoration projects that are proposed for design and construction, but for which design contracts are not yet in place, will also provide additional impervious surface

1 Thompson J, Pelc CE, Brogan III WR, Jordan TE. The multiscale effects of stream restoration on water quality. Ecological Engineering. 2018 Dec 1;124:7-18.

management. Credits intended for application towards the County's fifth generation MS4 permit ISR goal were calculated in accordance with the *Draft Accounting for Stormwater Wasteload Allocation and Impervious Acres Treated; Guidance for National Pollutant Discharge Elimination System Stormwater Permits; June 3, 2020* (MDE 2020).

**Table 24. FY20 Impervious Surface Restoration Acres to be Credited towards the Anticipated 5th Generation Permit ISR Goal**

| Restoration Project | Impervious Acres Credited Completed in FY20 |
|---|---|
| Restoration BMPs | |
| - ESD | 0 |
| - structural | 0 |
| Alternative Restoration BMPs | |
| - street sweeping[1] | - |
| - impervious surface elimination | 0 |
| - reforestation | 0 |
| - catch basin and storm drain cleaning[1] | - |
| - stream restoration | 162.1 |
| - shoreline management | 0 |
| - septic pumping[1] | - |
| - septic denitrification | 0 |
| - septic connections to WWTP | 0 |
| - aquaculture nutrient credit trading | 3.3 |
| **TOTAL ACRES** | **165.4** |

[1]Continued implementation of annual practices at current levels is planned to maintain attainment of the County's 4th Generation Permit 20% ISR goal. Increased implementation of these practices is not currently a part of the County's 5th Generation Permit impervious surface restoration plan.

In addition to maintaining a robust pipeline of planned County-managed stormwater CIP projects, the County utilizes other mechanisms to support its restoration goals, including the use of grants to non-governmental organizations (NGOs), public-private partnerships, and most significantly through design-build contracts. The County accepted proposals and awarded contracts for full delivery design-build water quality improvement projects in FY17, FY19, and FY20. Completed full delivery projects include a living shoreline and the retrofit of three ponds with continuous monitoring and adaptive control (CMAC) technology; these projects resulted in 246 acres of equivalent impervious restoration credit towards the existing 20% ISR Goal. In FY18, the County awarded a contract for a large-scale, commercial septic to sewer conversion project that is anticipated to deliver approximately 67 acres of treatment in FY21. The County is currently reviewing project proposals received in response to its FY21 solicitation.

Credit for projects completed in FY21 and beyond will be applied to the County's next ISR goal. Several of these full delivery design-build contracts were awarded, in part, based on cost-effectiveness metrics in place at the time of contract award. Given the financial investment in these

projects, and the extent of their implementation progress at the end of this current permit term, the County requests that MDE grandfather the ISR crediting for these projects under the terms which they were originally awarded. Changing the crediting protocols for this work, mid-stream, undermines the innovative procurement vehicles the County constructed to help accelerate implementation progress and acts as a disincentive to the pursuit of similar restoration efforts moving forward.

The County will also continue to look for new and innovative ways to support projects and activities with proven water quality benefits. For the first time in FY20, the County executed a nutrient credit trade with a local oyster aquaculture grower. If this pilot effort is successful and sustainable, the County may look to expand this program. Anne Arundel County acquired these credits on June 22, 2020 (see the Water Quality Trading Credit Agreement and Credit Acquisition Request in **Appendix H**). MDE verified and entered the credits in MDE's Water Quality Trading (WQT Register) on June 30, 2020.

**Strategy to Maintain Attainment of the 20% ISR Goal**

As noted above, the County has met its goal of restoring or providing equivalent stormwater management for 20% of unmanaged impervious surfaces in the County. To maintain attainment of its goal, the County understands it must continue current programmatic implementation levels of annual practices (street sweeping, inlet cleaning, and septic pumping). If for some reason continued programmatic implementation is not possible, the County will replace credit claimed for annual practices with credit derived from other structural or alternative practices according to the prevailing credit guidance at that time.

The County also has budgeted for and is committed to the continued maintenance and repair of its entire inventory of stormwater management and restoration practices, which include a robust inspection regime. The County is continuously enhancing its BMP maintenance inspection program, ramping up field inspection efforts, and increasing inspection and maintenance of existing and new BMPs to meet triennial inspection requirements. In the future this effort will be further enhanced as the County is in the process of automating and fully integrating our asset and work order management system (AWOM); stormwater BMP maintenance inspection is slated to be a part of this system. In addition, the County will continue to work, in the coming year, to inspect the backlog of BMPs identified through the historic BMP cleanup project.

***b. Within one year of permit issuance, Anne Arundel County shall submit to MDE for approval a restoration plan for each stormwater WLA approved by EPA prior to the effective date of the permit. The County shall submit restoration plans for subsequent TMDL WLAs within one year of EPA approval. Upon approval by MDE, these restoration plans will be enforceable under this permit. As part of the restoration plans, Anne Arundel County shall:***

***i. Include the final date for meeting applicable WLAs and a detailed schedule for implementing all structural and nonstructural water quality projects, enhanced stormwater management programs, and alternative stormwater control initiatives necessary for meeting applicable WLAs;***

ii. ***Provide detailed cost estimates for individual projects, programs, controls, and plan implementation;***
iii. ***Evaluate and track the implementation of restoration plans through monitoring or modeling to document progress toward meeting established benchmarks, deadlines, and stormwater WLAs; and***
iv. ***Develop an ongoing, iterative process that continuously implements structural and nonstructural restoration projects, program enhancements, new and additional programs, and alternative BMPs where EPA approved TMDL stormwater WLAs are not being met according to the benchmarks and deadlines established as part of the County's watershed assessments.***

**Status:**

Pursuant to its NPDES MS4 Permit requirements, Anne Arundel County is obligated to develop and submit to MDE restoration plans for every EPA approved TMDL having a stormwater wasteload allocation (SW-WLA). These restoration plans identify a suite of structural and non-structural projects and programs necessary for meeting the WLAs identified in the Chesapeake Bay TMDL and the individual TMDLs and include cost estimates and a schedule for implementation. Restoration plans are developed pursuant to the following MDE guidance documents:

- *"Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated – Guidance for National Pollutant Discharge Elimination System Stormwater Permits" August 2014 and June 2020*
- *"General Guidance for Developing a Stormwater Wasteload Allocation (SW-WLA) Implementation Plan" May 2014*
- *"Guidance for Developing a Stormwater Wasteload Allocation Implementation Plan for Bacteria Total Maximum Daily Loads" May 2014*
- *"Guidance for Developing a Stormwater Wasteload Allocation Implementation Plan for Nutrient and Sediment Total Maximum Daily Loads" November 2014*
- *"MDE Recommendations for Addressing the PCB SW-WLA" 2015*

Described below are EPA-approved TMDLs for Anne Arundel County that have a SW-WLA, the status of each TMDL restoration plan and, as applicable, associated FY20 implementation progress. **Appendix I** contains individual TMDL restoration plans completed in FY20 and FY20 annual implementation assessment reports. MDE-approved TMDL restoration plans completed prior to FY20 can be found at https://aacounty.org/departments/public-works/wprp/watershed-assessment-and-planning/chesapeake-bay-tmdl/ .

The final date for meeting the Chesapeake Bay TMDL SW-WLA is 2025, as set by EPA. Anne Arundel County established final dates for meeting the SW-WLAs in the individual sediment and nutrient TMDLs, approved by EPA prior to FY19, as 2025 and 2030, respectively. Individual sediment TMDLs approved in FY19 have a target date of 2030 for meeting the SW-WLA. The target date, set by the County, for meeting the Baltimore Harbor & Curtis Bay/Creek PCB SW-WLA was originally set at 2025 to be consistent with the sediment TMDL target dates. However, due to the magnitude of required load reduction and the complexity of achieving PCB load

reductions, the County may revisit that target date with MDE. Lastly, and in light of these same concerns, the County established 2040 as the target date for achieving the Patuxent Watershed PCB TMDL.

***Chesapeake Bay Nitrogen, Phosphorus, and Sediment TMDL***

The Chesapeake Bay TMDL was approved on December 29, 2010 and applies to all of Anne Arundel County. Anne Arundel County's Phase II WIP serves as the restoration plan for the SW-WLAs for the impairments addressed by the Chesapeake Bay TMDL. Anne Arundel County's Phase II WIP can be found here:
https://mde.maryland.gov/programs/water/TMDL/TMDLImplementation/Pages/WIPPhaseIICountyDocuments.aspx

On September 15, 2011 MDE finalized its Phase II Load Allocations. Anne Arundel County's Phase I NPDES MS4 load allocations are set forth in Table 25.

**Table 25. Anne Arundel County (Non-Federal) Stormwater SW-WLA for the Bay TMDL***

| | Total Nitrogen (TN) (lbs/yr) | Total Phosphorus (TP) (lbs/yr) |
|---|---|---|
| 2009 Baseline | 657,383 | 56,531 |
| 2017 Interim Target | 511,963 | 38,062 |
| 2025 Final Target | 449,641 | 30,147 |

*Per Maryland's Phase II WIP, if TP is met, TSS target will be met.

**FY20 Progress:**

With the integration of 2-Year Milestone reporting into the NPDES MS4 annual reporting process, MDE is no longer requiring the submittal of 2-Year Milestone reports for documenting progress toward the Bay TMDL. Guidance provided by MDE's Integrated Water Planning Program (IWPP) rendered progress reporting of WIP milestones by MS4 Phase I jurisdictions optional. (MDE Correspondence 9/30/2019)

The County's progress toward meeting its Bay TMDL goals through FY20 is summarized below (Table 26, Figure 2). The pollutant load reductions are calculated for all completed restoration projects and County programs, using an in-house spreadsheet model. The model follows MDE's guidance document *Accounting for Stormwater Wasteload Allocation and Impervious Acres Treated; Guidance for National Pollutant Discharge Elimination System Stormwater Permits, August 2014* (MDE 2014), individual expert panel reports from CBP, and any communications with MDE that clarify or modify existing credit guidance.

**Table 26. Summary of Bay TMDL Pollutant Load Reductions for TN and TP in Anne Arundel County, MD through FY20**

| Pollutant | 2009 Baseline (lbs/yr) | 2025 Target (lbs/yr) | Required Reduction (lbs/yr) | Current Reduction (lbs) | % of Required Reduction Achieved through FY20 |
|---|---|---|---|---|---|
| TN | 657,383 | 449,641 | 207,742 | 40,510 | 19.5% |
| TP | 56,531 | 30,147 | 26,384 | 10,052 | 38.1% |
| TSS | 14,218,000 | 4,646,000 | 9,572,000 | 8,448,837 | 88.0% |

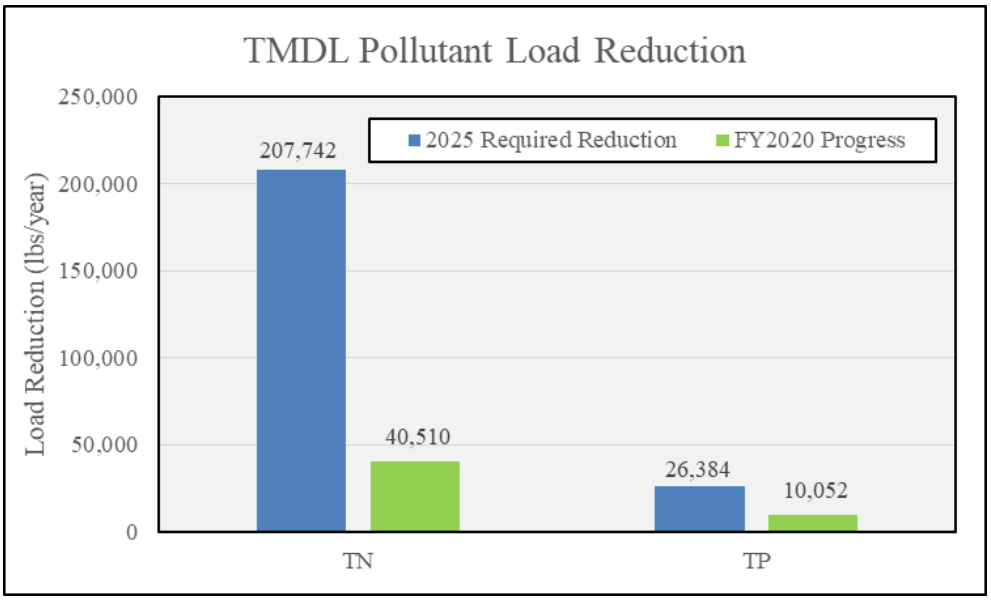


**Figure 2. Summary of Bay TMDL Pollutant Load Reductions for TN and TP in Anne Arundel County, MD through FY20**

***Individual Bacteria TMDLs***

There are currently nineteen (19) approved bacteria TMDLs associated with Anne Arundel County watersheds. Fecal coliform is the impairing pollutant for fifteen (15) of the TMDLs, while *E. coli* or *Enterococci* are identified as the impairing pollutant for the remaining four (4). Each of the TMDLs set forth a SW-WLA that is noted as a percent reduction in **Error! Reference source not found.** below.

**Table 27. Bacteria TMDLs for Anne Arundel County**

| Location | Approval Date | % Reduction Required* |
|---|---|---|
| Magothy River Mainstem | February 20, 2006 | 12.8 |
| Magothy River/Forked Creek | February 20, 2006 | 26.3 |
| Magothy River/Tar Cove | February 20, 2006 | 0.0 |
| Patapsco River/Furnace Creek | March 10, 2011 | 77.7 |
| Patapsco River Lower North Branch, 8 Digit WS 02130906 | December 3, 2009 | 20.7 |
| Patapsco River/Marley Creek | March 10, 2011 | 75.7 |
| Upper Patuxent River, Subsegment of 8 Digit WS 0213114 | August 9, 2011 | 22.3 |
| Rhode River/Bear Neck Creek | February 20, 2006 | 43.3 |
| Rhode River/Cadle Creek | February 20, 2006 | 72.2 |
| Severn River Mainstem, Subsegment of 8 Digit WS 02131002 | April 10, 2008 | 19.0 |
| Severn River/Mill Creek | April 10, 2008 | 86.0 |
| Severn River/Whitehall & Meredith Creeks | April 10, 2008 | 90.0 |
| South River/Duvall Creek | November 4, 2005 | 45.6 |
| South River, Subsegment of 8 Digit WS 02131003 | November 4, 2005 | 29.5 |
| South River/Ramsey Lake | November 4, 2005 | 59.3 |
| South River/Selby Bay | November 4, 2005 | 0.0 |
| W. Chesapeake Bay/Tracy & Rockhold Creeks | February 20, 2006 | 81.6 |
| West River, Subsegment of 8 Digit WS 02131004 | February 20, 2006 | 35.3 |
| West River/Parish Creek | February 20, 2006 | 53.1 |

*Based on the MDE published TMDL documents for bacteria impaired watersheds in Anne Arundel County and Anne Arundel County's *Total Maximum Daily Load Restoration Plan for Bacteria, February 2017.* Percent reductions required for the Patapsco and Upper Patuxent are for the Anne Arundel County portion only.

MDE identified four bacteria source categories in each of the 19 TMDLs: pet waste, wildlife, humans, and livestock. During the development of the TMDLs, MDE quantified the contribution for each of these source categories to the impaired waterbody. Among all 19 TMDL watersheds, the average percent contribution for each category was determined (Table 28).

**Table 28. Bacteria Source Categories and Contribution**

| Bacteria Source Category | Average % Contribution |
|---|---|
| Pet Waste | 46.0 |
| Wildlife | 34.5 |
| Human | 6.9 |
| Livestock | 12.6 |
| **TOTAL** | **100** |

Due to the number of bacteria TMDLs and because the four source categories were represented in all the impaired waterbodies, Anne Arundel County chose to develop a single consolidated implementation plan to address all 19 bacteria TMDLs. Anne Arundel County's Bacteria TMDL Restoration Plan is posted on the County's BWPR Bay TMDL webpage, under TMDL Restoration Plans, at www.aacounty.org/departments/public-works/wprp/watershed-assessment-and-planning/chesapeake-bay-tmdl/index.html .

**FY20 Progress:**

During this reporting year the County implemented a long-term bacteria trend monitoring strategy beginning in July 2019. The monitoring plan entails monthly sampling at twelve (12) sites within the Marley and Furnace Creek bacteria TMDL watersheds. The first year of monitoring data from this effort is reported in the County's *2020 Annual Bacteria TMDL Assessment* (**Appendix I**).

From July 2019 through October 2019 the County's Septic Task Force held meetings on a bi-weekly basis to develop the framework for a new septic connection program. In August 2019 a customer survey was distributed to County residents to gauge citizens' attitudes towards water quality and willingness to pay for a septic-to-sewer conversion program, with nearly 1,500 residents responding. A 2019 Septic Task Force Final Report was produced in April 2020. The 2019 Final Report, as well as Septic Task Force meeting minutes can be found at https://www.aacounty.org/departments/public-works/septic-task-force/.

Following upon the Septic Task Force efforts, the County's DPW developed and requested new legislation to allow septic system connections in eligible areas to be provided with a subsidy, and an option to defer a portion of their assessment. Eligible areas were defined to include areas in the Health Department's Onsite Wastewater Management Problem Areas, and locations within the Critical Area. Four separate pieces of legislation were passed between the end of 2019 and during 2020 to put the elements of the program into place.

In conjunction with the legislative changes, the "Our wAAter" initiative was developed to educate the public on strategies and efforts underway to reduce nutrient loads to Anne Arundel County waterways and the Chesapeake Bay. The new initiative incorporates five core elements: septic connections, small system upgrades, stormwater, groundwater resiliency, and wastewater treatment enhancements. A map showing the areas eligible for septic-to-sewer conversion can be found on the Our wAAter program site at https://www.aacounty.org/departments/public-works/ourwaater/index.html, clicking on the Septic-to-Sewer Connection Program page and scrolling to the bottom.

The County continued implementing Tier B (non-human source) recommendations during FY20 by continuing to educate citizens on the importance of riparian buffers. Anne Arundel County and the Maryland Department of Natural Resources (DNR) continue to provide support to the Anne Arundel County WSA which manages the Backyard Buffers program, providing landowners with free native trees and shrubs. The County has also partnered with WSA on a new tree planting initiative called "Replant Anne Arundel" to combat forest canopy loss. WSA programs resulted in the planting of 2,014 native trees and shrubs in FY20. Information on the Backyard Buffers and Replant Anne Arundel programs can be found on the WSA site at http://aawsa.org/

The County also continued the pet waste outreach program development. During the reporting year, the County hired a private consultant to develop pet waste outreach messaging to effect behavior change in regard to pet waste disposal. In conjunction with the outreach campaign, the County is conducting pre- and post-outreach surface water bacteria monitoring within the target communities. Pre-outreach monitoring began in October 2020, while community outreach is slated to begin in Spring 2021.

An evaluation of the Restoration Plan's implementation progress was completed in FY20 (*2020 Annual Bacteria TMDL Assessment)* and is included in **Appendix I**. The bacteria load reductions achieved from current implementation of the proposed Tier A and two Tier B restoration strategies were quantified using the Center for Watershed Protection's Watershed Treatment Model (WTM). Existing literature was used to evaluate load reduction progress associated with remaining Tier B strategies. Table 29 presents a summary of the County's progress toward achieving the SW-WLAs for Bacteria TMDLs.

**Table 29. Bacteria TMDL SW-WLAs Implementation Progress for Anne Arundel County**

| Watershed | SW-WLA | | Percent Reduction | |
|---|---|---|---|---|
| | Baseline | Target | Required | Reduction through FY20[1] |
| Magothy River Mainstem | $4.97x10^{12}$ | $4.33x10^{12}$ | 12.8% | 21.06% |
| Forked Creek | $1.83x10^{11}$ | $1.35x10^{11}$ | 26.3% | 3.36% |
| Tar Cove | $9.82x10^{11}$ | $2.07x10^{12}$ | 0.0% | 1.86% |
| Furnace Creek | $3.66x10^{12}$ | $8.14x10^{11}$ | 77.7% | 13.59% |
| Marley Creek | $6.19x10^{12}$ | $1.50x10^{12}$ | 75.7% | 16.56% |
| Patapsco Lower North Branch | $2.37x10^{15}$ | $1.99x10^{15}$ | 20.7% | 20.03% |
| Upper Patuxent River | $1.20x10^{16}$ | $6.01x10^{15}$ | 22.3% | 21.90% |
| Bear Neck Creek | $3.55x10^{11}$ | $2.01x10^{11}$ | 43.3% | 1.63% |
| Cadle Creek | $3.54x10^{11}$ | $9.85x10^{10}$ | 72.2% | 1.02% |
| Severn River Mainstem | $6.07x10^{12}$ | $4.92x10^{12}$ | 19.0% | 27.16% |
| Mill Creek (Severn River) | $1.78x10^{12}$ | $2.49x10^{11}$ | 86.0% | 5.53% |
| Whitehall & Meredith Creeks | $4.92x10^{11}$ | $4.92x10^{10}$ | 90.0% | 4.32% |
| South River Mainstem | $1.32x10^{13}$ | $9.31x10^{12}$ | 29.5% | 30.31% |
| Duvall Creek | $1.52x10^{11}$ | $8.27x10^{10}$ | 45.6% | 4.15% |
| Ramsey Lake | $5.57x10^{11}$ | $2.27x10^{11}$ | 59.3% | 0.27% |
| Selby Bay | $3.27x10^{11}$ | $3.57x10^{11}$ | 0.0% | 0.26% |
| Tracy & Rockhold Creeks | $1.67x10^{12}$ | $3.06x10^{11}$ | 81.6% | 10.38% |
| West River Mainstem | $1.77x10^{12}$ | $1.15x10^{12}$ | 35.3% | 13.82% |
| Parish Creek | $2.56x10^{11}$ | $1.20x10^{11}$ | 53.1% | 2.16% |

[1] Reductions from Tier A and Tier B strategies quantified using the modified WTM (elimination of household illicit connections, abatement of SSOs, retirement of OSDS, new BMP projects and BMP retrofits, and riparian buffer education).

**Comparison of FY19 and FY20 Modeling Results**

The FY19 load reduction progress previously reported was the modeled progress through the compliance year, 2025. Due to the availability of more granular data, the current modeled FY20 progress (Table 29) is the actual progress through FY20, rather than projections through FY25. Consequently, when comparing FY20 progress to previous years reporting there appear to be reductions in progress achieved. Observations regarding the modeling results are provided below:

- There was a net increase in the bacteria load reduction related to the retirement of County septic systems; however, while many watersheds saw an increase in load reduction, others saw a decrease compared to the previous year's reporting. The greatest increase was observed in Tracy and Rockhold Creeks, where the reductions from OSDS retirement increased by 2.4%. Conversely, the greatest decrease was observed in Mill Creek, where the reductions from OSDS retirement decreased by 0.63%. It is important to reiterate that the difference in reductions is due to the FY19 modeling using forecasted disconnections through FY25, whereas the FY20 modeling used actual implemented disconnections through FY20.

- The increase in the IDDE rate resulted in a slight increase in percent bacteria load reductions across all watersheds. The Severn River Mainstem watershed showed the greatest change with a 0.3 percent increase in bacteria load reductions.

- The percent bacteria load reductions in South River Mainstem watershed resulting from the implementation of urban stormwater management retrofits was slightly reduced in FY20 as well as FY25 projections, compared to previous years reporting, because the drainage area and impervious treated data for a large BMP project were revised. For bacteria reductions forecasted through FY25, several watersheds also saw a reduced percent bacteria load reduction due to a slight increase in the baseline load resulting from the IDDE survey. Magothy River/Forked Creek had the greatest change in percent bacteria load reduction resulting from urban stormwater management, with an increase of 2.19 percent. Tracy and Rockhold Creeks, South River/Ramsey Lake, South River/Selby Bay, West River and Rhode River/Cadle Creek, and West River and Rhode River/Parish Creek have no planned or completed urban stormwater management retrofits. For bacterial load reductions achieved through FY20, several watersheds saw large decreases compared to FY19 reporting, due to pending BMP implementation. The watersheds with the largest differences were Forked Creek, Furnace Creek, and Mill Creek, which have few or no projects implemented, but several awaiting construction.

- No new planned sewer pump station upgrades were implemented in FY20. A sewer line extension to connect a pump station was completed in the Severn River/Severn River Mainstem watershed in FY20, but this was a planned project and was accounted for in the FY19 progress modeling. However, due to the differences in modeling approaches, all watersheds saw a decrease in progress between the FY19 and FY20 modeling results.

Overall, a decrease in percent bacteria load reductions is apparent in most watersheds compared to FY19 annual progress modeling results ( Table 30). This is due to revisions made to the modeling approach for FY20, and the use of annual data, rather than forecasts through FY25.

However, as seen in Table 31**,** the projected progress through FY25 is in most cases greater than the modeled FY20 progress.

Detailed information on the WTM modeling, and the County's FY20 implementation progress, is documented in the previously referenced *2020 Annual Bacteria TMDL Assessment* found in **Appendix I**.

**Table 30. Comparison of Load Reductions for Proposed Strategies in Bacteria TMDL Watersheds, FY19 and FY20**

| Watershed | Urban SW BMP Projects (new and retrofits) (%) | | Elimination of Illicit Household Connections (%) | | Abatement of SSOs (%) | | Retirement of OSDS (%) | | Total Cumulative Reduction[1] (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | FY19 | FY20 | FY19 | FY20 | FY19 | FY20 | FY19 | FY20 | FY15-FY19 | FY15-FY20 |
| Magothy River Mainstem | 12.47 | 8.44 | 10.81 | 11.02 | 1.82 | 0.36 | 0.26 | 0.43 | 26.18 | 21.06 |
| Forked Creek | 8.84 | 0.00 | 1.39 | 1.43 | 6.20 | 0.00 | 0.11 | 0.20 | 18.28 | 3.36 |
| Tar Cove | 0.00 | 0.11 | 0.83 | 0.84 | 0.00 | 0.00 | 0.46 | 0.00 | 2.20 | 1.86 |
| Furnace Creek | 5.11 | 1.71 | 13.92 | 10.49 | 2.54 | 0.00 | 0.10 | 0.04 | 21.63 | 13.59 |
| Marley Creek | 7.63 | 1.30 | 10.29 | 13.53 | 2.29 | 0.00 | 0.07 | 0.28 | 19.09 | 16.56 |
| Patapsco Lower North Branch | 1.42 | 3.20 | 13.28 | 14.17 | 2.93 | 0.00 | 0.00 | 0.07 | 24.28 | 20.03 |
| Upper Patuxent River | 0.00 | 0.00 | 1.40 | 1.43 | 0.00 | 0.00 | 0.38 | 0.00 | 22.26 | 21.90 |
| Bear Neck Creek | 0.63 | 0.63 | 0.65 | 0.67 | 4.60 | 0.00 | 0.00 | 0.23 | 5.99 | 1.63 |
| Cadle Creek | 0.00 | 0.00 | 0.33 | 0.33 | 17.04 | 0.00 | 0.00 | 0.00 | 18.05 | 1.02 |
| Severn River Mainstem | 2.94 | 2.94 | 22.36 | 22.67 | 1.11 | 0.12 | 0.20 | 0.11 | 27.93 | 27.16 |
| Mill Creek (Severn River) | 6.84 | 1.11 | 1.90 | 1.94 | 0.00 | 0.00 | 0.00 | 0.00 | 11.83 | 5.53 |
| Whitehall & Meredith Creeks | 1.03 | 0.92 | 1.17 | 1.20 | 0.00 | 0.00 | 0.08 | 0.08 | 4.74 | 4.32 |
| South River Mainstem | 3.08 | 9.25 | 0.81 | 13.79 | 6.40 | 0.27 | 6.40 | 0.02 | 31.47 | 30.31 |
| Duvall Creek | 10.27 | 3.08 | 13.50 | 0.83 | 0.40 | 0.00 | 0.40 | 0.24 | 10.28 | 4.15 |
| Ramsey Lake | 0.00 | 0.00 | 0.14 | 0.14 | 0.00 | 0.00 | 0.00 | 0.00 | 0.26 | 0.27 |
| Selby Bay | 0.00 | 0.00 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.26 | 0.26 |
| Tracy & Rockhold Creeks | 0.00 | 0.00 | 0.30 | 0.30 | 0.22 | 0.00 | 0.22 | 2.41 | 8.19 | 10.38 |
| West River Mainstem | 0.08 | 0.08 | 1.71 | 1.76 | 2.00 | 0.00 | 2.00 | 0.16 | 15.63 | 13.82 |

| Watershed | Urban SW BMP Projects (new and retrofits) (%) | | Elimination of Illicit Household Connections (%) | | Abatement of SSOs (%) | | Retirement of OSDS (%) | | Total Cumulative Reduction[1] (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | FY19 | FY20 | FY19 | FY20 | FY19 | FY20 | FY19 | FY20 | FY15-FY19 | FY15-FY20 |
| Parish Creek | 0.00 | 0.00 | 0.24 | 0.24 | 12.90 | 0.00 | 12.90 | 1.50 | 13.59 | 2.16 |

[1] Total reduction percentages also include reductions attributed to Riparian Buffer Education. Reduction percentages for this strategy do not change from year to year, and are therefore not listed elsewhere on the table.

**Table 31. Comparison of Load Reductions Through FY20 (actual) and Through FY25 (forecasted)**

| Bacteria TMDL Watershed | Required Reduction | Total Cumulative Reduction through FY20[1] | Total Forecasted Reduction through FY25[1] |
|---|---|---|---|
| Magothy River Mainstem | 12.8 % | 21.06 % | 25.82 % |
| Forked Creek | 26.3 % | 3.36 % | 20.50% |
| Tar Cove | 0.0 % | 1.86 % | 2.32 % |
| Furnace Creek | 77.7 % | 13.59 % | 22.01 % |
| Marley Creek | 75.7 % | 16.56 % | 20.42 % |
| Patapsco Lower North Branch | 20.7 % | 20.03 % | 23.30 % |
| Upper Patuxent River | 22.3 % | 21.90 % | 22.29 % |
| Bear Neck Creek | 43.3 % | 1.63 % | 4.89 % |
| Cadle Creek | 72.2 % | 1.02 % | 18.05 % |
| Severn River Mainstem | 19.0 % | 27.16 % | 29.14 % |
| Mill Creek (Severn River) | 86.0 % | 5.53 % | 12.00 % |
| Whitehall & Meredith Creeks | 90.0 % | 4.32 % | 4.66 % |
| South River Mainstem | 29.5 % | 30.31 % | 31.68 % |
| Duvall Creek | 45.6 % | 4.15 % | 6.46 % |
| Ramsey Lake | 59.3 % | 0.27 % | 0.27 % |
| Selby Bay | 0.00 % | 0.26 % | 0.26 % |
| Tracy & Rockhold Creeks | 81.6 % | 10.38 % | 9.12 % |
| West River Mainstem | 35.3 % | 13.82 % | 21.66 % |
| Parish Creek | 53.1 % | 2.16 % | 7.13 % |

[1] Reductions from Tier A and Tier B strategies quantified using the modified WTM (elimination of household illicit connections, abatement of SSOs, retirement of OSDS, new BMP projects and BMP retrofits, and riparian buffer education).

### *FY20 Progress Modeling Methodology for Nutrient and Sediment TMDLs*

Baseline and FY20 Progress Loads and Reductions were determined using CAST, which calculates pollutant loads and reductions calibrated to the Chesapeake Bay Program Partnership

P6 Watershed Model. This is the second year that Anne Arundel County has used CAST for modeling annual assessment pollutant loads. In general, modeling conducted in previous years used BayFAST and MAST for the initial plans and annual assessments, however TMDL plans developed in the last two years have typically used CAST. It is anticipated that future modeling will be conducted using MDE's forthcoming spreadsheet model, which is currently under development, but is anticipated to be ready for use in FY21 modeling for total nitrogen (TN), total phosphorus (TP), and total suspended solids (TSS).

Local TMDL baseline loads were calibrated in CAST by modeling BMPs installed prior to the TMDL baseline year using a CAST Progress Scenario on top of baseline year land use background loads for the baseline year appropriate for that specific TMDL. BMPs are entered at the land-river segment scale in CAST. The target nutrient load for the MS4 stormwater sector (i.e., local TMDL SW-WLA) was calculated by multiplying the local TMDL target reduction percent with the CAST baseline load to first calculate the reduction target. This reduction target was then subtracted from the baseline load modeled in CAST to determine the TMDL load allocation.

Bay TMDL modeling is conducted at the edge-of-tide (EOT) scale. Local TMDLs were modeled at the edge-of-stream (EOS) scale, except for the Baltimore Harbor Nutrient TMDL, which is modeled at the edge-of-river (EOR) scale. Most of the County's local TMDLs are for impairments to the tributary streams and are therefore managed and modeled at the EOS scale. Others, like the Baltimore Harbor Nutrient TMDL are for an impairment in the receiving water and are managed and modeled at the EOR scale. A stream-to-river delivery factor (EOS to EOR) is available for each land-river segment of the Bay watershed and can be applied to the EOS loads to translate them to EOR. Rather than focusing on the loads to the small tributary streams of the watershed, the Baltimore Harbor Nutrient TMDL plan focuses on reducing the nutrient load to the Baltimore Harbor receiving water, so the EOR scale is more appropriate and was used for all the modeling analysis. The average Stream to River TN and TP delivery factor of the three land river segments within the Baltimore Harbor Watershed was applied to the final scenario load to translate EOS loads to EOR loads.

Pollutant load reductions achieved by stream restoration, shoreline restoration (used only in EOR scale TMDLs), and annual based maintenance efforts (e.g., street sweeping and inlet cleaning) are calculated outside of CAST following MDE's 2020 accounting guidance and Bay Program methods. Stream restoration and shoreline restoration projects were credited using project specific load reductions calculated using the Bay Program's Protocol method, when available, and default rates were used when protocol data was not available. Pollutant reduction credits for vacuum-assisted street sweeping were calculated by sweeping frequency based on the annual number of miles swept averaged over the span of the 5-year permit term. Pollutant reduction credits for inlet cleaning are calculated based on the annual aggregate load collected (organic and inorganic material) and averaged over the span of the 5-year permit term. All other BMPs were entered in CAST at the land river segment scale.

The Phase 6 Chesapeake Bay Program Model (P6) provides a separate load source for stream bed and bank loads, while the previous version of the Bay model (P5.3.2) included the stream loads implicitly into the upland load sources. The stream bed and bank load in P6 includes loads from

agriculture, natural, MS4, and non-regulated developed land areas, and therefore needs to be disaggregated for a single source sector, like MS4s.

The stream bed and bank load was disaggregated using calculations provided by the Chesapeake Bay Program using the same principals used by CAST to calculate the total stream bed and bank load. The calculations for TN, TP and TSS are as follows:

TN STB load = (Scenario EOS without STB TN / CAL EOS without STB TN) * STB base TN
TP STB load = (Scenario EOS without STB TP / CAL EOS without STB TP) * STB base TP
TSS STB load = ((Scenario EOS without STB TSS / CAL EOS without STB TSS) * STB base TSS) + (4/3 * Scenario Impervious TSS)

Where:
EOS = edge-of-stream
STB = stream bed and bank load source
TN = total nitrogen
TP = total phosphorus
TSS = Total Suspended Solids
CAL = calibration average

These equations are used to calculate the stream bed and bank load for a given scenario outside of CAST. Load reductions associated with stream restoration practices are applied directly to the stream bed and bank loads in CAST. As a result, stream restoration practices are modeled in a spreadsheet outside of CAST and the calculated load reductions are subtracted from the disaggregated stream bed and bank load to determine the total disaggregated stream bed and bank load for a given scenario (i.e., baseline, progress, planned).

To account for shoreline restoration BMPs for the Baltimore Harbor TMDL, which is modeled at the EOR scale, the baseline shoreline load from CAST was added to the baseline scenario load. This was done in a spreadsheet, after the EOS disaggregation and stream-to-river delivery factor was applied for each scenario.

***Individual Nutrient TMDLs***

The *"Total Maximum Daily Loads of Nitrogen and Phosphorus for the Baltimore Harbor in Anne Arundel, Baltimore, Carroll and Howard Counties and Baltimore City, Maryland,"* approved by EPA in 2007 and revised by MDE in August 2015, is currently the only individual nutrient TMDL applicable to Anne Arundel County. All other waterbodies listed as impaired for nitrogen and phosphorus are included in the 2010 Chesapeake Bay TMDL. Reductions in nitrogen and phosphorus loads for those waterbodies are addressed by Anne Arundel County's Phase II WIP, July 2012.

To assure that critical conditions are addressed, the TMDL establishes a growing season allocation (May 1 through October 31) as well as an average annual allocation. The water quality goal of

these TMDLs is to reduce excessive algal blooms that result in high chlorophyll *a* concentration, and maintain the dissolved oxygen concentrations at levels above the water quality criteria for the specific designated uses of the Baltimore Harbor.

**FY20 Progress:**

During FY20, the County continued to implement restoration projects to reduce nutrient loads to the Baltimore Harbor. A summary of nutrient baseline loads, TMDL allocations, required load reductions, and progress toward meeting the required load reductions through FY20 for Anne Arundel County's portion of the Baltimore Harbor is presented in Table 32.

**Table 32. Nutrient TMDL SW-WLA Implementation Progress for Baltimore Harbor (Anne Arundel County)**

| Watershed | SW-WLA (lbs/yr) | | | % Reduction Required | |
|---|---|---|---|---|---|
| | Baseline (1995) | Target | Current | Required | Reduction Through FY20 |
| Baltimore Harbor | Nitrogen | | | | |
| | 231,359 | 196,655 | 221,412 | 15% | 4.3% |
| | Phosphorus | | | | |
| | 14,062 | 11,953 | 13,150 | 15% | 6.5% |

***Sediment TMDLs***

EPA approved eight (8) individual sediment TMDLs for Anne Arundel County. The most recent sediment TMDL, Non-Tidal West River Watershed, was approved in April 2019. The eight (8) approved sediment TMDLs are listed in Table 33 along with their approval dates.

**Table 33. Sediment TMDLs in Anne Arundel County**

| Location | Approval Date |
|---|---|
| Little Patuxent River, 8 Digit WS 02131105 | September 30, 2011 |
| Upper Patuxent River, 8 Digit WS 02131104 | September 30, 2011 |
| Patapsco River Lower North Branch, 8 Digit WS 02130906 | September 30, 2011 |
| South River, 8 Digit WS 02131003 | September 28, 2017 |
| Other West Chesapeake, 8 Digit WS 02131005 | February 9, 2018 |
| Middle Patuxent River, 8 Digit WS 02131102 | July 2, 2018 |
| Lower Patuxent River, 8 Digit WS 02131101 | July 2, 2018 |
| West River, 8 Digit WS 02131004 | April 24, 2019 |

A description of the individual sediment TMDLs, including the NPDES MS4 regulated area baseline and target loads, and required load reduction follows.

## Little Patuxent River

The *Total Maximum Daily Load of Sediment in the Little Patuxent River Watershed, Howard, and Anne Arundel Counties, Maryland, September 30, 2011* presents the TMDL for sediment in the Little Patuxent Watershed as an average annual load to ensure the support of aquatic life. WLAs were calculated for NPDES regulated individual industrial, individual municipal, individual municipal separate storm sewer systems, general mineral mining, general industrial stormwater, and general MS4 permits in the Little Patuxent River Watershed. To attain the TMDL loading cap, reductions were only applied to the urban sediment sources, because urban land was identified as the only predominant controllable sediment source in the watershed.

FY20 progress toward meeting the SW-WLA is summarized in Table 34 below.

**Table 34. Sediment TMDL NPDES MS4 Regulated SW-WLA Implementation Progress (FY20) for the Little Patuxent River Watershed (Anne Arundel County)**

| Watershed | SW-WLA (lbs/year) | | | % Reduction Required | |
|---|---|---|---|---|---|
| | Baseline (2005) | Target | Current | Required | Reduction Through FY20 |
| Little Patuxent | 13,808,981 | 10,978,140 | 11,712,577 | 20.5% | 15.2% |

## Upper Patuxent River

The *Total Maximum Daily Load of Sediment in the Upper Patuxent River Watershed, Anne Arundel, Howard and Prince George's Counties, Maryland, September 30, 2011* presents the TMDL for sediment in the Upper Patuxent River Watershed as an average annual load to ensure the support of aquatic life. To attain the TMDL loading cap calculated for the watershed, reductions were applied equally to the predominant controllable sediment sources, which were identified as urban land, high till crops, low till crops, and hay. Since all urban land use in the Upper Patuxent Watershed is representative of all regulated stormwater sources, the NPDES SW-WLA is equivalent to the urban land use loads resulting from applying reductions to all the predominant land uses.

FY20 progress toward meeting Anne Arundel County's portion of the SW-WLA is presented in Table 35.

**Table 35. Sediment TMDL NPDES MS4 Regulated SW-WLA Implementation Progress (FY20) for the Upper Patuxent River Watershed (Anne Arundel County)**

| Watershed | SW-WLA (lbs/yr) | | | % Reduction Required | |
|---|---|---|---|---|---|
| | Baseline (2005) | Target | Current | Required | Reduction Through FY20 |
| Upper Patuxent | 10,925,666 | 9,680,140 | 10,510,375 | 11.4% | 3.8% |

**Patapsco River Lower North Branch**

The *Total Maximum Daily Load of Sediment in the Patapsco River Lower North Branch Watershed, Baltimore City and Baltimore County, Howard, Carroll and Anne Arundel Counties, Technical Memorandum: Significant Sediment Point Sources in the Patapsco River Lower North Branch, September 30, 2011* presents the TMDL for the Lower North Branch as an average annual load to ensure that there will be no sediment impacts affecting aquatic health.

FY20 progress toward meeting Anne Arundel County's portion of the SW-WLA is presented in Table 36.

**Table 36. Sediment TMDL NPDES MS4 Regulated SW-WLA Implementation Progress (FY20) for the Patapsco Lower North Branch Watershed (Anne Arundel County)**

| Watershed | SW-WLA (lbs/year) | | | % Reduction Required | |
|---|---|---|---|---|---|
| | Baseline (2005) | Target | Current | Required | Reduction Through FY20 |
| Patapsco LN Branch | 11,527,942 | 8,968,739 | 11,090,717 | 22.2% | 3.8% |

**South River**

The *Total Maximum Daily Load of Sediment in the Non-tidal South River Watershed, Anne Arundel County, Maryland*, approved on September 28, 2017, presents the TMDL for sediment in the South River Watershed as an annual average load to ensure the support of aquatic life. The NPDES regulated stormwater loads within the South River Watershed is expressed as an aggregate NPDES SW-WLA. The SW-WLA is based on reductions applied to the sediment load from the portion of the urban land-use in the watershed associated with the NPDES MS4 Permit.

FY20 progress toward meeting Anne Arundel County's SW-WLA is presented in Table 37.

**Table 37. Sediment TMDL NPDES MS4 Regulated SW-WLA Implementation Progress (FY20) for the South River Watershed**

| Watershed | SW-WLA (lbs/year) | | | % Reduction Required | |
|---|---|---|---|---|---|
| | Baseline (2009) | Target | Current | Required | Reduction Through FY20 |
| South River | 18,280,219 | 13,161,758 | 15,228,323 | 28% | 16.7% |

**Nontidal Other West Chesapeake Sediment**

The *Total Maximum Daily Load of Sediment in the Other West Chesapeake Watershed, Anne Arundel County and Calvert Counties, Maryland,* approved by EPA on February 9, 2018, presents

the sediment TMDL as an average annual load to ensure acceptable biological integrity in the watershed's streams.

FY20 progress toward meeting Anne Arundel County's SW-WLA is in Table 38.

**Table 38. Sediment TMDL SW-WLA Baseline Load and Load Reduction Required for Other West Chesapeake Watershed (Anne Arundel County)**

| Watershed | SW-WLA (lbs/yr) | | | % Reduction Required | |
|---|---|---|---|---|---|
| | Baseline (2009) | Target | Current | Required | Reduction Through FY20 |
| Other West Chesapeake | 8,186,442 | 5,484,916 | 8,135,710 | 33% | 0.6% |

**Middle Patuxent River and Lower Patuxent River**

The *Total Maximum Daily Load of Sediment in the Non-Tidal Patuxent River Middle Watershed, Anne Arundel, Calvert, and Prince George's Counties, Maryland, July 2, 2018* presents the TMDL for sediment in the Non-Tidal Middle Patuxent River Watershed as an average annual load to ensure acceptable biological integrity in the watershed's streams.

FY20 progress toward meeting Anne Arundel County's portion of the regulated SW-WLA for the Non-Tidal Middle Patuxent River Watershed is presented in Table 39.

**Table 39. Sediment TMDL SW-WLA Baseline Load and Load Reduction Required for the Non-Tidal Middle Patuxent River Watershed (Anne Arundel County)**

| Watershed | SW-WLA (lbs/yr) | | | % Reduction Required | |
|---|---|---|---|---|---|
| | Baseline (2009) | Target | Current | Required | Reduction Through FY20 |
| Nontidal Middle Patuxent River | 12,426,617 | 5,467,712 | 12,422,636 | 56% | 0% |

The *Total Maximum Daily Load of Sediment in the Non-Tidal Patuxent River Lower Watershed, Anne Arundel, Calvert, Charles, Prince George's and Saint Mary's Counties, Maryland, July 2, 2018* presents the TMDL for sediment in the Lower Non-Tidal Patuxent Watershed as an average annual load to ensure acceptable biological integrity in the watershed's streams.

FY20 progress toward meeting Anne Arundel County's portion of the regulated SW-WLA for the Non-Tidal Lower Patuxent River Watershed is presented in Table 40.

**Table 40. Sediment TMDL SW-WLA Baseline Load and Load Reduction Required for the Non-Tidal Lower Patuxent River Watershed (Anne Arundel County)**

| Watershed | SW-WLA (lbs/yr) | | | % Reduction Required | |
|---|---|---|---|---|---|
| | Baseline (2009) | Target | Current | Required | Reduction Through FY20 |
| Nontidal Lower Patuxent River | 1,708,554 | 666,336 | 1,708,529 | 61% | 0% |

**West River**

The *Total Maximum Daily Load of Sediment in the Non-Tidal West River Watershed, Anne Arundel County, Maryland, April 24, 2019* presents the West River Watershed sediment TMDL as an average annual load to ensure acceptable biological integrity in the watershed's streams with the objective of supporting the Use Class I designation. The regulated SW-WLA for the West River Watershed, and the required percent reduction, are presented in Table 41.

**Table 41. Sediment TMDL SW-WLA Baseline Load and Load Reduction Required for the West River Watershed**

| NPDES MS4 Regulated SW | Baseline Load (lbs/year) | SW-WLA (lbs/year) | %Reduction Required |
|---|---|---|---|
| Non-Tidal West River | 576,000 | 452,000 | 22% |

During FY20, Anne Arundel County developed a restoration plan to address this sediment SW-WLA. Due to the previously discussed concerns regarding modeling in the context of restoration plan development, the County developed this plan to include all necessary elements except for sediment load reduction modeling. As required by the County's MS4 Permit, the County submitted the restoration plan to MDE on April 17, 2020. When the sediment modeling methodology has been finalized, the restoration plan will be updated to include that component.

***Individual PCB TMDLs***

There are currently six (6) approved PCB TMDLs for Anne Arundel County. Table 42 provides information on the six TMDLs, their approval dates, and the required percent load reductions to achieve the SW-WLAs. Of these six, only the Baltimore Harbor and Curtis Creek/Bay and the Patuxent Mesohaline, Oligohaline and Tidal Fresh TMDLs have SW-WLAs.

**Table 42. PCB TMDLs for Anne Arundel County**

| Location | Approval Date | % Reduction Required |
|---|---|---|
| Subsegment of 8 Digit WS 02130903 | | |
| Baltimore Harbor | October 1, 2012 | 91.1% |
| Curtis Creek/Bay | | 93.5% |

| Location | Approval Date | % Reduction Required |
|---|---|---|
| Magothy River 8 Digit WS 02131001 | March 16, 2015 | 0 |
| Severn River 8 Digit WS 02131002 | July 19, 2016 | 0 |
| South River 8 Digit WS 02131003 | April 27, 2015 | 0 |
| West and Rhode Rivers 8 Digit WS 02131004 | January 8, 2016 | 0 |
| Patuxent Mesohaline, Oligohaline, Tidal Fresh PCB Segments 8 Digit WS 02131101 and 02131102 | September 19, 2017 | 99.9% |

Anne Arundel County focused its FY20 PCB restoration efforts on source tracking via monitoring. Pursuant to guidance provided by MDE (MDE Correspondence 8/10/2020), PCB progress modeling was not conducted in FY20. The following text documents the County's progress toward PCB source tracking for these two TMDLs. The remaining four individual PCB TMDLs are addressed, in this report, in a more summary manner.

**Sub Segment of 8-Digit WS 0230903/Baltimore Harbor and Curtis Creek/Bay**

The Maryland Department of Environment identified the Baltimore Harbor portion of the Patapsco River Mesohaline Tidal Chesapeake Bay Segment, and the Curtis Creek/Bay portion of that Segment, as individually impaired by PCBs in fish tissue and by PCBs in sediment as well as fish tissue, respectively. Both PCB impairments are addressed in the *Total Maximum Daily Loads of Polychlorinated Biphenyls in Baltimore Harbor, Curtis Creek/Bay, and Bear Creek Portions of Patapsco River Mesohaline Tidal Chesapeake Bay Segment, Maryland* which was approved by EPA on October 1, 2012. Because the Curtis Creek/Bay segment was individually identified as impaired for PCBs due to sediment data, in addition to the listed impairment for the entire Baltimore Harbor portion of the Bay Segment based on PCB fish tissue concentrations, there is spatial overlap between the PCB listings for this Bay Segment.

The PCB load to the Baltimore Harbor Embayment and Curtis Creek/Bay is primarily due to point and nonpoint source loads. Resuspension/diffusion from within the embayment and loading from the Chesapeake Bay mainstem may occur but is not considered to be a major source of PCBs to these TMDL watersheds. Moreover, modeling results indicate a likely net transport of PCBs out of the embayment and Curtis Creek. This PCB TMDL SW-WLA addresses only controllable sources (e.g., point and nonpoint sources) for load reduction implementation, and does not include resuspension or tidal influx from the Chesapeake Bay mainstem.

**FY20 Progress:**

In July, Anne Arundel County initiated PCB source tracking monitoring in the Sawmill Creek Watershed, geographically located within the Baltimore Harbor and Curtis Creek/Bay TMDL watershed, in collaboration with MDE's IWPP and the University of Baltimore County (UMBC). Passive samplers were deployed at 17 locations in the Sawmill Creek Watershed and at 2 reference site locations (Severn Run and Back River in Baltimore County) in September and will remain in place until the end of November 2020. Water column and sediment grab samples will be used to characterize potential sources of contamination in the watershed.

## Patuxent River Mesohaline, Oligohaline, and Tidal Fresh Chesapeake Bay Segments

The Maryland Department of the Environment identified the waters of the Patuxent River mesohaline, oligohaline, and tidal fresh segments as impaired by Polychlorinated Biphenyls (PCBs) in fish tissue. This impairment is addressed through the *Total Maximum Daily Loads of Polychlorinated Biphenyls in the Patuxent River Mesohaline, Oligohaline and Tidal Fresh Chesapeake Bay Segments, Maryland* which was approved by EPA on September 19, 2017. Although the transport of PCBs from bottom sediments to the water column through re-suspension and diffusion can be a major source of PCBs in estuarine systems, they were not considered a source within the framework of this TMDL which, as modeled, considers the exchange between the sediment and water column an internal load. Only external sources to the system are assigned a baseline load. The transport of PCBs into the Patuxent mesohaline tidal segment due to tidal influences from the Chesapeake Bay mainstem is the identified external source of PCBs to the system; however, this load contribution results from other point and nonpoint source inputs and is not considered to be a directly controllable source.

Responsibility for the Patuxent River Watershed PCB load reduction is divided among multiple contributing jurisdictions. Anne Arundel County has been assigned a SW-WLA for its portion of the Patuxent Tidal Fresh Segment (PAXTF).

### FY20 Progress:

MDE provided comments and approved Anne Arundel County's *Patuxent River Watershed PCB TMDL Restoration Plan* draft on November 5, 2019. In response to MDE's comments, Anne Arundel County revised the draft to include a revised PCB monitoring approach based upon MDE guidance and developed in collaboration with Howard County. The revised draft was submitted to MDE on August 31, 2020 (**Appendix I**). If MDE concurs with the approach presented, the County will move forward in a collaborative effort with Howard County to finalize the monitoring plan and initiate PCB monitoring in the watershed.

MDE has directed MS4 Phase I jurisdictions to focus restoration efforts on PCB source tracking in lieu of modeling PCB load reductions. Therefore, PCB modeling was not conducted by the County in FY20.

With respect to PCB remediation, previous MS4 Annual Reports noted that the County was exploring an opportunity to remediate PCBs in-situ in a stormwater detention pond located in the Severn River Watershed. During FY20 the County conducted PCB monitoring in the stormwater detention pond prior to remediating PCBs in the pond by amending the bottom sediments with activated carbon, PCB de-chlorinators and aerobic degraders. Remediation activities took place between June 2 and July 1. The final pre-remediation report was submitted to the County in September and is available upon request. Installation of passive samplers for post-remediation monitoring will occur in December. Samplers will remain in place until March 2021. Although the proposed site is not located within the Patuxent River Watershed it is anticipated that the findings will be applicable to watersheds that are assigned a PCB SW-WLA, including the Baltimore Harbor, Curtis Creek/Bay and the Patuxent River Watersheds.

**Individual PCB TMDLs with no SW-WLA**

As noted earlier, four individual PCB TMDLs applicable to Anne Arundel County do not have prescribed SW-WLA reduction requirements and, thus, individual restoration plans were not developed. Table 43 provides a summary of NPDES MS4 regulated PCB baseline loads, TMDL allocations, load reductions, and maximum daily loads for the Magothy, Severn, South, and Rhode/West River Watersheds as sourced from the documents listed below.

- *The Total Maximum Daily Load of Polychlorinated Biphenyls in the Magothy River Mesohaline Chesapeake Bay Tidal Segment, Anne Arundel County, Maryland. Document Version: February 12, 2015. EPA Approval Date: March 16, 2015*
- *Total Maximum Daily Load of Polychlorinated Biphenyls in the Severn River, Mesohaline Chesapeake Bay Tidal Segment, Anne Arundel County, Maryland. Document Version: July 2016. EPA Approval Date: July 19, 2016*
- *Total Maximum Daily Load of Polychlorinated Biphenyls in the South River Mesohaline Chesapeake Bay Tidal Segment, Anne Arundel County, Maryland. Document Version December 2014. EPA Approval Date: April 27, 2015*
- *Total Maximum Daily Load of Polychlorinated Biphenyls in the West and Rhode River Mesohaline Chesapeake Bay Tidal Segment, Anne Arundel County, Maryland. Document Version: December, 2015. EPA Approval Date: January 8, 2016*

**Table 43. PCB TMDL SW-WLA Baseline Loads and Load Reductions for Four Anne Arundel County Watershed Segments**

| Watershed | SW-WLA (g/year) | | | % Reduction Required | |
|---|---|---|---|---|---|
| | Baseline (2011) | Target | Current | Required | Reduction Through FY20 |
| Magothy River | 7.9 | 7.9 | N/A | 0.0 | N/A |
| Severn River | 21.5 | 21.5 | N/A | 0.0 | N/A |
| South River | 3.9 | 3.9 | N/A | 0.0 | N/A |
| West and Rhode Rivers | 1.6 | 1.6 | N/A | 0.0 | N/A |

Each of these four watersheds are identified as impaired for PCBs in fish tissue. The objective of each TMDL is to reduce the total PCB loads to the waterbodies such that water column and sediment PCB TMDL endpoint concentrations are achieved, and the designated uses (e.g., fishing) are supported. Per the EPA-approved TMDL documents, the PCB TMDL for each of these watersheds is achieved through the decline in PCB concentrations in the Bay and natural attenuation in sediments. Therefore, no reduction in PCB load is required to achieve the TMDL. The County understands the need to ensure that PCB loads from stormwater runoff will not increase over the baseline load. Although an increase in the baseline load is unlikely because the manufacture of PCBs has been banned since 1979, Anne Arundel County is prepared to investigate and identify remediation actions for any new sources of PCBs that may be identified in the future.

### *3. Nutrient Trading*

***Anne Arundel County may acquire total nitrogen (TN), total phosphorus (TP), and total suspended solids (TSS) credits, in accordance with the requirements of the Maryland Water Quality Trading and Offset Program, COMAR 26.08.11, to meet its twenty percent impervious surface area restoration requirement in this permit. The basis for an equivalent impervious acre restored through trading is the difference in pollutant loads between urban and forest stormwater runoff according to MDE's "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits" (MDE, 2014, or the most recent version). On an annual basis, until reissuance of this permit, the permittee shall report to the Department:***

***a. The cumulative impervious acres restored achieved through installation of BMPs during the permit compliance period;***
***b. The equivalent impervious acres restored achieved through credit acquisition during the permit compliance period; and***
***c. Documentation required to verify credits acquired and to be used for impervious surface restoration during the permit compliance period.***

**Status:**

Effective December 31, 2018, MDE modified the discharge permits for the six County WRFs to allow nutrient trading. In early 2019, the County submitted Discharge Monitoring Reports (DMRs) for the calendar year 2018 to MDE to confirm the nutrient credits generated and available for trading via the registry. MDE verified the County's documentation and then entered the credits in MDE's Water Quality Trading (WQT Register) on October 4, 2019. The letter from MDE to the County providing verification of available credits for trading and a copy of the State's Water Quality Trading (WQT) Register are found in Appendix I of the FY19 MS4 Annual Report.

The FY19 MS4 Geodatabase documented completed restoration and alternative BMP projects that restored the equivalent of 3,170 acres of impervious surface. This required the County to acquire 1,827 acres of restoration credit through nutrient trading at the end of FY19 to comply with the 20% impervious surface restoration in its MS4 permit (Table 44).

**Table 44. Impervious Restoration Credit Accounting, Including Acquired Nutrient Trading Credits, Demonstrating Attainment of the 20% ISR Goal for FY19**

| Category | Acres | Restoration Progress | Source |
|---|---|---|---|
| Total unmanaged impervious area | 24,981 | | 2018 Revised Baseline |
| 20% impervious surface restoration (ISR) goal | 4,996 | | 2018 Revised Baseline |

| Category | Acres | Restoration Progress | Source |
|---|---|---|---|
| Impervious area restored through FY19 through implementation of restoration and alternative BMPs | 3,170 | 12.7% | FY19 MS4 Geodatabase (see FY19 Annual Report and Geodatabase) |
| Available Equivalent Impervious Restoration Credits | 3,024 | | Nutrient Trading |
| Acquired Equivalent Impervious Restoration Credits | 1,827 | 7.3% | Nutrient Trading (see FY 19 Annual Report - **Appendix J**; only a portion of the credits generated were required for FY19 MS4 permit compliance) |
| **Total** | | **20.0%** | **20% ISR Attainment** |

In FY20, the County restored the equivalent of 1,595.2 acres of impervious surface. This acreage, combined with 234.4 acres of credit from older projects that were inadvertently omitted from the County's project inventory and the refinement of credit for several existing projects based on additional data, as described in **Part IV.E.2.a,** allowed the County to replace all 1,827 acres of restoration credit acquired through nutrient trading with credit earned through restoration or alternative BMP implementation. As of June 18, 2020 (FY20), the County has restored 4,999.1 acres of impervious surface (Table 45), meeting the 20% impervious surface restoration goal in its MS4 permit through BMP implementation.

The County is in compliance with its MS4 permit impervious surface restoration goal and, therefore, will not acquire restoration credit via nutrient trading with the County's WRFs in FY20.

**Table 45. Cumulative Impervious Surface Restoration Achieved Through Restoration and Alternative BMP Implementation Through FY20**

| Restoration Project | Impervious Acres Restored |
|---|---|
| Restoration BMPs | |
| - ESD | 18.1 |
| - structural | 1,163.8 |
| Alternative Restoration BMPs | |
| - street sweeping[1] (annual practice) | 168.9 |
| - impervious surface elimination | 0.5 |
| - reforestation | 1.5 |
| - catch basin and storm drain cleaning[1] (annual practice) | 69.8 |
| - stream restoration | 1,200.8 |
| - outfall stabilization | 38.3 |
| - shoreline management | 1,615.6 |
| - septic pumping[1] (annual practice) | 287.0 |

| Restoration Project | Impervious Acres Restored |
|---|---|
| - septic denitrification | 345.5 |
| - septic connections to WWTP | 89.3 |
| **Total** | **4,999.1** |

[1] For annual practices, Impervious Acres Restored is the average annual equivalent impervious treatment achieved, dating from the full implementation of the programs. Averages for street sweeping and septic pumping are based on FY16–FY18 implementation, and the average for catch basin cleaning is based on FY17–FY18 implementation.

### *4. Public Participation*

***Anne Arundel County shall provide continual outreach to the public regarding the development of its watershed assessments and restoration plans. Additionally, the County shall allow for public participation in the TMDL process, solicit input, and incorporate any relevant ideas and program improvements that can aid in achieving TMDLs and water quality standards. Anne Arundel County shall provide:***

***a. Notice in a local newspaper and the County's web site outlining how the public may obtain information on the development of watershed assessments and stormwater watershed restoration plans and opportunities for comment;***

***b. Procedures for providing copies of watershed assessments and stormwater watershed restoration plans to interested parties upon request;***

***c. A minimum 30 day comment period before finalizing watershed assessments and stormwater watershed restoration plans; and***

***d. A summary in each annual report of how the County addressed or will address any material comment received from the public.***

**Status:**

The County provides information on watershed assessments, TMDL restoration plans and environmental restoration projects via the County BWPR website (www.aarivers.org) as well as through its interactive online mapping application. As the comprehensive watershed assessments and TMDL restoration plans were completed, the documents were publicized for a 30-day comment period after which a summary of comments and County responses were incorporated into the final documents. The final associated study reports were published on the BWPR webpage and environmental concerns and recommendations were also published as GIS files via the interactive mapping application, as noted in **Part IV.E.1**.

As originally reported in the 2010 Annual Report, the County developed an interactive online mapping application to track restoration projects undertaken by non-County organizations such as the Watershed Stewards Academy, grassroots environmental preservation groups, and local Riverkeepers. The mapping application allows these organizations, and anyone with internet

access and interest, to open and view the many data layers that have resulted from the County's watershed assessments. Since 2010, the County has provided additional functionality by making changes to the overall look and feel of the application, and by moving it to the more robust Geocortex viewer. The mapping application can be accessed at: http://gis-world3.aacounty.org/HTML5Viewer/index.html?viewer=WPRP

No new TMDLs were approved by EPA during this reporting period. A restoration plan was developed by the County for the Non-Tidal West River Watershed Sediment TMDL approved by EPA on April 24, 2019. The draft plan, submitted to MDE on April 17, 2020, does not include load reduction modeling because the MDE sediment load calculator was not finalized and available to local jurisdictions for use. Completion of this draft plan is anticipated in 2021 and, when baseline and progress modeling are incorporated and the draft finalized, will be advertised for public comment.

The County recognizes the importance of public input into both watershed assessments and restoration plans and provides a minimum of 30 days for public comment on draft plans and reports. Draft documents are made available for review and/or download through the County webpage, and a minimum number of hard copy reports may also be made available on request. Prior to final acceptance, a summary of the comments received and County response are incorporated into each document.

***5. TMDL Compliance***

***Anne Arundel County shall evaluate and document its progress toward meeting all applicable stormwater WLAs included in EPA approved TMDLs. An annual TMDL assessment report with tables shall be submitted to MDE. This assessment shall include complete descriptions of the analytical methodology used to evaluate the effectiveness of the County's restoration plans and how these plans are working toward achieving compliance with EPA approved TMDLs. Anne Arundel County shall further provide:***

***a. Estimated net change in pollutant load reductions from all completed structural and nonstructural water quality improvement projects, enhanced stormwater management programs, and alternative stormwater control initiatives;***

***b. A comparison of the net change in pollutant load reductions detailed above with the established benchmarks, deadlines, and applicable stormwater WLAs;***

***c. Itemized costs for completed projects, programs, and initiatives to meet established pollutant reduction benchmarks and deadlines;***

***d. Cost estimates for completing all projects, programs, and alternatives necessary for meeting applicable stormwater WLAs; and***

***e. A description of a plan for implementing additional watershed restoration actions that can be enforced when benchmarks, deadlines, and applicable stormwater***

***WLAs are not being met or when projected funding is inadequate.***

**Status:**

During FY20, the County continued implementing the individual TMDL restoration plans previously submitted to and approved by MDE. Progress made during 2020 on these plans is documented in the individual Annual TMDL Implementation Assessment Reports found in **Appendix I**. Annual TMDL Assessment Reports submitted in **Appendix I** include

- 2020 Annual Bacteria TMDL Assessment;
- 2020 Annual Baltimore Harbor Watershed Nutrient TMDL Assessment;
- 2020 Annual Patapsco Lower North Branch Watershed Sediment TMDL Assessment;
- 2020 Annual Little Patuxent Watershed Sediment TMDL Assessment;
- 2020 Annual Upper Patuxent Watershed Sediment TMDL Assessment;
- 2020 Annual Middle and Lower Patuxent Watershed Sediment TMDL Assessment;
- 2020 Annual Nontidal Other West Chesapeake Watershed Sediment TMDL Assessment;
- 2020 Annual South River Watershed Sediment TMDL Assessment;
- 2020 Annual Baltimore Harbor and Curtis Creek/Bay PCB TMDL Assessment; and
- 2020 Annual Patuxent River Watershed PCB TMDL Assessment.

A summary of progress is presented in **Part IV.E.2b.** FY20 progress is also reported in the *LocalStormwaterWatershedAssessment* table of the MS4 Geodatabase **(Appendix A).** It should be noted that PCB modeling results are not included in this table as modeling was not required nor accomplished for FY20.

A draft of the Non-Tidal West River Sediment TDML Restoration Plan was submitted to MDE on April 17, 2020 as required by the County's MS4 permit. The Patuxent River Watershed PCB TMDL Restoration Plan was revised to address MDE's comments and to include a revised monitoring strategy. The revised plan was submitted to MDE on August 31, 2020.

As noted earlier, Anne Arundel County continues working collaboratively with MDE and various stakeholders within the County to implement the County's Phase II WIP, in support of the Chesapeake Bay TMDL WIP, to reduce the nutrient and sediment load within Anne Arundel County's portion of three major tributary basins (Lower Western Shore, Patuxent River, and Patapsco River). The County's progress (i.e., net change in load) for achieving the Bay TMDL SW-WLA is presented in **Part IV.E.2.b** of this report and documented in the *CountywideStormwaterWatershedAssessment* table of the MS4 Geodatabase (**Appendix A**). The *LocalStormwaterWatershedAssessment* table of the FY20 MS4 Geodatabase (**Appendix A**), as well as **Part IV.E.2.b** of this report, documents the load reduction summary for completed water quality improvement projects applicable to the County's local TMDLs. Specific itemized costs for the projects completed in FY20 are found in the FY20 MS4 Geodatabase in the *RestBMP*, *AltBMPPoint*, *AltBMPLine*, and *AltBMPPoly* feature classes. Costs associated with the restoration projects implemented by NGOs or other private entities are not provided.

The net pollutant load reductions associated with the County's cumulative stormwater management and restoration efforts, and the County's Chesapeake Bay TMDL SW-WLA are presented in **Part IV.E.2**. Any remaining reductions required to meet the SW-WLAs will be achieved through a blending of sector WLAs under the purview of Anne Arundel County. The cumulative cost of these restoration efforts is detailed in the County's FY2020 Financial Assurance Plan (FAP) submitted to MDE and appended to this FY20 Annual Report (**Appendix J**, *Narrative Files* table of the MS4 Geodatabase). The associated cumulative cost, as of FY20, was $81,436,134 (see FY2020 FAP, Spec Actions tab). The FY20 project specific costs are documented in the County's 2020 WPRP Annual Report (**Appendix K**, *NarrativeFiles* table of the MS4 Geodatabase) that is submitted concurrent with this FY20 Annual Report. Additional information on FY20 expenditures associated with restoration efforts is also found in the *FiscalAnalysis* table of the MS4 Geodatabase (**Appendix A**).

The County continues to work toward meeting the targeted SW-WLA goals. Currently there are 102 projects planned (design contract issued) or under construction that are expected to be completed in upcoming reporting cycles (e.g., FY21, FY22) as previously mentioned in **Part IV.C.6** of this report. Additional projects are proposed for restoration and will be included in the planned projects once a design contract is initiated.

**Part IV.E.5.e.** of this Permit requires the development of a plan for implementing additional watershed restoration actions when benchmarks, deadlines, and applicable SW-WLAs are not being met or when projected funding is inadequate. During the 2012 development of Maryland's Phase II WIP for the Chesapeake Bay, Anne Arundel County with the concurrence of the State of Maryland and EPA recognized the need for adaptive management in the WIP development and implementation process. As discussed in Maryland's Phase II WIP for The Chesapeake Bay, March 20, 2012, as implementation moves forward the achievement of SW-WLA goals needs to be evaluated and watershed restoration plans modified in response to the rate of progress, additional modeling results, and resource availability. The 2018 adoption of nutrient trading regulations by the State, and the subsequent modification of the County's permit on December 7, 2018 allowing cross sector trading as an adaptive management tool for achieving load reductions, is an integral component of adaptive management to ensure future progress. The County recognizes that nutrient trading provides temporary credit which must ultimately be replaced by restoration actions.

Anne Arundel County took a conservative approach when developing the urban stormwater component of its Phase II WIP. The County's strategy was structured to achieve the Edge of Stream (EOS) final target load derived from the County's Watershed Management Tool (WMT) baseline estimate which was higher than the MAST baseline estimates. In addition, the strategy included only restoration and preservation recommendations for the seven watersheds that were assessed when the County's Phase II WIP was developed in July 2012. Restoration opportunities for load reduction from the Little Patuxent, West and Rhode Rivers, Herring Bay and Middle Patuxent River Watersheds were not identified nor taken into account at that time. With these watershed assessments now complete opportunities for load reduction are being formulated into restoration projects and incorporated into the County's Capital Improvement Program (CIP) budget.

Further, Anne Arundel County adopted legislation in June 2013 to create a Watershed Protection and Restoration Program (WPRP) including a Stormwater Remediation Fee (Fee). The Fee is structured to provide sufficient funding for projects to meet the requirements of the County's MS4 Permit which also assists in meeting pollutant load reduction required by the Chesapeake Bay TMDL, EPA approved individual TMDLs with a SW-WLA, and to meet the impervious surface management requirements and other stormwater obligations set forth in the County's NPDES MS4 Permit.

Following the adoption of its Stormwater Remediation Fee, the County developed a 6-year Capital Improvement Program (CIP) in FY14 that created a Watershed Protection and Restoration Program (WPRP) Class of projects to implement those restoration projects identified in the County's Phase II WIP for achieving SW-WLAs. Projects in the WPRP Class were identified and prioritized through a planning level assessment and consist of restoration of ephemeral and perennial streams with a MBSS Maryland Physical Habitat Index (PHI) rating of severely degraded or degraded; implementation of stormwater/water quality treatment at currently untreated stormwater pipe outfalls (greater than 24 inches), and retrofit of stormwater management ponds built prior to 2002 (with drainage areas in excess of 10 acres) to optimize pollutant reduction and ecosystem functions for the facilities. As WPRP class projects are funded, a determination is made whether more detailed constructability assessments are needed. These assessments may result in identifying projects previously thought to be implementable but are not due to a variety of reasons, or identifying additional and new opportunities for load reduction. As these assessments are completed the County will incorporate these findings into its modeling, reassess anticipated load reductions, and adapt its implementation program to delete or add projects.

Adaptive management is a critical component of achieving the SW-WLAs required by the County's NPDES MS4 Permit. The Chesapeake Bay TMDL and individual approved TMDLs clearly established load reduction targets. Two-Year Implementation Milestones were established by the County to provide interim planning targets and to serve as a vehicle for assessing progress toward the Bay TMDL reduction targets. Likewise, the progress toward meeting local TMDLs is evaluated annually. Progress is measured through three approaches: tracking implementation of management measures, estimating load reductions through modeling, and tracking overall program success through long term monitoring. Planning targets are re-evaluated against progress and revised to ensure that Anne Arundel County is on track to meet its goals. In FY21 the County will initiate a critical review of progress toward achieving individual TMDL SW-WLA attainment. Where individual TMDL progress through FY20 and planned load reduction through programmed restoration activities and BMPs fail to achieve SW-WLAs, the County will begin developing an adaptive management plan that speaks specifically to the individual SW-WLAs not being achieved.

At this time multiple lines of evidence, including results of several model runs, monitoring data, and the most recent science on BMP effectiveness and water quality response, are evaluated as part of TMDL compliance assessment. The milestones and progress assessments contribute to continual reassessment of management plans, and adapting responses accordingly as technologies and efficiencies change, programs mature, credit trading is implemented, and regulations are put in place.

## *F. Assessment of Controls*

***Assessment of controls is critical for determining the effectiveness of the NPDES stormwater management program and progress toward improving water quality. The County shall use chemical, biological, and physical monitoring to assess watershed restoration efforts, document BMP effectiveness, or calibrate water quality models for showing progress toward meeting any applicable WLAs developed under EPA approved TMDLs identified above. Additionally, the County shall conduct physical stream monitoring to assess the implementation of the latest version of the 2000 Maryland Stormwater Design Manual. Specific monitoring requirements are described below.***

### *1. Watershed Restoration Assessment*

***The County shall continue monitoring the Parole Plaza outfall and Church Creek in-stream station in the South River watershed, or select and submit for MDE's approval a new watershed restoration project for monitoring. Monitoring activities shall occur where the cumulative effects of watershed restoration activities can be assessed. One outfall and an associated in-stream station, or other locations based on a study design approved by MDE, shall be monitored. The minimum criteria for chemical, biological, and physical monitoring are as follows:***

#### *a. Chemical Monitoring*

- ***i. Twelve storm events shall be monitored per year at each monitoring location with at least two occurring per quarter. Quarters shall be based on the calendar year. If extended dry weather periods occur, baseflow samples shall be taken at least once per month at the monitoring stations if flow is observed;***
- ***ii. Discrete samples of stormwater flow shall be collected at the monitoring stations using automated or manual sampling methods. Measurements of pH and water temperature shall be taken;***
- ***iii. At least three samples determined to be representative of each storm event shall be submitted to a laboratory for analysis according to methods listed in 40 CFR Part 136 and EMC shall be calculated for:***

| | |
|---|---|
| ***Biochemical Oxygen Demand ($BOD_5$)*** | ***Total Lead*** |
| ***Total Kjeldahl Nitrogen (TKN)*** | ***Total Copper*** |
| ***Nitrate plus Nitrite*** | ***Total Zinc*** |
| ***Total Suspended Solids*** | ***Total Phosphorus*** |
| ***Total Petroleum Hydrocarbons (TPH)*** | ***Hardness*** |
| ***E. coli or enterococcus*** | |

- ***iv. Continuous flow measurements shall be recorded at the in-stream monitoring station or other practical locations based on an approved study design. Data collected shall be used to estimate annual and seasonal pollutant loads and reductions, and for the calibration of watershed assessment models. Pollutant***

***load estimates shall be reported according to any EPA approved TMDL with a stormwater WLA.***

**Status:**

Anne Arundel County continues to conduct a long-term monitoring program to satisfy the above permit conditions. This monitoring program includes chemical, biological, and physical monitoring in the Church Creek subwatershed located in the South River Watershed. Monitoring for this permit reporting period extended from July 2019 through June 2020. The full Church Creek monitoring report can be found in **Appendix C** (*Chemical, Biological, and Physical Characterization of the Church Creek and Parole Plaza NPDES Monitoring Stations: 2019-2020*) and the data required to support this section are also provided in the *MonitoringSite* and *MonitoringDrainageArea* feature classes, and the *ChemicalMonitoring and BiologicalMonitoring* tables of the MS4 Geodatabase included in **Appendix A** in the prescribed format. Figure 3 shows the locations of chemical, biological, and physical monitoring sites/reaches, as well as the location of stream and pond restoration projects.

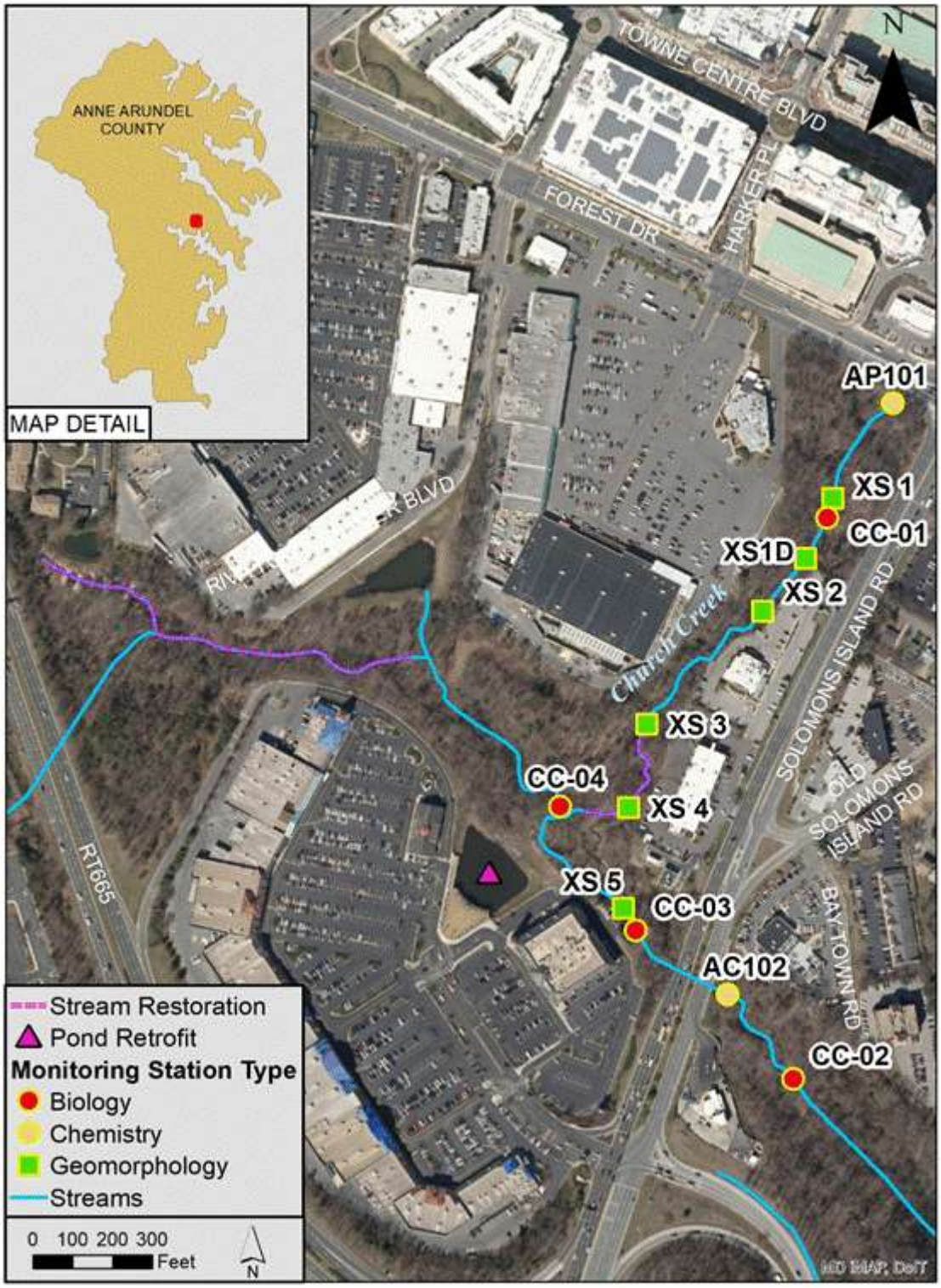


**Figure 3. Church Creek and Parole Plaza Study Area, Stream Monitoring Sites, and Approximate Stream Restoration Locations**

Chemical monitoring activities take place at two stations in the Church Creek subwatershed:

- Parole Plaza Station: Outfall representing highly impervious (78.5 percent) commercial land use which was redeveloped in 2007 as the Annapolis Towne Centre; the construction incorporated stormwater management into the redevelopment (i.e., a restoration station); and
- Church Creek Station: An instream station on the mainstem of Church Creek, approximately 500 feet downstream of the Parole Plaza Tributary confluence (69.2 percent impervious).

Located within the Church Creek subwatershed and upstream of the Church Creek Station and the Parole Plaza Tributary confluence, restoration of the Annapolis Harbor Center pond occurred during a prior reporting period (July through September 2017). This restoration involved draining the pond and excavating the bottom to provide additional storage; and construction of two forebays, a wetland berm, and aquatic benches all within the existing pond footprint. Prior to this pond retrofit work, the South River Federation (SRF), now Arundel Rivers Federation (ARF), completed 1,500 linear feet of stream restoration in the Church Creek reach upstream of the Harbor Center pond and the Church Creek sampling station. ARF and the Smithsonian Environmental Research Center (SERC) collaboratively monitored the restored stream reach to document changes in habitat as well as post-restoration in-stream nutrient processing. The County shared the continuous flow data and storm event water quality data from both MS4 monitoring stations with the researchers.

During the 2020 reporting period, nine storm events were sampled and four baseflow samples were collected and analyzed. The storm event samples were collected from both stations for the rising, peak, and falling limbs of the hydrograph. Samples were analyzed for the required parameters. Please see the monitoring report in **Appendix C**, and the *ChemicalMonitoring* table in the MS4 Geodatabase (**Appendix A**) for specific information related to each monitored storm event as well as the water quality analytical results. The FY20 dates for successful storm event and baseflow sampling are provided in Table 46.

**Table 46. Storm and Baseflow Sample Collection Dates for the Church Creek Monitoring Stations in FY20**

| Quarter | Date of Sampling | Sample Type |
|---|---|---|
| Summer Quarter 2019 | 7/11/19 | Storm |
| | 9/17/19 | Baseflow |
| | 9/26/19 | Baseflow |
| Fall Quarter 2019 | 10/16/19 | Storm |
| | 11/23/19 | Storm |
| | 12/27/19 | Baseflow |
| | 12/29/19 | Storm |
| Winter Quarter 2020 | 1/25/20 | Storm |
| | 3/13/20 | Storm |
| | 3/25/20 | Storm |
| Spring Quarter 2020 | 4/12/20 | Storm |
| | 6/11/20 | Storm |
| | 6/25/20 | Baseflow |

Four baseflow samples were collected in place of storm samples due to a low number of opportunities to sample qualifying events in three quarters of the monitoring period. Please see the monitoring report in **Appendix C**, and the *ChemicalMonitoring* table in **Appendix A**, for baseflow event information and water quality monitoring data.

- Summer Quarter 2019:
    - Consultant support field team sampled at baseflow conditions in the third week of September to complete a second sampling event for the summer period. Field teams had not monitored a storm in August due to little rainfall during that month, and forecasts did not predict a storm in the near future. The field team collected samples to document baseflow conditions at both stations on September 17, 2019.
    - Consultant support field team sampled at baseflow conditions in the final week of September, to complete a third sampling event for the summer period. Field teams had not monitored a storm in September due to continuing dry conditions and forecasts did not predict a storm for the remainder of the month. The field team collected samples to document baseflow conditions at both stations on September 26, 2019.

- Fall Quarter 2019:
    - Consultant support field team sampled at baseflow conditions in the final week of December to complete a third sampling event for the fall period. Field teams had not monitored a storm in December because storms were forecast to be longer than project requirements. The field team collected samples to document baseflow conditions at both stations on December 27, 2019.

- Spring Quarter 2020:
    - On June 25, 2020, the field team collected baseflow samples to complete a third sampling event for the spring period. At Parole Plaza, only the reinforced concrete

pipe (RCP) outfall exhibited flow; the field team documented a water level of 0.02 feet. Field teams measured 0.577 feet of water at the outfall at Church Creek.

Continuous water level measurements were taken at the Church Creek instream station and within both the 60-inch corrugated metal pipe (CMP) and the 54-inch RCP at the Parole Monitoring Station. Discharge was then determined using the rating curves developed for each monitoring location. Event Mean Concentrations (EMCs) for each measured water quality parameter were calculated for each event and applied to total stormflow discharges to calculate stormflow pollutant loads for each site. An EMC is a statistical parameter used to represent the flow-weighted average concentration of a given parameter during a storm event (U.S. EPA 2002). Total seasonal loads were calculated by multiplying the average seasonal EMC by the total volume for the season. Annual loads were calculated by summing all seasonal loads.

Overall, water chemistry data collected in 2020, except *E. coli*, continue to show general, gradually decreasing pollutant levels at the Parole Plaza outfall and in Church Creek, but at concentrations that continue to exceed surface water criteria for certain parameters.

During the 2020 monitoring year, annual average EMCs for just under half of the parameters - $BOD_5$, total phosphorus, TSS, lead, and hardness - were higher at Church Creek than at Parole Plaza. Annual average EMCs for total phosphorus, nitrate-nitrite, and *E. coli* exceeded their corresponding criteria at both stations. The EMCs for copper and zinc exceeded their criteria at Parole Plaza only (see Table 4-5, **Appendix C**).

Concentrations of phosphorus and combined nitrate and nitrite exceeded surface water criteria in 100% of wet weather samples collected at both Church Creek and Parole Plaza in 2020. *E. coli* concentrations exceeded the water quality criterion in 96 percent of samples at Church Creek and in 85 percent of samples at Parole Plaza. Percentage exceedances for copper, zinc, and $BOD_5$ were higher at Parole Plaza than at Church Creek (see Table 4-4, **Appendix C**).

At Church Creek, the seasons in which the highest pollutant loads occurred were fall, spring, and winter. Zinc, TSS, and hardness were higher in the winter; BOD, nitrate-nitrite, and *E. coli* were higher in the fall; and phosphorus, TKN, and copper were higher in the spring. At Parole Plaza, most parameters were at their highest during the spring except for *E. coli* and BOD, which were highest in Fall, and TSS, which was highest during the winter (see Table 4-8, **Appendix C**).

Annual loads at Church Creek exceeded those at Parole Plaza during 2020 for all parameters except *E. coli*. The mean annual loading rates for all parameters at the Parole Plaza station were lower during post-redevelopment (2009 to 2020) than pre-redevelopment (2002-2006). However, at the Church Creek station, all mean annual post-redevelopment parameters except for lead and *E. coli* (compared to fecal coliform) exceeded the mean annual pre-redevelopment loads, likely due to higher annual flow volume during the post-redevelopment period than the pre-redevelopment period (see Tables 4-6 and 4-7, **Appendix C**).

At Parole Plaza, annual pollutant concentrations in 2020 increased for most parameters (except for TPH, $BOD_5$, and *E. coli*) after three successive years of declining values (see Figures 4-1 to 4-5, Appendix C). Most average annual pollutant concentrations (except for TPH and *E. coli*) increased

at Church Creek in 2020 (see Figures 4-6 to 4-10, Appendix C). Annual EMCs for total phosphorus, lead, and TSS at Church Creek in 2020 were the highest since 2010 or earlier. Overall, the moderate downward trends in EMC values at both Parole Plaza and Church Creek since approximately 2006, except for *E. coli*, continue. The period after the most recent stream restoration (2016) and stormwater pond retrofit (2017) projects in the Church Creek subwatershed coincided with a temporary decline in pollutant concentrations in the 2017-2019 annual monitoring periods.

Reasons for the unexpected increase in average annual EMCs at Church Creek may include the following and could confound efforts to determine the cumulative benefits of restoration projects in the Church Creek subwatershed:

- Natural variability in pollutant deposition on impervious surfaces and other phenomena, such as frequency of rain (which would keep surfaces relatively cleaner or allow buildup of pollutants depending on frequency); or
- Disintegration of stormwater infrastructure (e.g., CMPs) due to age, which would promote leaching of metals from metal pipes (via storms at Parole Plaza outfalls, which form 42.7% of the impervious surface in the Church Creek subwatershed) and transport of suspended solids and other stored material from BMPs.

At Parole Plaza, average annual pollutant concentrations increased between 2019 and 2020 for most parameters, except for TPH, BOD5, and *E. coli*. All average annual pollutant concentrations increased at Church Creek in 2020 except for TPH and *E. coli*. Overall, there is a moderate downward trend in EMC values at Parole Plaza since approximately 2006, except for *E. coli*, which is trending upward. EMCs of parameters at Church Creek are trending in a similar fashion to Parole Plaza.

The short post-redevelopment/post-restoration assessment period (2017-2020) prevents any strong conclusions regarding positive trends in pollutant loading and concentrations, as measured at the Church Creek instream station, from being made at this time. As additional data are obtained, these trends will continue to be explored.

Again, further discussion of the monitoring activities at these stations and the resulting data can be found in **Appendix C** (*Chemical, Biological, and Physical Characterization of the Church Creek and Parole Plaza NPDES Monitoring Stations: 2019-2020*) and the *ChemicalMonitoring* table of the MS4 Geodatabase included in **Appendix A**.

***b. Biological Monitoring***

***i. Benthic macroinvertebrate samples shall be gathered each Spring between the outfall and in-stream stations or other practical locations based on an MDE approved study design; and***

***ii. The County shall use the EPA Rapid Bioassessment Protocols (RBP), Maryland Biological Stream Survey (MBSS), or other similar method approved by MDE.***

**Status:**

Four 75-meter biological monitoring reaches are positioned along Church Creek between the Annapolis Towne Centre (Parole Plaza) outfall station and the Church Creek in-stream water quality monitoring station. Benthic macroinvertebrate samples were collected from these stations in April 2020, following the MBSS spring index period protocols. Three sites were established and first monitored in 2006; one site is located on the Parole Plaza Tributary just below Forest Drive (CC-01), and two sites are located along the Church Creek mainstem, on either side of Solomons Island Road (Maryland State Highway 2), CC-02 is the downstream station and CC-03 is the upstream station. A fourth site, CC-04, is located just upstream of the confluence with the Parole Plaza Tributary and was added in 2007 to monitor the effects of runoff from the adjacent Annapolis Harbour Center and Festival at Riva shopping centers (see Figure 2-1, CC Report, **Appendix C** for site locations).

The biological condition at each station was evaluated using the BIBI developed for use in Maryland's Coastal Plain streams. The 2020 BIBI score narrative ratings at the Church Creek sites ranged from "Very Poor" at CC-01 to "Poor" at CC-02, CC-03, and CC-04. BIBI scores ranged from 1.86 and 2.71 indicating a highly impaired benthic macroinvertebrate community; however, BIBI scores increased across all stations from 2019 to 2020. BIBI ratings increased at stations CC-03 and CC-04 from "Very Poor" to "Poor", while BIBI ratings at CC-01 and CC-02 remained the same between 2019 and 2020. Since 2006, all stations have consistently been rated as either "Poor" or "Very Poor." Low BIBI scores can be explained by the lack of pollution-sensitive taxa (reflected in both the EPT taxa metric and the pollution intolerant taxa metric), as well as by generally low taxonomic diversity.

Physical habitat quality was evaluated using the MBSS Physical Habitat Index (PHI) and EPA Rapid Bioassessment Protocol (RBP). PHI scores increased at all four sites in 2020 but did not change any of the associated narrative ratings from those observed in 2019. RBP scores at three sites increased in 2020, however, shifting the associated narrative rating into a higher category than that observed in 2019 at two of these sites—CC-02 and CC-04—while CC-01 remained in the Non-supporting category; RBP score and narrative rating stayed the same at site CC-03 from 2019 to 2020. The RBP scores have generally been in the "Supporting" or "Partially Supporting" categories at all study reaches since reporting of these scores began in 2013, with the exception of CC-02 in 2015, 2018, 2019, and 2020 and CC-01 in 2019 and 2020, where narrative ratings were scored as "Non-Supporting". Overall, PHI and RBP scores indicate that habitat conditions may limit the potential for healthy biological communities. Increases in epifaunal substrate, pool substrate, and sedimentation scores were the driving factors in the increased narrative ratings between 2019 and 2020. Also, urban stressors such as hydrologic alteration (i.e., increased runoff, increased frequency of peak flows, reduced infiltration) within the watershed have resulted in a reduction of stable banks and marginal to suboptimal instream habitat, which may limit the capacity of the stream to support a diverse and healthy macroinvertebrate community. In addition, elevated conductivity levels reflect high levels of dissolved solids during baseflow conditions, which typically indicate the presence of water quality stressors. The results of the biological monitoring work are included in **Appendix C** (*Chemical, Biological, and Physical Characterization of the Church Creek and Parole Plaza NPDES Monitoring Stations: 2019-2020*) and the data required to support this section are also provided in the *MonitoringSite* and

*MonitoringDrainageArea* feature classes and the *BiologicalMonitoring* table of the MS4 Geodatabase in the prescribed format (**Appendix A**).

***c. Physical Monitoring***

***i. A geomorphologic stream assessment shall be conducted between the outfall and in-stream monitoring locations or in a reasonable area based on the approved study design. This assessment shall include an annual comparison of permanently monumented stream channel cross-sections and the stream profile;***

***ii. A stream habitat assessment shall be conducted using techniques defined by the EPA's RBP, MBSS, or other similar method approved by MDE; and***

***iii. A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.***

**Status:**

Due to the highly altered conditions of the drainage area and stream channel in the study area, reliable bankfull indicators can be difficult to locate in the field; thus, best professional judgment is often used to augment data interpretation and categorize the stream segments. Table 47 presents a summary of each reach and its classification for the past 7 years (for site locations, refer to Figure 3 in this document and Figure 2-1 in **Appendix C**).

**Table 47. Summary of the Physical Characterization Assessments for Cross Sections in the Church Creek Subwatershed**

| Reach | Classification by Year | | | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|
| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | |
| XS-1 | F4 | F5/4 | F4 | F4 | F4 | F4 | F5 | F5 | Channel degradation, loss of floodplain connectivity, and widening indicate this channel is not stable. |
| XS-1D | ND | ND | ND | ND | ND | ND | ND | C4 | Stable stream channel, moderate floodplain connectivity, slight entrenchment ratio, and moderate width/depth ratio. |
| XS-2 | G5c | G4c | G4 | G4c | G4c | G4c | G4c | G4c | Channel is widening, scouring, and is unstable, with increasing entrenchment ratio and low sinuosity. |
| XS-3 | G4c | G4c | G4/3c | G4c | G4c | G4c | G4c | G4c | This section was stabilized, with modification to the channel dimensions. |

| Reach | Classification by Year | | | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|
| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | |
| XS-4 | C5 | C5 | C5 | E5/4 | E4/5 | E4/5 | E5 | E4 | Channel affected by restoration just downstream. Entrenchment ratio increased, width-depth ratio decreased. |
| XS-5 | F4/3 | F3 | F4/3 | F4 | F4 | F4 | F4 | F4 | Slight entrenchment, moderate width/depth ratio, and low sinuosity. |

The Church Creek study area has a very high percentage of impervious surface (approximately 64 percent), and only one reach was classified as a C channel, which are generally considered stable stream types due to adequate floodplain connectivity. The only reach classified as a C channel was the newly established XS-1D in 2020, created to compare to previous classifications in reach XS-1 before it transitioned to a pool feature (see Section 3.4, page 3-7 of Appendix C). Four reaches were classified as either F or G channels, which are more entrenched and less stable. The most downstream reach of the Parole Plaza Tributary was classified as an E channel and maintains some limited connectivity to its floodplain even though there are significant stormwater inputs feeding into the stream, which typically result in accelerated channel erosion and degradation.

Bankfull channel dimensions (cross-sectional area, width, and depth) in the Church Creek study area showed departure from expected values, as derived from Maryland Coastal Plain regional relationships of bankfull channel geometry (McCandless 2003). Almost all dimensions were generally larger in the Church Creek study area and were often more similar to relationships of bankfull channel geometry derived from gaged urban watersheds located in the Coastal Plain (AADPW 2002). Values measured in 2020 were slightly higher than prior assessment results. This reflects the higher level of imperviousness in the study area, as compared to the lower impervious levels in the drainage areas used to develop the regional relationship data, suggesting the stream has enlarged as a result of high imperviousness and is both wider and deeper than the more stable channel forms (C and E-type channels) found in rural/suburban watersheds of the Coastal Plain.

Additional information and data pertinent to the water quality, biological, physical and habitat assessments of Church Creek are found in the full report in **Appendix C** (*Chemical, Biological, and Physical Characterization of the Church Creek and Parole Plaza NPDES Monitoring Stations: 2019-2020*).

***d. Annual Data Submittal***

***The County shall describe in detail its monitoring activities for the previous year and include the following:***

***i. EMCs submitted on MDE's long-term monitoring database as specified in Part V below;***

***ii. Chemical, biological, and physical monitoring results and a combined analysis for the approved monitoring locations; and***

***iii. Any requests and accompanying justifications for proposed modifications to the monitoring program.***

**Status:**

The County continues the monitoring program at the Church Creek and Parole Plaza monitoring stations. The required chemical monitoring results are found in the *ChemicalMonitoring* table, and the required biological monitoring results are found in the *BiologicalMonitoring* table, of the MS4 Geodatabase in the prescribed format (**Appendix A**). As there is no geodatabase table for the physical monitoring results, these data are presented in **Appendix C** (*Chemical, Biological, and Physical Characterization of the Church Creek and Parole Plaza NPDES Monitoring Stations: 2019-2020),* which also provides greater detail on the work performed in this watershed.

The County's ongoing, long-term monitoring (chemical, biological, and physical) will continue at these same locations for the duration of this administratively extended permit term or until the County successfully joins the available Pooled Monitoring Program option under the next generation NPDES MS4 Permit.

***2. Stormwater Management Assessment***

***The County shall continue monitoring the Picture Spring Branch in the Severn River watershed, or select and submit for MDE's approval a new watershed restoration project for determining the effectiveness of stormwater management practices for stream channel protection. Physical stream monitoring protocols shall include:***

***a. An annual stream profile and survey of permanently monumented cross-sections in Picture Spring Branch to evaluate channel stability;***

***b. A comparison of the annual stream profile and survey of the permanently monumented cross-sections with baseline conditions for assessing areas of aggradation and degradation; and***

***c. A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC- RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.***

**Status:**

Physical condition and habitat monitoring for Picture Spring Branch, located adjacent to the Odenton Regional Library (formerly called West County Library), began in 2003 and is conducted annually. Five permanent cross-sections were established throughout the study area to evaluate channel stability over time (see *Biological and Geomorphological Condition in the Picture Spring Branch Subwatershed, Severn River Watershed, Anne Arundel County, Maryland: 2019-2020* in **Appendix D** for a location map, Fig 2-1). Three of the five cross-sections are located on the North

Tributary, one is downstream of Maryland State Highway 170, and one is on the South Tributary. These cross-sections were re-measured and longitudinal profile surveys were conducted along both the North Tributary (totaling 1,968 linear feet) and South Tributary (totaling 356 linear feet). It should be noted that the South Tributary does not receive significant stormwater runoff from the Odenton Regional Library site. Most of the runoff from this site drains to the North Tributary, downstream of XS-1.

To compare changes over time, the cross-sectional area from 2011 through 2020 was calculated using the top of bank elevation from the baseline survey to standardize comparisons and reduce variability among more subjective bankfull elevation reference points, or even changes that can occur to top of bank elevations from year to year. As documented in prior years' reports, calculations prior to 2011 did not use this baseline reference elevation; instead, the corresponding year's top of bank elevation was used to calculate cross-sectional area. Consequently, these values are not directly comparable to the cross-sectional areas reported in 2011 through 2020. Comparison of baseline cross-section area is, however, comparable from 2011 through 2020 as all calculations are made using the same top of bank elevation.

Channel dimensions along the North Tributary have not changed substantially from baseline conditions, although some aggradation has occurred in the past six years (2014-2020). Channel dimensions appear relatively constant for three (XS-2, XS-3, and XS-5) out of the five cross-sections in 2020 compared to baseline conditions; the cross-sectional areas decreased by 5.3%, 8.8%, and 0.3%, respectively, since the beginning of the study in 2003. Larger increases in overall cross-sectional area at XS-1 (68.8%) and XS-4 (approximately 48.7%) have been observed over the same interval. Unlike the other stations, XS-1 and XS-4 are not located in an engineered or partially armored channel. Additionally, XS-1 is located upstream of the library site; as such, it does not receive stormwater runoff from this site. In examining changes in cross-sectional area since 2011, when calculations were standardized as discussed above, the changes in cross-sectional area decrease at each cross-section to much lower percentages. Cross-sections 1 and 4 still exhibit the greatest overall percent change using these standardized calculations; 11.3% and 21.5%, respectively (see Table 4-3, **Appendix D**).

Overall, it appears that the BMPs installed as part of the development of the Odenton Regional Library site have been effective in reducing the geophysical impacts of stormwater runoff. As noted previously, XS-1 on the North Tributary and the South Tributary (XS-4) do not receive significant amounts of drainage from the Odenton Regional Library site.

In April 2020, a benthic macroinvertebrate biological assessment was conducted at three previously established 75-meter reaches within the study area. Two sites were placed on the North Tributary, PSB01 and PSB02, and one site was placed downstream of the confluence with the South Tributary and below Piney Orchard Parkway (MD State Highway 170), PSB03.

From 2006 to 2008, biological condition in these reaches appeared to remain steady with ratings of "Fair" to "Poor"; however, during 2009 scores declined at all three sites with two of the sites rating "Poor" and one rating "Very Poor". Between 2010 and 2015, BIBI narrative ratings were somewhat variable, fluctuating between the "Poor" and "Fair" categories. Each site sampled in both 2016 and 2017 received narrative BIBI ratings of "Fair". In 2018, 2019, and 2020, the benthic

macroinvertebrate community at the site below Piney Orchard Parkway (PSB03) was rated as "Poor", while the other two sites received a "Fair" rating. Taxa diversity remained the same or slightly increased across all sites in 2020, and no Ephemeroptera taxa were found at any site during the 2020 sampling period.

Physical habitat was assessed at the same three benthic macroinvertebrate sampling reaches using the Maryland Physical Habitat Index (PHI) and EPA Rapid Bioassessment Protocol (RBP). The three Picture Spring Branch sites were given a narrative PHI rating of "Partially Degraded" in 2020. Although the narrative rating remained the same at these three stations, the PHI scores at all three sites decreased from 2019 scores. The stream physical habitat has remained largely characterized as Degraded or Partially Degraded at all study reaches since monitoring began in 2006, though a general trend in higher scores can be seen over time. The slight increase in scores since 2006 is primarily a result of improvements in the quality of epifaunal substrate and instream habitat. Physical habitat quality was also evaluated using the RBP and rated "Partially Supporting" for all three sites. Generally, the Picture Spring Branch sites had optimal or sub-optimal scores for channel flow status and channel alteration, and sub-optimal or marginal scores for bank stability, vegetative protection, and riparian zone width. The stream physical habitat has remained largely characterized as "Partially Supporting" or "Supporting" at all study reaches since monitoring began in 2013. The RBP ratings have remained largely similar over time; however, in 2020, one site (PSB01) saw a downgrade to "Partially Supporting" for the first time since 2013. The complete biological and geomorphological conditions report is found in **Appendix D** *(Biological and Geomorphological Conditions in the Picture Spring Branch Subwatershed: 2019-2020).*

### *G. Program Funding*

1. ***Annually, a fiscal analysis of the capital, operation, and maintenance expenditures necessary to comply with all conditions of this permit shall be submitted as required in Part IV.***

2. ***Adequate program funding to comply with all conditions of this permit shall be maintained.***

   **Status:**

This Annual Report covers the reporting period of July 2019 through June 2020, and corresponds to the County's 2020 Fiscal Year (FY20). The summary of funding and expenditures for FY20 is found in the *FiscalAnalyses* table of the MS4 Geodatabase (**Appendix A**). Table 48 provides the FY20 breakdown of expenditures by permit condition.

**Table 48. FY20 Fiscal Analysis (Operating and Capital Appropriations)**

| Permit Condition | Fiscal Year 2020 |
|---|---|
| Legal Authority | $0 |
| Source ID | $1,515,180 |
| SW Management | $1,251,267 |
| Erosion and Sediment Control | $63,107 |
| Illicit Discharge Detection and Elimination | $251,207 |
| Trash and Litter Control | $718,440 |
| Property Management | $9,774,095 |
| Inlet Cleaning | $593,314 |
| Street Sweeping | $395,345 |
| Other Road Maintenance | $0 |
| Public Education | $846,165 |
| Watershed Assessment | $192,647 |
| Watershed Restoration | $10,645,450 |
| Chemical Monitoring Assessment | $540,031 |
| Biological Monitoring Assessment | $1,014,947 |
| Physical Stream Assessment | $150,646 |
| Stormwater Design Manual Monitoring | $0 |
| TMDL Assessment | $940,122 |
| Annual Report Preparation | $79,218 |
| **Total Annual Cost for NPDES MS4 Program** | **$28,971,181** |

The WPRP Fund (Fund) was implemented July 1, 2013, in response to State legislated requirements found in Maryland Environmental Code Ann §4202.1 (2013). This Fund provides the primary fiscal support for all eligible components of the NPDES MS4 Permit program. Those MS4 permit-requirements not eligible for WPRP funding continue to be supported by the County's annual budget process (general revenue funds).

With the implementation of the Fund, a dedicated revenue source was created. These revenues for FY20 totaled $23,370.508. A total of 212,980 properties in Anne Arundel County were assessed the fee in FY20, which was the fifth year of the full fee implementation after the phase-in periods. In addition to the stormwater fee revenues, the Fund realized revenues from investment income as well as interfund recovery. Please refer to the FY20 WPRP Annual Report (**Appendix K**) for additional information. Estimated projections of revenue for FY21 are $23,656,081. These revenues fund the operating budget directly, and the CIP budget indirectly through debt repayment.

During the reporting period, funding for NPDES MS4 Permit compliance was addressed through the County CIP and operating budgets. CIP funding for the current County fiscal year and the next five fiscal years is allocated to the "Watershed Protection and Restoration" CIP project class. In prior reports, the County also noted CIP funding allocations to the "Stormwater Runoff Controls," "Water Quality Improvements" CIP project classes. The remaining funded projects in these two

project classes are nearing full implementation, and future projects will be budgeted from the Watershed Protection and Restoration project class.

Specific line items funded through the CIP include storm drain rehabilitation, closed storm drain repairs and replacement, stormwater infrastructure inspection and maintenance, stormwater facility retrofits, outfall repairs, and stream and ecological restoration projects. The Watershed Protection and Restoration CIP budgets for FY20 through FY25 total $96,416,600. The projected CIP budget for FY20 through FY25 increased over what was reported in FY19 due to the addition of a Permit Cycle 3 placeholder project. Additionally, during the FY21 budget cycle prior approved funding that was not already programmed into actual projects was cut from that fiscal year's Watershed Protection and Restoration CIP project class. This is reflected in the CAP_BUDGET field of the MS4 Geodatabase *FiscalAnalysis* table.

The Anne Arundel County operating budget for FY20 also provides permit compliance support through funding of personnel associated with permit compliance actions. Such support is derived primarily from the County's I&P, A A SCD, and DPW. Each of these agencies has responsibility or provides support for certain permit requirements and all must work collaboratively to achieve County compliance with permit terms. Additional funding for permit compliance has been included in the operating budgets for the WPRP Fund. Specific line items funded through the operating budget include chemical, biological, and physical stream assessments, public education, grants, and contracted street sweeping.

The complete FY20 and FY21 approved County budgets (operating and capital) are available for review and download at https://www.aacounty.org/departments/budget-office/index.html.

Submitted concurrent with this FY20 MS4 Annual Report is the County's FY20 WPRP Financial Assurance Plan (FAP) with Executive Summary and the approved County Council Resolution 4-21 (**Appendix J**). These documents demonstrate adequate program funding to comply with all conditions of this NPDES MS4 permit. The public hearing and Council vote approving Resolution 4-21 was held on February 1, 2021.

Lastly, with dedicated funding, increased staffing began in FY14. Delays due to proposed legislation changes initially slowed program implementation. At the end of FY20, staffing levels were at 87% and additional hiring will be accomplished in FY21. The increase in staffing continues to assist the County to achieve MS4 permit and TMDL compliance.

## *H. References*


Anne Arundel County Department of Public Works (AADPW). 2002. Cypress Creek Tributary Assessment and Findings Report. Prepared by Bayland Consultants and Designers, Inc., and Clear Creek Consulting. 32 pp., plus Appendices.

Maryland Department of the Environment (MDE). 1997. Dry Weather Flow and Illicit Discharges in Maryland Storm Drain Systems.

Maryland Department of the Environment (MDE). 2009. 2000 Maryland Stormwater Design Manual, Volumes I & II. Revised May 2009. Prepared by the Center for Watershed Protection, Ellicott City, MD, for the Maryland Department of the Environment, Baltimore, MD.

Maryland Department of the Environment (MDE). 2014. Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated: Guidance for National Pollutant Discharge Elimination System Stormwater Permits. Baltimore, MD.

Maryland Department of the Environment (MDE). 2017. National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4), Geodatabase Design and User's Guide. Version 1.2. Revised May 2017. Prepared by MDE and Maryland Environmental Service (MES) for Environmental Protection Agency (EPA) Chesapeake Bay Regulatory and Accountability Program (CBRAP). Baltimore, MD.

Maryland Department of the Environment (MDE). 2020. Accounting for Stormwater Wasteload Allocation and Impervious Acres Treated; Guidance for National Pollutant Discharge Elimination System Stormwater Permits; June 3, 2020. Baltimore, MD. *https://mde.maryland.gov/programs/water/StormwaterManagementProgram/Documents/2020%20MS4%20Accounting%20Guidance.pdf*

McCandless, T.L. 2003. *Maryland stream survey: Bankfull discharge and channel characteristics of streams in the Coastal Plain hydrologic region*. U.S. Fish and Wildlife Service, Annapolis, MD. CBFO-S03-02.

U.S. EPA. United States Environmental Protection Agency. 2002. *Urban Stormwater BMP Performance Monitoring: A Guidance Manual for Meeting the National Stormwater BMP Database Requirements*. EPA-821-B-02-001.